MIROS

MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH

BOOK OF ABSTRACTS

2021

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CONTENTS

MIROS Book of Abstracts 2021

This book compiles and lists the reports published by MIROS in 2021. 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 (MIROS)

Established on 3rd January 2007, MIROS is a one-stop centre for the generation 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 2021 are available in this book of abstracts.

VISION

To emerge as the world leader in road safety research

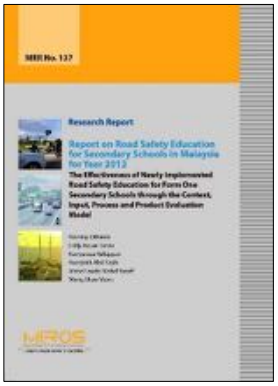
MISSION

To foster the science and arts of road safety interventions

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. 137



Report on Road Safety Education for Secondary Schools in Malaysia for Year 2012: The Effectiveness of Newly Implemented Road Safety Education for Form One Secondary Schools through Context, Input, Process and Product Evaluation Model: Input and Process Evaluations

Author(s) : Norainy Othman, Eddy Azuan Senin, Kaviyarasu Yellappan, Nurajirah Abd Najib, Mohd Faudzi Mohd Yusoff, Wong Shaw Voon

ISBN : 978-967-2988-02-1

This report is in respect of the evaluation of the Road Safety Education Programme (RSE Programme or Programme) for students introduced at all national-type secondary schools throughout Malaysia, which commenced with Form One students in 2012. This evaluation covered not just the outcome but also the implementation of the programme. It was therefore of wider scope than the evaluation of the RSE Programme for all primary schools, which only used outcomes as the measurement for effectiveness. This present evaluation utilises the context, input process and product (CIPP) model which evaluates the RSE Programme's implementation through context, input, and process domains, while the product domain is covered by outcome evaluation.

The context evaluation findings revealed that the students felt there was a need for an RSE Programme. The teachers reported highly positive perceptions of the importance, benefits, and the ability of RSE to enhance road safety. All schools involved in this study had received the learning materials for the year 2012. However, the implementation of the supporting programmes were not fully carried out. In respect of pedestrian facilities, 66.7% of the schools that were evaluated had crossing facilities, with only 42.9% of schools are equipped with a zebra crossings, and the remaining 23.8% with pedestrian bridges. Pedestrian lanes, however, were only available at 61.6% of the schools studied.

Moreover, the input evaluation discovered that 38% had no formal RSE training. However, more than 50% of the teachers had high understanding of RSE and 27% recorded high skills in teaching the RSE module but almost 80% had the confidence to teach the RSE. 44.5% of the teachers' had high school support to implement RSE. Teachers' without policy constraint to implement RSE were 37%

but teachers' with implementation constraint were only 2.4%. RSE training for teachers did not yield significant contribution towards teachers' RSE understanding and teaching skills. However, school support, teachers' confidence and teaching constraint were among factors that contributed significantly towards RSE implementation. In addition, teachers with higher RSE understanding and RSE teaching skills tended to have more confidence while teaching the Form One RSE module.

Furthermore, the process evaluation found that almost 68% of teachers had implemented the Form One RSE module. The increase in the workload of Form One Bahasa Melayu teachers, delay in the delivery of RSE kits and module to schools, and communication breakdown among teachers and school management were the reasons for the failure to complete the RSE module. The two (2) top excuses given by the teachers for non-implementation of RSE module are "late receipt of module" and "non-receipt of module". Most of the teachers took approximately three (3) months to implement the Form One RSE module.

Finally, product evaluations found that all of the three (3) psychological constructs that were measured, namely attitude, subjective norms and intentions, were consistently stable within a reasonable pattern of increase among the respondents. RSE is partially effective in encouraging the intention to practice the knowledge gained by the students. The students had high road safety knowledge even before the implementation of the RSE module and indicated less intention to practice the road safety measures. The rate of usage of seatbelts and crash helmets amongst students had also improved. This might be an indication that implementation of the RSE module were somewhat successful. The study also revealed that there was a spill-over effect of RSE from teenagers to their parents. The increase in willingness to pay (WTP) among parents of teenagers in the intervention group compared to that of the control is the result of the positive effect of RSE.

Relatively, CIPP evaluation provided a good insight of RSE implementation. As a whole, CIPP did not merely measure the RSE outcome alone to gauge the effectiveness of RSE but had also helped to measure the strengths and weaknesses of RSE implementation as well. Nevertheless, CIPP could be considered a

suitable model to evaluate the RSE implementation. There is more room for improvements to enhance the evaluation of RSE through CIPP model in future.

MRR No. 141

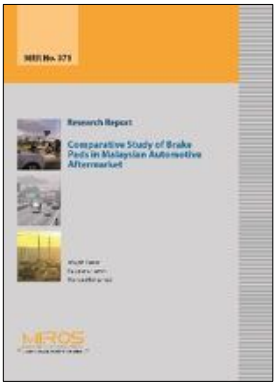
Report on Road Safety Education for Secondary Schools in Malaysia for Year 2012: The Effectiveness of Newly Implemented Road Safety Education for Form One Secondary Schools through the Context, Input, Process and Product Evaluation Model

Author(s) : Eddy Azuan Senin, Kaviyarasu Yellappan, Nurulhana Borhan, Mohd Faudzi Mohd Yusof

ISBN : 978-967-2988-03-8

The purpose of this study is to determine the supporting factors towards effective implementation of Form One RSE module implementation focusing on six (6) variables namely teachers' understanding of RSE, teachers' RSE teaching skills, teachers' confidence, school support in RSE implementation, teaching constraint: RSE policy and teaching constraint: RSE implementation (process domain). For input domain of evaluation, it seeks to ascertain the association among the teachers' understanding, teachers' skill and teachers' confidence. It also seeks to determine the effect of teachers' training towards teachers' knowledge and skill. This study is based mainly on the primary data collected through a survey conducted on 375 teachers who taught Bahasa Melayu subject to Form One students in secondary schools in 2012. A total of 120 schools from six (6) districts representing Malaysia were visited for data collection. Statistical tools, using SPSS V.17, namely descriptive statistics, factor analysis, correlation analysis and binary logistic regression analysis were employed to analyse the data set. Distributions were also established for the variables. Teachers' understanding of RSE, teachers' RSE skill, teachers' confidence, school support, and teaching constraints were found to be the influencing factors towards effective implementation of Form One RSE module. The study reveals an association among teachers' knowledge, teachers' skill and teachers' confidence. Training's contribution towards teachers' understanding and teacher's skill were found to be insignificant.

MRR No. 371



Comparative Study of Brake Pads in Malaysian Automotive Aftermarket

Author(s) : Afiqah Omar, Fauziana Lamin, Norlen Mohamed
ISBN : 978-967-2988-04-5

Friction material requires in depth research to meet the safety standards and requirements during braking, yet must be produced at reasonable cost. Brake pads are one of the most important friction functional materials in the automotive brake system and requires to be changed on time due to wear. As part of composite materials, brake pads are made of different material combinations. Commonly, the main constituents used in commercial brake pads are frictional additives, filler, binder and reinforcing fibre. Each constituent plays important roles in ensuring the brake pads are intact together and function properly. Among the ingredients currently available, the reinforcing fibres play a crucial role in determining the friction characteristics.

The variety of brake pad brands in the market present the customers with many options at various price points. Aftermarket brake pads can vary from as low as RM25 to RM300, depending on the model of the vehicle. This report highlights the variation of aftermarket brake pads price in Malaysian market. The study focuses on the selection of front brake pads used in passenger vehicles, specifically brake pads used in Proton Wira, as 25.8% of the car models were involved in fatal crashes, based on MIROS investigated crash cases. For microstructural study, 13 brake pads of low or semi metallic types were collected. The elemental compositions of the brake pads were studied using Energy Dispersive X-ray (EDX).

From the results, there was no standardised or controlled prices that can represent the majority of commercial brake pads exist in the market. In order to substitute asbestos in brake pads, a multitude of different brake pads with their own unique composition can be found in the market. Cost minimisation of brake pads is achieved by blending more expensive substitutes with cheaper but less effective materials. However, significant costs to produce brake lining are still increasing, and affect the selling price of commercial brake pads. Section 4 discusses the constituents

used in the brake pads categorised by price. The composition might be slightly different between the frictional and lateral surface.
From the sample studies, the weight percentage of fibre does not affect the price of brake pads. Expensive brake pads do not necessarily contain the highest fibre content. Metal is widely used due to high density, hardness and good thermal conductivity. The huge price variation from one brand to another may need to be further studied in order to ensure customers are satisfied with the price and quality of the parts.

MRR No. 372

Heavy Commercial Goods Vehicle Crashes in Malaysia

Author(s) : Ahmad Noor Syukri Zainal Abidin, Sharifah Allyana Syed Mohamed Rahim, Fauziana Lamin, Abdul Rahmat Abdul Manap, Norlen Mohamed
ISBN : 978-967-2988-05-2

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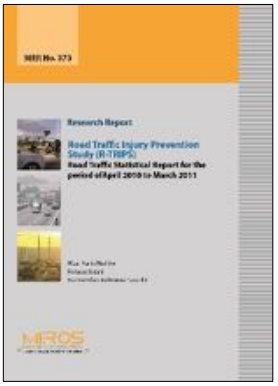
MRR No. 373



Road Traffic Injury Prevention Study (R-TRIPS) Road Traffic Statistical Report for the Period of April 2010 to March 2011

Author(s) : Hizal Hanis Hashim, Rohayu Sarani, Nur Fazzillah Mohamed Noordin

ISBN : 978-967-2988-06-9

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

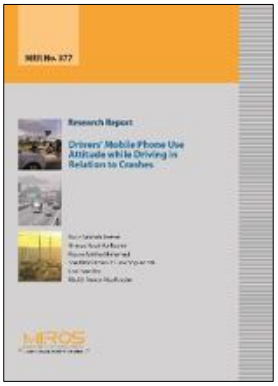
The general objectives of the study are:

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

The specific aims of the study are:

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

MRR No. 377



Drivers' Mobile Phone Use Attitude while Driving in Relation to Crashes

Author(s) : Nuur Sakinah Azman, Ahmad Azad Ab Rashid, Nuura Addina Mohamad, Sharifah Osman @ Liew Shyuan Yei, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : -

This study aims to understand drivers' mobile phone use attitude while driving in relation to crashes. The survey method was used in this study and the items were based on the "attitude" component and the "intention" component of the Theory of Planned Behaviour. A total of 345 respondents from around Klang Valley participated in this study. The findings of this study showed that the respondents of the study did not have a favourable attitude towards the use of mobile phone while driving although they would use their mobile phone while driving if they have the intention to do so. Potential explanations of the results are offered in the discussion section. There were no significant differences found between the drivers' mobile phone use attitude while driving and road crash involvement. However, three (3) significant differences were found under the "intention" component, which is between "I will use my mobile phone while driving" and crash involvement, "I intend on using my mobile phone while driving" and crash involvement and the overall "intention" construct with road crash involvement.

MRR No. 378

Automotive Consumerism: Exploring Car User's Ownership Experience via Motoring Online Portal

Author(s) : Zulhaidi Mohd Jawi, Mohd Syazwan Solah, Ahmad Azad Ab Rashid, Muhamad Arif Fahmi Abdul Wahab, Mohd Hafzi Md Isa, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-07-6

This study is primarily an exploratory approach by the authors with two (2) layers of the exploratory element; the authors were interested to know whether the information shared by netizens these days has the credential to be used as reliable data, and the authors would like to expand the knowledge on automotive consumerism. The former is about to respond to the growth of big data growth in local context, and the latter will enrich the current database collected using the traditional paper-and-pencil survey, with the expectation to also include the owners of luxury car segment who are hard to obtain. The findings in this report only covered the quantitative part of the data, and the qualitative will be analysed later in the near future. As per the results gained from the quantitative data analysis, it can be said that the information retrieved from CarBase.my portal has the potential to be a credible reference. This study also provides other notable findings such as the tendency of owners to give more credit to their cars as compared to experts' views, and the data from this study further strengthen the argument that car owners in this country are "somewhat emotionally attached" to their cars.

MRR No. 379

Overview of Tyre Ecosystem in Malaysia

Author(s) : Ahmad Noor Syukri Zainal Abidin, Kak D-Wing, Afiqah Omar, Tan Choon Yeap, Muhammad Arif Fahmi Abdul Wahab, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-08-3

Issues related to tyre failure particularly retread tyres as a contributing factor in road crashes often been highlighted by local media. However, in order to provide recommendations that are more comprehensive to the entire spectrum of the tyre usage and industry in Malaysia, loopholes in the current tyre ecosystem need to be identified and thorough understanding of the ecosystem is required. Thus, this study was conducted to establish the knowledge on current situation pertaining to tyre ecosystem in Malaysia. The scope of the study is divided into five (5) processes starting from the production of the tyres until processes involving disposal and scraping. The study looks into each process and the stakeholders involved in each scope within the ecosystem and from that onwards, current and potential gaps were identified and recommendations to improve the identified issues were put forward. To enable a clearer explanation of the issues found and the proposed recommendations, the findings were tabulated separated according to each phase. The findings from this study are expected to provide useful insight into the current tyre ecosystem in the country.

MRR No. 381

Identification of Crash Determinants Involving Students at School Area in Selangor

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

ISBN : 978-967-2988-09-0

Half of the world's road traffic deaths involving the vulnerable road users—pedestrians, motorcyclists and cyclists. In Malaysia, there are several strategies introduced to improve the road safety level of school children. However, crashes involving school children still worrisome. Recent trends of school children involved in crashes at school vicinity have become the nation's concern. Therefore, this study is aimed to investigate the contributing factors of pedestrian-vehicle conflict involving school children at school vicinity. This study focused on the utilization of the facilities provided at school, exposure measure and demographic characteristics of the schools. The facilities that being considered in this study are; zebra crossing, pedestrian bridge, drop off and pick-up zone and the presence of traffic warden. A total of 57 primary and secondary schools in Selangor were assessed for this study. The important variables have been analysed using Negative Binomial Regression model to identify the significant attributes. Non-parametric analysis has been used to compare the differences in characteristics of the schools. The findings of the study concluded that road type and number of pedestrian are the underlying factors that would increase pedestrian-vehicle conflict at school vicinity.

MRR No. 382

The Study of the Effectiveness of the Transverse Rumble Strip (TRS) on Reducing Speed along Curve Section Urban Roads

Author(s) : Muhammad Marizwan Abdul Manan, Syed Tajul Malik Syed Tajul Arif, Norfaizah Mohamad Khaidir, Noraini Mohd Din, Siti Zaharah Ishak, Rizati Hamidun, Khairil Anwar Abu Kassim

ISBN : ISBN 978-967-2988-10-6

The City Council of Petaling Jaya (MBPJ) has decided to equip some of their roads with the Transverse Rumble Strip (TRS) in order to reduce the speed of road users. The main aim of this study is to evaluate the effectiveness of the Transverse Rumble Strips (TRS) in reducing the speed of traffic along an urban curve road section. To evaluate the effectiveness, we had to analyse the speed distribution, the rate of average speed reduction and the rate of braking by road users before and after the installation of TRS at the site. The key findings obtained in this study is operating speed was reduced at both locations before and after the installation of TRS but the speed reduction is higher with presence of TRS. The speed reduction is more obvious at Jalan Sultan compare to Jalan Barat. In terms of speed compliance, the speed compliancy rate was also increased with the presence of TRS at both locations. The compliancy was also maintained even after 1-week of installation of TRS. In evaluating the rate of braking, the higher rate was obtained after 1-day of TRS installation than any other period on both sites and Jalan Barat shows higher braking rate as compare to Jalan Sultan.

Due to its potential as a countermeasure in reducing or controlling operating speed, it is recommended that TRS is installed at high-risk location such as at curve or approaching intersection. However, TRS usage at downhill slope should be further studied or improvised due to the non-significant speed reduction, i.e. no difference in speed reduction, obtained in this study. Precaution should be taken in ensuring that the specifications and material used for TRS follow the standard and comply with the surface skid resistance value.

Keywords: Transverse rumble strip, Traffic calming, Speed management

MRR No. 383

Age Differences in Reckless Riding among Motorcyclists

Author(s) : Nor Fadilah Mohd Soid, Sharifah Liew, Ahmad Azad Ab Rashid, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-11-3

Over the years, Malaysia never fails to achieve high numbers of road accidents. In fact, in the year 2016, the nation has been shocked with 7,152 of road users died due to the road accidents. According to the Annual Report of Ministry of Transport in 2016, motorcycle death comprises of 64.2% from the overall number of death due to road accidents. Reckless is a major contributing factor to road morbidity and mortality (McNally & Bradley, 2014). However, in motorcyclists' context, reckless riding was less emphasized as compared to risky riding among Malaysian. Thus, this study focused on determining the reckless riding among older motorcyclists. About 785 motorcyclists aged from 26 years old up to the golden age (where available) were surveyed in order to answer the objectives. Findings show that group of motorcyclists aged from 26 to 35 years old have the highest frequencies of committing reckless riding as compared to other age groups. Meanwhile, the older group depicts the lowest frequencies of committing reckless riding. In addition, a Pearson correlation also showed that there was a negative relationship exist between age and reckless riding score. However, the magnitude of age only contributes a small percent of the association. An appropriate countermeasure needs to be taken in order to instil discipline and specifically to older motorcyclists.

MRR No. 384

Analysis of Front and Rear Passenger Car Occupant Injuries Involved in Road Crashes

Author(s) : Zarir Hafiz Zulkipli, Siti Atiqah Mohd Faudzi, Abdul Rahmat Abdul Manap, Ahmad Noor Syukri Zainal Abidin, Khairil Anwar Abu Kassim

ISBN : -

In Malaysia, passenger car comprises 40% of all total registered vehicles on the roads and account about 3,000 fatalities every year. Although many studies already documented the injury pattern of passenger car crashes, nevertheless the differences in injury pattern between front-seated and rear-seated passengers are still missing. Thus, this study was conducted to specifically analyse the injury severity among front-seated and rear-seated passengers.

The data were collected retrospectively from closed files of the third-party bodily injury (TPBI) insurance claims database for the period 2011 – 2015. A systematic random sampling technique was used to select the cases due to the large sampling frame.

In summary, the results indicate that the different seating position produced different injury type. Extremities and thorax injuries were mostly found on the driver while head and face injuries were mostly found among front and rear passenger. In comparison between all seating position, front passenger had the highest percentage of severe injury. Further study using more complete dataset is needed to better understand the association between vehicle safety features such as seatbelt, airbag and injury severity for different seating positions.

MRR No. 385

Identifying Factors Associated with Sleep Quality among Manufacturing Workers Riding to Work in Klang Valley

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

ISBN : -

Data on work-related accident reported by SOCSO shows that even though commuting accident contributed less than 45% of the total accidents reported by SOCSO in 2014, however, it shows an increasing trend starting from the year 2008. Review on studies conducted to identify risk factors of the commuting accident had found that most of the studies investigated on sleepiness among workers. Based on a survey conducted in 2010 among those involved in a commuting accident in Klang Valley, about 15% of them involved in a crash due to feeling sleepy or fatigue. Sleep quality could contribute to sleep deprivation. Sleep deprivation could impair driving and riding performance. Thus, this study aims to determine prevalence and factor associated with poor sleep quality among manufacturing company in Klang Valley. This is a cross-sectional study involving sample size of 460 respondents. Sleep quality was assessed using validated and translated Pittsburgh Sleep Quality Index (PSQI). Besides, socio-demographic details, work and riding information, and lifestyle and health status were also obtained from respondents. Daytime sleepiness was also assessed through validated Epworth Sleepiness Scale (ESS). The findings reveal that about 53.3% of the respondents reported had poor sleep quality. Meanwhile, about 176 respondents were identified as having daytime sleepiness. Out of 176 respondents, 65.3% of them found to have poor sleep quality and the association was strongly significant ($p < 0.001$). Through multiple logistic regression analysis, five (5) factors were identified significantly associated with sleep quality: ethnicity, shift work, insomnia, usage of medicine to induce sleep as well as sleep duration. Comprehensive countermeasures against poor sleep quality among working population are needed and not only at individual level but also require involvement at the organizational and societal level.

MRR No. 386

Exploring Moped Use in Malaysia

Author(s) : Azhar Hamzah, Aqbal Hafeez Ariffin, Mohd Syazwan Solah, Noor Faradila Paiman, Muhammad Syukri Abdul Khalid, Zulhaidi Mohd Jawi, Mohd Hafzi Md Isa, Mohd Rasid Osman, Horizon Gitano-Briggs, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-12-0

The use of low engine capacity or low-speed two-wheelers, known as mopeds (primarily in Europe) is relatively very quiet and does not catch much attention from other road users. Its undefined status in road transport regulations makes its presence somewhat unofficial, or a grey area. Correspondingly, records of crashes are not available for detail scrutiny. The design of moped as a single-track vehicle, like motorcycle, exposed them to comparable crash risks, except its speed range is lower. Mopeds fill the void between motorcycle and the electric bicycle categories, where it occupies the vehicle speed category of > 25 km/h to 50 km/h. A recent survey at selected areas in Klang Valley, Ayer Keroh, Melaka and Serdang, Kedah provided some valuable information on existing moped specifications and its user's characteristics. Comparing to existing vehicle standards, the mopeds displayed strong resemblance to the electric bicycle (e-bike) such as having cycle pedals and cycle body frames. Almost all were equipped with throttle/accelerator device in the handle bar. Users of moped were primarily in the higher age group and for short-distance travel and none used safety helmets. Their travel and movement in traffic are very much like bicycles and they have been providing important mobility to a certain group of the population, as early as the 1990s. Findings from this study could be useful for future government policy direction considering that the safety record of two-wheeler users is not very encouraging, and has been unfavourable, for decades now. Nevertheless, the all-electric drives moped could be one of the good options for low carbon emission initiative.

MRR No. 387

Review on Child Restraint Legislation Practices around the World

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

ISBN : 978-967-2988-13-7

Child restraint system (CRS) is essential to protect infants and young children from injury in road crash. It has been proven that a correctly installed child safety seats can reduce the risk of fatality by 70% and 54% for infants and young children at the age of 1 – 4 years old. In 2013, the World Health Organization reported that 96 countries have enacted child restraint law. Unfortunately, there are only three (3) out of 11 countries in South East Asia region that have implemented such a law. Despite implementing frontal and rear seatbelt laws, Malaysia is still yet to establish its child restraint law. Low usage on CRS on passenger vehicle can be one (1) of the major contributing factors to the high fatality rate. The usage of CRS is very low where it was reported that only 9.5% out of observed 537 children were using CRS in Kajang, Malaysia. To increase the usage ratio of CRS among Malaysians, it is essential to establish child restraint law to make it mandatory for all children to be restrained on CRS while they are travelling on motor vehicle. Prior adopting any established child restraint law from other countries, it is wise to conduct a thorough and holistic review of these child restraint laws to ensure that the suggested legal framework can be applied with effective and efficient outcomes. The objective of this study is to determine the specification, usage criterion and exemption criterion of CRS in the new legal framework. This study also intended to provide an insight into the effective execution of the child restraint law through studying the practices from success stories of other countries.

The CRS usage criterion includes age, weight and height of children required in using an appropriate CRS, type of vehicle and situations exempted from using CRS. Among all, the legal system regarding CRS in Europe countries, United States, Australia, New Zealand and Japan are selected in this discussion section. The child restraint specification, criteria of CRS usage and the exemption criteria of these countries are highlighted and presented.

CRS safety standard is developed to outline the requirement of crash criteria and design specifications of CRS. United Nations (UN) standard ECE Regulation No. 44 and No. 129 are well-known safety standards for CRS. More than 50 countries worldwide including all European Union countries, Japan, the Russian Federation and South Africa have transposed and adopted this safety standard into their national legislation since 2013. According to this safety standard, CRS is designed to diminish the risk to injury to the wearer, in the event of a collision or of abrupt deceleration of the vehicle, by limiting the mobility of the wearer's body. A similar definition of CRS was also found in the Australian standard. Dynamic loading test in the frontal, side and rear impact are required before a CRS can obtain approval under this safety standard. All manufactured CRS must be conformed to the safety standard in European Union countries and Australia. Thus, Malaysian authority needs to implement stringent condition on the safety level of CRS in accordance to the well-established safety standard from the European Union.

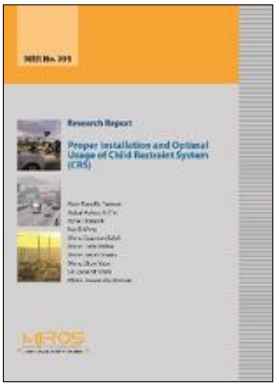
Introduction of UN ECE R129 also intended to reduce installation option of CRS to ISOFIX only which can lower the risk of the CRS being incorrectly fitted in the car. It was reported that the misuse issue was identified among 80% of examined CRS usage in Israel and Australia. Incorrect and inappropriate installation of CRS may reduce or nullify the safety benefits of CRS. ISOFIX and similar system such as LATCH (Lower Anchors and Tethers for Children) used in the United States are designed to reduce serious installation errors in using vehicle seatbelts to secure CRS. From this perspective, Malaysian authority must be aware of the issue of misuse or inappropriate installation of CRS after the implementation of child restraint law. Besides providing constructive information related to correct used of CRS, the authority should also promote the usage of ISOFIX installation method and progressively fully implement the requirement as prescribed in UN ECE R129.

In regards to usage criterion of CRS in child restraint law, the combination of age, height and weight has been chosen as the criterion in the law system of reviewed countries. Weight and height have always been related to the main criterion to be used while choosing the right CRS. Nonetheless, surveys of CRS usage in

various countries have shown that many parents are lacking knowledge in selecting correct CRS for their children. Instead, using the age of child may be a more preferable way in advocacy and regulation because parents always know their child's age. It can help to reduce the error rate in installation of CRS in motor vehicles. In term of exemption criteria, most countries considered the limitation of some situation and have allowed some exception for not using CRS.

To ensure the effective implementation of child restraint law, it is essential to be conducted along with advocacy and appropriate education to the public for the optimum result to be seen. It is very important to convey the correct message to the public regarding the importance of using CRS and also how to install a CRS correctly. It is to minimise the issue of misuse and inappropriate installation of CRS. In the effort in promoting the usage of CRS, the related authority shall take strict and effective enforcement in ensuring the compliance of the enacted child restraint law by the public to avoid failure in executing the child restraint law nationwide by the public.

MRR No. 391



Proper Installation and Optimal Usage of Child Restraint System (CRS)

Author(s) : Noor Faradila Paiman, Aqbal Hafeez Ariffin, Azhar Hamzah, Kak D-Wing, Mohd Syazwan Solah, Mohd Hafzi Md Isa, Mohd Rasid Osman, Wong Shaw Voon, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-15-1

Children are much more likely than adults to get serious injuries in car crashes. Child restraint system (CRS) has been proven could reduce injury and prevents fatality in the event of a crash. Inappropriate usage of CRS may increase the risk of fatality. This research is aimed to determine the prevalence of CRS improper usage behaviour among CRS users. Driver travelling with children age 11 years old and below were interviewed, and those who restrained their children in CRS were further observed in CRS installation and usage practice. 178 parents were interviewed and 267 children were observed. Overall, out of 267 children, only 12.7% were restrained properly in an appropriate CRS for their sizes, with the correct CRS installation and appropriate seating

location in the observed passenger car. Many initiatives could be introduced before the implementation of the CRS law in Malaysia such as awareness, community-based programs and CRS clinics that aim to guide parents on the correct and effective way of installing the CRS device in their car.

MRR No. 392

Faktor Pemanduan Tanpa Lesen yang Sah dalam Kalangan Penunggang Motosikal

Author(s) : Kaviyarasu Yellappan, Ahmad Azad Ab Rashid, Roziana Shahril, Nur Afifah Aisyah Mohmood, Azmi Awang, Norainy Othman, Low Suet Fin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

Pemandu-pemandu yang pernah melalui proses perlesenan memahami kaedah dan rukun ketika memandu di jalan raya. Oleh sebab itulah, sistem pemanduan menjadi lebih lancar dan kurang berlaku konflik. Pemandu tanpa lesen pula boleh menjadi satu (1) ancaman di jalan raya kerana tanpa pemahaman tentang pemanduan yang betul, mereka boleh mengganggu keharmonian dan keseimbangan sistem pemanduan yang mungkin boleh menyebabkan kemalangan jalan raya. Kajian ini dibuat bertujuan untuk mengenal pasti faktor-faktor yang menyebabkan para pemandu membuat keputusan untuk tidak mengambil lesen memandu yang sah. Berdasarkan soal selidik yang telah dijalankan, secara amnya, faktor-faktor yang menyebabkan seseorang itu tidak mengambil lesen memandu yang sah termasuklah kekangan kewangan (contohnya, kos mendapatkan lesen yang mahal), sikap tidak endah ahli keluarga, kewujudan pengangkutan awam sebagai alternatif, tanggapan bahawa proses untuk mendapatkan lesen adalah leceh dan renyah, kedudukan institut memandu yang jauh dari rumah, buta huruf dan kurangnya penguatkuasaan.

MRR No. 393

Red Light Running Motorcyclists at Signalised Intersection in Malaysia: An Empirical Study

Author(s) : Muhammad Marizwan Abdul Manan, Syed Tajul Malik Syed Tajul Arif, Ho Jen Sim, Muhammad Ruhaizat Abdul Ghani, Norfaizah Mohamad Khaidir, Hawa Mohamed Jamil, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-16-8

Malaysia currently ranked number five (5) in the world among countries with a high percentage of motorcyclist fatalities, i.e. more than 50% of the total road fatalities are associated with motorcycles. Although the great majority of motorcycle fatal crashes in Malaysia are reported on straight road sections, motorcycle fatal crashes reported on major signalised intersections (SI) (i.e. 3-legged and 4-legged) is the next most common (18.5%). This study investigates the factors that are associated with red light running motorcyclist (RLR-MC) behaviour based on approaching and crossing movement type at the 3-legged and 4-legged SI along major roads in Malaysia and develops countermeasures in order to curb this risky behaviour. This study was conducted in early 2016 and ends in mid of 2017, where only 27 intersections with Pre-timed traffic light (PTTL) and Actuated traffic light (ATL) were selected based on a strict selection criteria and observed during peak and off peak hour period. In general, the average rate of RLR-MC was 3.61%, by which the highest rate of RLR-MC recorded was 22.5%, while the lowest rate was 0.6% from the total traffic volume. Our observations have shown that there were three (3) movement types of RLR-MC approached the SI, - (a) approaching the SI with weaving or lane splitting, (b) approaching the SI from the centre of the lane, and (c) approaching the SI from the left side or on the shoulder. There were three (3) movement types of RLR-MC cross the SI, - (a) crossing the SI by illegal manoeuvre (illegal U-turn, contra-flow, prohibited left-turn), (b) crossing the SI by stopping at or before the stop line, and (c) crossing the SI without stopping before the stop line. Among these crossing behaviours, crossing the SI without stopping at the stop line was the majority with 51.2% from the total observation and it may be associated with the high speed limit road. In order to curb the risky behaviour,

it is recommended that the SI with high RLR-MC to be equipped with adequate traffic island, replace the SI signal type from PTTL to ATL system and installing traffic light on pole instead of gantry to restrict motorcyclist's view of the traffic light's indicator and discourage aggressive approach.

MRR No. 394

Development of Assessment Framework for Courier Companies in Malaysia

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ISBN : 978-967-2988-17-5

The booming of courier industry is happening. Along with this positive development is the challenge to road safety. This is because more drivers and riders will populate the road, for a longer period of time and farther distance – higher the exposure, higher the risk. To face this challenge, the industry must be ready, and willing to uplift their safety standard. Current study proposed an assessment framework developed from the mapping between the status quo and the related available literature and guidelines. The resultant assessment framework for courier companies entails two (2) factors – quality service, and road safety. Excellent courier companies are those that can strike a balance between the two (2) to emerge as not only profitable but also responsible and caring entities. The framework may serve as a reference to identify the gap, risk and opportunity within a company, or even the industry, before focusing on intervention programmes.

MRR No. 395

Evaluating Road Safety Risks at Schools in Selangor: An iRAP Approach

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

ISBN : 978-967-2988-18-2

A school zone that is appropriately designed not only ensures the safety of school children commuting to school but also smooth traffic operation throughout the adjacent road network. In Malaysia, the design and condition of the built environment at school vary, thus the likelihood and severity of road crashes involving school children depend on how safe a school zone is designed. The objectives of this study are to establish safety risk star rating in considering the various built environment of school in Malaysia and to propose potential safety improvement programmes. A sample of schools in the state of Selangor with various built environment was assessed for safety condition using the International Road Assessment Programme (iRAP) star rating methodology. In addition to vehicle speed measurement, data collection includes capturing images for each 20 m road section within the school zone as well as measuring several road cross section elements for star rating analysis. The results revealed that the safety condition of school zones varied greatly as indicated by the 1-star to 5-star ratings within the samples. This study also determined that the presence of traffic calming measures, traffic warden and sidewalk were very critical in ensuring the safety of school children as the likelihood for pedestrian crashes at schools with reduced by 75%, 80% and 37% respectively. In conclusion, the iRAP star rating methodology is proven to be very useful in predicting the risk of pedestrian crashes around school areas.

MRR No. 399

The Safer2School App – Development of a Road Safety Data Repository and Analysis System at Vicinity of School

Author(s) : Muhammad Marizwan Abdul Manan, Hizal Hanis Hashim, Muhammad Ruhaizat Abd Ghani, Hawa Mohamed Jamil, Nur Fazzillah Mohamed Noordin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-19-9

Majority of schools in Malaysia have provided with good facilities. However, accidents still occur in the vicinity of schools. Safer2School is the first of its kind, web-based application that provides comprehensive road infrastructure safety assessment around the vicinity of schools in Malaysia. The app allows engineers, researchers and related authorities to deposit road infrastructure attributes and make general road safety assessment, which was based from the iRAP star rating for schools and the Schoolchildren Traffic Conflict (TCSchool) model developed by MIROS. Teachers, parents and school authorities can also give feedbacks and view the road safety assessment on their school vicinity. The app is also able to assign specific countermeasures based on the iRAP assessment that could be helpful for authorities to improve the safety at school. The Safer2School app is also being developed with the intention of allowing a continuous database input and update from various level of users towards continuous improvement on the road safety in the vicinity of the school in Malaysia.

MRR No. 400

Phase Two Development of Road Surface Condition and Monitoring System Utilizing Motorcycle (ROCOM) – Visual Tracking and Validation

Author(s) : Muhammad Ruhaizat Abd Ghani, Muhammad Marizwan Abdul Manan, Mohd Hafzi Md Isa, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

An iOS (an operating system used for mobile devices manufactured by Apple Inc.) mobile and web-based application software that analyses motorcycle motion data gathered from a mobile app and mapped out risky road sections for motorcyclists was developed in 2015. The app is called ROCOM, which stands for Road Surface Deficiencies utilizing motorcycle motion. To further enhance the app, the video-tracking capability was added and the data collected was validated using a VBOX or high accuracy GPS data logging for vehicle testing. The study finds that visual tracking able to prove the accuracy of road surface detection from raw data taken by the iOS application. Risk mapping validation along a section of the exclusive motorcycle lane along Federal Route 2 shows that both ROCOM and VBOX have a similar risk-mapping pattern. Furthermore, ROCOM route tracking on the map is far superior to the VBOX due to iPhone complementary technologies on board that work in conjunction with the GPS chip to master the phone's location. As for the acceleration data comparison, ROCOM is able to detect adverse acceleration or vibration on the road surface similar to VBOX. For further development and validation, ROCOM must undergo a mass scale data validation and utilize cloud technology.

Keywords: Road surface condition, mobile application, visual tracking, data validation

MRR No. 402

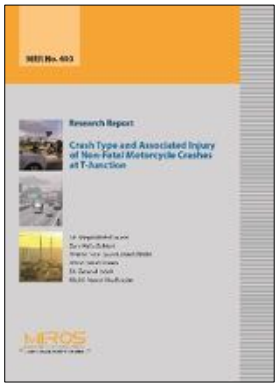
Development of 3-Dimension (3D) Driving Animation for Digital Advertising Boards

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

ISBN : 978-967-2988-20-5

There are huge numbers of advertising boards all around Malaysia. The advertising board has evolved from the classic board to modern boards such as electronic advertising, mobile advertising and 3D advertising boards. While the marketing industry gets more benefit on this evolution, the advertising boards may give a distraction to the drivers, especially the LED boards that were located near the road. We need to know the level of distraction from a driver's perspective on the LED boards. To recreate the real situation of the scenario, 3D animation is needed to evaluate the distraction towards LED boards. However, this project aimed to develop the LED glow effect in the animation. This development project is considered as the baseline project to the advanced phase of realistic animation in 3D evaluation scenes. The animation can be an evaluation tool for advertising projects in the future.

MRR No. 403



Crash Type and Associated Injury of Non-Fatal Motorcycle Crashes at T-Junction

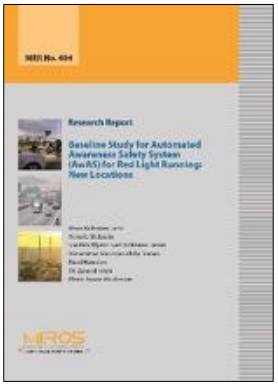
Author(s) : Siti Atiqah Mohd Faudzi, Zarir Hafiz Zulkipli, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-21-2

The crash configuration of crashes involving motorcycle is quite extensive due to the size of motorcycle is relatively small as compared to other vehicles. In addition, the motorcycle-related injuries are expensive. The current data on motorcycle crash pattern in Malaysia were carried out by Abdul Manan (2011) and Sharifah Alyana et al. (2010) which focused on fatalities of motorcycle crashes while characteristic of non-fatal motorcycle crashes had been studied by Phang et al. (2000), 17 years ago. Therefore, this study is focusing on non-fatal motorcyclist on

current data (5-year period: 2011 - 2015) and injuries pattern among motorcyclist associated with the crash type of the crash. The objectives of the study were to: (i) investigate trends of occurrence of pre-crash roadway situations (crash typing) involved motorcycle crashes in Malaysia; (ii) identify injuries related to the crash type; and (iii) recognise the injuries severity of the corresponding crash type. The results show more than half (57%) of the motorcycle and passenger car crashes happened at T-junction followed by midblock with 27%. The majority (75%) of the cases occurred at municipal road and in urban area. A total of 642 accident cases with injury were found to occur at T-junction. From the 642 cases at T-junction, seven (7) types of crash typing were identified appropriate with the cases involved. They are approach turn, angle 1/2, rear-end, U-turn, side swipe, overtaking and both turning. Approach turn crashes with passenger car is making a turn while motorcycle was traveling straight ahead on primary roads was the highest action that cause collision among motorcycle and passenger car at T-junction in the study. However, in term of injury severity, the most hazardous crash types identified was among angle 1/2 crashes where passenger car/motorcycle is coming out from an access point and turning into same direction with the motorcycle/passenger car that is travelling straight. Four (4) body regions to be the most regions being injured in every crash types include lower extremity, upper extremity, face and head with the injury severity is higher at lower extremity region compared to other regions.

MRR No. 404



Baseline Study for Automated Awareness Safety System (AwAS) for Red Light Running: New Locations

Author(s) : Hawa Mohamed Jamil, Akmalia Shabadin, Sharifah Allyana Syed Mohamed Rahim, Muhammad Marizwan Abdul Manan, Rizati Hamidun, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

With new locations of AwAS for red light running is said to be installed soon, a baseline study needs to be carried out. Adopting the same methodology as the previous study, traffic volume and violation data were obtained and used for the calculation of violation rate. Observations were carried out at two (2) locations; in Perak, Kedah, Negeri Sembilan and Melaka. KM14 Ipoh – Pusing was chosen as the site in Perak while KM54 Jalan Alor Setar – Butterworth was chosen as the site in Kedah.

In general, the study showed an overall violation rate of 3.38%. This figure is much lower than previous research by Hawa et al. (2014) whereby the baseline violation rate was 4.29%. Other vehicle types are the highest violator with 4.44% followed by cars, 3.39%, and motorcycles, 3.05%. This result contradicts with previous baseline study conducted by Hawa et al. (2014) which reported motorcycles as the highest contributor in violation rate. Signal duration/cycle length was found to be statistically significant with traffic light violation ($p = 0.000$). Drivers facing longer cycle time tend to violate 1.60 times more (95% CI: 1.499, 1.704) than drivers facing shorter cycle time. For day of week, weekend has the highest violation rate (3.68%), followed by weekdays (3.42%) and hectic days (3.06%). Drivers driving during peak hour were 1.10 times (95% CI: 1.040, 1.161) more likely to violate than drivers driving off-peak hour.

The installation of AwAS is indeed timely and was found to be very beneficial in Malaysia. AwAS has been proven in previous studies to be an effective tool in reducing red light crashes (Hawa et al., 2014), but the violation rate increased with time. Issues with the public on whether AwAS is beneficial or have improved safety may have led to revise the amount of fine thus many unsettled summonses. This has created an opportunity and attitude for drivers to ignore their summonses since previous traffic offenders that have to pay the full fine will feel unfair and could explain the

increase in violation. In order to evaluate whether AwAS at the new location is effective, "after" study is recommended to be carried out.

MRR No. 405

Comparing CRS Performance between UN R44 and ASEAN NCAP CRS Sled Pulse

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ISBN : 978-967-2988-22-9

Crash severity is determined by the energy transfer to the occupant compartment during a crash event. This energy transfer is known as Delta V. It is defined as the maximum vehicle velocity change throughout the crash duration. Such a definition has been used to determine the severity of real-world crashes to correlate with occupant injury inside the vehicle. Delta V is normally obtained through a vehicle post-crash damage assessment for real world crashes.

This study will further explore the behaviour of ASEAN NCAP CRS pulse which has been developed based on ASEAN NCAP assessment protocol. The study was conducted using two (2) types of pulses, namely UN R44 frontal sled pulse and ASEAN NCAP CRS pulse. The pulse measurement was taken from the accelerometer mounted on the sled platform in x direction only. The injuries criteria were recorded using tri-axial accelerometers installed in the head and chest of the P-series dummies. Comparisons of the pulse behaviour were based on these measurements.

The analysis found that the main difference between both pulses was that UN R44 rose to the peak faster (with higher slope) than ASEAN NCAP CRS pulse. Besides, UN R44 reached its peak 25 ms earlier than ASEAN NCAP CRS pulse. This factor contributed to the dummy response in both cases. Different peaks duration could also be observed in all cases. The peak timing for the dummy head and chest therefore varied by 20 ms and 25 ms respectively. Such a difference was due to the kinematics between the head and chest. Injury comparison between both pulses can be divided into the head and chest categories. In the head category for the P3 dummy, ASEAN NCAP CRS pulse recorded a higher peak value compared to

the UN R44 by 4.78G. In the case of the P1.5 dummy, the head acceleration peak for UN R44 was higher than ASEAN NCAP CRS pulse by 2.43G. As for the chest acceleration, the trend is reversed. UN R44 pulse was higher by 1.04G for the P3 dummy while ASEAN NCAP CRS pulse was higher by 6.41G for the P1.5. The contradicting trend in both cases may be due to the direction of CRS installation where P3 was installed in a forward-facing direction whereas P1.5 was facing rearward.

The limitation of the sled test facility to replicate a full-scale crash test was also studied by comparing the dummy response in both tests. The analysis showed that for all cases, the duration and shape of curves were similar. The first analysis was for the P3 dummy. The head acceleration comparison showed the curve matched for both test types with a slight difference of 1.27G. On the other hand, chest acceleration recorded a difference of 2.25G. In the case of the P1.5 dummy, the head resultant acceleration was similar for both tests, with a difference in peak value of 0.28G. However, the chest resultant acceleration registered a bigger difference by 4.64G. This was because the pitching of the vehicle in a full-scale crash test could not be replicated in the sled test.

MRR No. 406

Development of Photogrammetry Method in Measuring Damaged Vehicle

Author(s) : Kak D-Wing, Khairil Anwar Abu Kassim, Siti Atiqah Mohd Fauzi, Mohd Amirudin Mohamad Radzi, Noor Faradila Paiman, Ahmad Noor Syukri Zainal Abidin, Iskandar Abdul Hamid, Zarir Hafiz Zulkipli

ISBN : 978-967-2988-23-6

Crash reconstruction usually requires the detail on vehicle damage to establish the vehicle dynamics and kinematic during the occurrence of the motor vehicle crash. The conventional way of obtaining these measurements is through using measurement tape and flexible ruler. The conventional method requires appropriate training for a crash reconstructionist to ensure accurate measurement being taken. Nevertheless, the conventional method is still highly exposed to human error while measuring damaged vehicle especially while it is required to measure complex damaged surface. Thus, to prevent such problem, this study proposed using

photogrammetry method to replace the conventional method in obtaining measurement from damaged vehicles.

In this study, two (2) damaged vehicles with different impact configuration were used to evaluate the performance of photogrammetry measurement. Four (4) different groups consist of two (2) experienced crash investigators were assigned to use the conventional method to measure the basic dimension and crush profile of both damaged vehicles. A coordinate measuring device (CMM) was used as a benchmark to evaluate the accuracy of photogrammetry measurement. From the results, it was found that the mean residual of photogrammetric was as low as 7.5 mm. The findings also revealed that number of photos used in photogrammetry can reduce the variance of residual and can help to achieve lower residual error. On the other hand, the findings showed that the conventional method was not consistent and was having high residual if compared with CMM measurement. Thus, photogrammetry method is a more reliable option to replace the conventional method in measuring damaged vehicle.

MRR No. 408

Effectiveness of Commuting Safety Support Program (CSSP) on Riding Behavior among Working Population in Selected SME in Klang Valley

Author(s) : Wahida Ameer Batcha, Ilhamah Othman, Nor Fadilah Mohd Soid, Aziemah Azhar, Noor Kamaliah Alias, Najwa Shaari, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

In January 2017, SOCSO had initiated an initiative namely Commuting Safety Support Program (CSSP). MIROS was appointed to collaborate by providing technical assistance and expertise to design and implement the intervention program. The module of the program was outlined based on SIRIM 4: 2014 Good Practices in Implementing Commuting Safety Management focusing improvement of commuting safety management for the selected companies, to improve riding behaviour through defensive training and safety talk focusing on major contributing factor to road accident, to instil riding preparedness through route and risk assessment, motorcycle inspection as well as fitness to ride

checking. As this program is a new initiative implemented by SME companies and plan to be expanded to nationwide in the future, thus, this study aims to determine the effectiveness of CSSP in improving riding behaviour among workers of the selected SME companies in Klang Valley. A pre-post intervention program study design was employed to assess riding behaviour of workers before and after the implementation of CSPP in their respective companies using simplified Malaysian version of MRBQ. Overall, about 458 respondents completed both phases of data collection. Key finding derived from this study is significant reduction of not wearing riding personal protective among respondents after received the intervention program as compared to before intervention program. Thus, similar module in the intervention program should be extended to employees in Malaysia to ensure more workers would be exposed to the knowledge and awareness of riding behaviour specifically on usage of riding personal protective and speeding, which ultimately will help in reducing number of commuting accident in Malaysia.

MRR No. 410

Carbon Monoxide Concentration in Express Bus and Its Intoxication Level among the Bus Drivers Plying to Route in West Malaysia

Author(s) : Wahida Ameer Batcha, Noor Kamaliah Alias, Ilhamah Othman, Aziemah Azhar, Mohamad Suffian Ahmad, Zulhaidi Mohd Jawi, Khairil Anwar Abu Kassim, Siti Zaharah Ishak, Siti Hasnah Nasarudin, Mohd Hasni Ja'afar

ISBN : 978-967-2988-26-7

Carbon monoxide was classified as one (1) of the five (5) major air pollutants which emitted either through endogenous or exogenous. Certain occupations inclusive bus drivers have high risk of high carbon monoxide exposure. Exposure to carbon monoxide could cause a variety of health problems which indirectly would affect driving. This study intended to explore the concentration of carbon monoxide inside express buses and to identify carboxyhemoglobin level among drivers of the express buses due to exposure to carbon monoxide. The cross-sectional study design was employed among selected express busses and express bus

drivers plying Peninsular of Malaysia to meet the objectives. The study was carried out through field observations. Carbon monoxide was measured using MultiRae and personal carboxyhemoglobin level was measured using piCO Smokerlyzer. All respondents were administered with questionnaire consist of socio-demographic, daytime sleepiness and fatigue. A total of 78 drivers participated and 40 express busses were measured for carbon monoxide exposure. As overall, the finding revealed that the mean concentration of carbon monoxide is 0.69 ± 2.79 ppm which below the acceptable limit of carbon monoxide exposure. In addition, the carboxyhemoglobin level among the express bus drivers was ranged between 0.0 to 4.3%. Smoker drivers reported higher range of carboxyhemoglobin level, and the range did not show decrease throughout their driving. Analysis on association between carboxyhemoglobin with daytime sleepiness shows that drivers with carboxyhemoglobin level of more than 0.8% were 1.79 times more likely to report daytime sleepiness as compared to those with carboxyhemoglobin level of 0.8% and below. This study suggests that drivers should be educated on the danger of smoking prior and while driving as the exposure to carbon monoxide from smoking would cause adverse health effect which indirectly would affect their driving as well.

MRR No. 411

Development of Simulated Black Spot Scenario for Driving Simulator

Author(s) : Nurulhana Borhan, Low Suet Fin, Mohd Firdaus Mohd Siam, Khairil Anwar Abu Kassim

ISBN : ISBN 978-967-2988-27-4

For several years, the Malaysian Institute of Road Safety Research (MIROS) has been actively used its driving simulator as a research tool to carry out several studies related to road safety. Some of the studies such as hazard perception and driver distraction had been successfully done with MIROS driving simulator. With the in-house developer, the driving environment can be developed according to the studies requirement. Our previous database has no black spot nor accident prone driving scenario. To add to the scenario database, the enhanced scenario with better environment need to be developed to have various type of driving experiences. In this

study, we aimed to develop the black spot environment with some of the accident-prone criteria such as elevated land and also bad weather driving condition such as rain and fog. This development project is considered as the baseline project to the advanced phase of realistic black spot in the real local area.

MRR No. 412

The Impact of the Mass Rapid Transit (MRT) on Modal Choice and Road Accidents

Author(s) : Rizati Hamidun, Azzuhana Roslan, Akmalia Shabadin, Hizal Hanis Hashim, Badrulhisham Othman, Rohayu Sarani, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-28-1

In the effort of addressing massive traffic jam and improve public transport connectivity in the Klang Valley, the government introduces the Mass Rapid Transit, or better known as MRT. Having MRT as an alternative transport mode may also reduce the risk of road traffic accidents (RTA). As of now, limited study has been conducted to measure the impact of MRT towards the reduction of road crashes and its exposure. Thus, this study aimed to investigate the reduction of road exposure in lowering the potential of road traffic accidents, as well as to identify the factors influencing the users' decision to modal shifting from private-to-MRT after the completion of the MRT SBK line in 2017. Crash data of the MRT and control area were compared as the before-after study to estimate the impact of MRT on potential crash reduction. The road exposure of the MRT users also measured using quantitative method through questionnaires distribution. The questionnaire comprised of three (3) sections: (i) respondents' demographic profile, (ii) respondents trip profile and (iii) experience of using MRT. Results from analysis indicate that an area with MRT did not show any reduction on road traffic accidents as compared to the control area. In other hand, the road exposure towards the MRT users had a significant reduction compared those who are travelling on road. The most influential factors that encourage people to shift their mode transportation from private-to-MRT includes the convenience of MRT service, cost and time. Findings of this study supported that MRT is a good transport choice to minimal exposure of road

crashes. MRT impact on the reduction of crashes should be further evaluate once the MRT ridership increase to a number that comparable to private modes.

MRR No. 413

Persepsi Orang Awam Tentang Kelayakan Umur Minimum Mendapat Lesen Motosikal dan Kereta

Author(s) : Sharifah Osman @ Liew Shyuan Yei, Nor Fadilah Mohd Soid, Amelia Hazreena Abdul Ghani, Nuur Sakinah Azman, Roziana Shahril, Maslina Musa, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-29-8

Malaysia merupakan negara ketiga tertinggi di Asia yang mencatatkan kadar kematian akibat nahas jalan raya (WHO, 2016). Sepanjang tahun 2008 hingga 2017, rekod kematian di jalan raya menunjukkan peningkatan pada setiap tahun kecuali pada tahun 2013, 2014 dan 2017. Rekod kematian paling tinggi dicatatkan pada tahun 2016 iaitu sebanyak 7,152. Sebanyak 1,162 kematian adalah dalam kalangan umur 16 hingga 20 tahun dan 1,000 kematian melibatkan kumpulan umur 21 hingga 25 tahun (PDRM, 2017). Objektif utama kajian ini adalah untuk mengenal pasti persepsi orang awam terhadap umur minimum mendapatkan lesen motosikal (B2, B1 dan B) dan kereta (D dan DA). Kajian ini dijalankan dengan menggunakan kaedah “dalam talian” melalui media sosial dan survei (borang kaji selidik). Sebanyak 4,005 orang awam dan 11 pakar penilai bidang terlibat dalam kajian “dalam talian”, manakala 4,158 responden terlibat dalam kajian survei. Kajian “dalam talian” menunjukkan bahawa kebanyakan orang awam dan penilai pakar bidang bersetuju bahawa umur minimum untuk mendapatkan lesen motosikal dinaikkan kepada umur 18 tahun. Bagi kajian melalui survei pula, kajian mendapati kebanyakan pemandu (68%) tidak bersetuju bahawa kelas D dan DA dikaji semula. Hanya 32% yang bersetuju bahawa pengambilan lesen kelas D/DA dikaji semula dan umur yang dicadangkan adalah 18 tahun (45.8%). Bagi pengambilan lesen motosikal pula, kebanyakan penunggang (69%) tidak bersetuju lesen kelas B2 dikaji semula, manakala bagi kelas B1 sebanyak 57% tidak bersetuju dan kelas B pula adalah sebanyak 54% tidak bersetuju. Mereka yang bersetuju bahawa umur minimum perlu dikaji semula, kebanyakannya mencadangkan

supaya umur minimum mendapatkan lesen dinaikkan ke umur 18 tahun. Bagi responden pelajar pula, kebanyakannya iaitu 82.1% tidak bersetuju lesen kelas B2 dikaji semula, manakala bagi kelas B1 sebanyak 69.5% tidak bersetuju dan kelas B pula 59.4% tidak bersetuju. Daripada peratusan 17.9% pelajar yang bersetuju umur minimum kelas B2 perlu dikaji semula, kebanyakannya mencadangkan agar umur minimum mendapatkan lesen B2 diturunkan kepada 15 tahun (44.9%). Manakala bagi had umur dinaikkan kepada umur 18 tahun untuk kelas B1 dan B masing-masing bersetuju dengan peratusan sebanyak 32.5% dan 30.8%. Bagi mengatasi masalah kemalangan yang semakin meningkat dalam kalangan golongan muda, pihak MIROS ingin mengesyorkan kepada Kementerian Pengangkutan Malaysia (MOT) agar mempertimbangkan rombakan semua syarat yang ditetapkan untuk mendapatkan lesen motosikal dan kereta. Antaranya termasuklah mengetatkan syarat pengambilan lesen kelas B1 dan B bagi calon yang ingin mendapatkan lesen motosikal, menghadkan had laju dan masa memandu untuk pemandu yang baharu mendapat lesen L dan P, mengadakan ujian khas untuk calon yang bakal mendapat lesen memandu dan sebagainya.

MRR No. 414

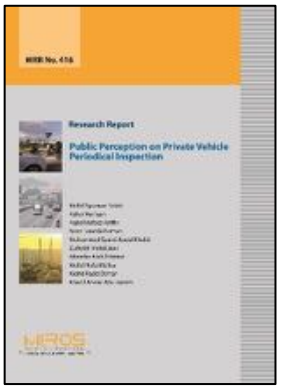
Safety and Service Performance of Express Bus Operators

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

ISBN : -

n/a

MRR No. 416



Public Perception on Private Vehicle Periodical Inspection

Author(s) : Mohd Syazwan Solah, Azhar Hamzah, Aqbal Hafeez Ariffin, Noor Faradila Paiman, Muhammad Syukri Abdul Khalid, Zulhaidi Mohd Jawi, Iskandar Abdul Hamid, Mohd Hafzi Md Isa, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-30-4

Aged vehicles are susceptible to road crashes and more than 40% involved in accidents. A recent survey conducted was able to gather perceptions of 423 respondents on periodical technical inspections. Almost two-third agreed that private vehicles should go for roadworthiness check after completing five (5) years of use. A big majority of respondents supported that the inspection should be performed in the authorized service centre. Considering that Malaysia is yet to have vehicle-end-of-life policy, periodical inspection is thus very practical and much needed to ensure safer vehicles operate on roads.

MRR No. 417

Crashes at Emergency Lane on Malaysian Expressway: Case Studies

Author(s) : Zarir Hafiz Zulkipli, Mohd Amiruddin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Siti Atiqah Mohd Faudzi, Kak D-Wing, Norfaizah Mohamad Khaidir, Iskandar Abdul Hamid, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-31-1

Fatalities involving motorcycle at expressway is reported the lowest out of other type roads there is a concern on the increasing of motorcycle crashes at expressway especially at the emergency lane. Thus, this study was commenced as an effort to understand the causes of crashes at the emergency lane. Cases studies from an in-depth crash investigation was utilized to determine the contributing factors.

Findings showed among one (1) of the main issues was conspicuity as other drivers seem didn't aware of the vehicle stopped at the emergency lane. The driver of the vehicle stopped at the

emergency lane should have a responsibility to take care to provide extra caution to other users by putting safety triangle and activating emergency stop lights.

In addition, vehicle entering the traffic from emergency lane should have applied safe approach while entering the slow lane. The driver should have properly assessed the traffic conditions along the slow lane before deciding to enter the lane. Priority needs to be given to the main traffic travelling along the slow lane. Abused of emergency lane by heavy vehicles also should be taken seriously as the driver would stop just to take a rest at the inappropriate location at emergency lane. Furthermore, the speed management at a certain location at highway also needed as vehicle tend to veer off the road and hit stopped vehicle at emergency lane.

MRR No. 418

Feasibility Study on Roadside Observation and Population Survey of Seatbelt Wearing Using Smartphone Application

Author(s) : Wahida Ameer Batcha, Akmalia Shabadin, Mohamad Suffian Ahmad, Nor Fadilah Mohd Soid, Ilhamah Othman, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-32-8

The effective ways to reduce injuries and fatalities for car occupants are through wearing seatbelt and the impact of the intervention needs to be monitored. In Malaysia, MIROS has been actively involved in research regarding seatbelt. It requires a large number of resources of man and material for data collection and data entry. Thus, this study tries to find an alternative way of data collection and data entry to minimise the operation cost so that the observation of seatbelt wearing could be conducted continuously. Besides, other objectives of this research are to determine seatbelt wearing rate among vehicle occupants and to identify the contributing factors of seatbelt wearing. From the findings, it could be said that the smartphone application can help to minimise operational cost in term of man and material resources for roadside observation and survey form. Yet, further study on procurement expenditures and maintenance of suitable smartphone needs to be done. From the roadside observations, results show that the seatbelt wearing rate for drivers, front

passengers and rear passengers shows a decreasing trend as compared to the year 2009, 2010 and 2014. This is alarming and strategic intervention should be implemented by the relevant agencies in order to improve the wearing rate. For contributing factors, the surveys revealed that gender, age group, self-consciousness and attitude are the indicator of seatbelt use. Therefore, the new strategic intervention should be focused on those gender and age group to inculcate good attitude towards seatbelt wearing among road users in Malaysia.

Keywords: Seatbelt wearing, seatbelt wearing apps, contributing factors.

MRR No. 419

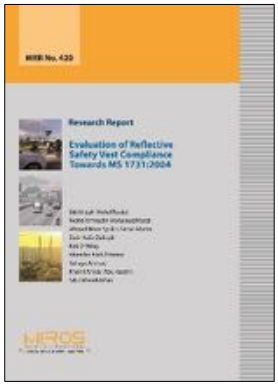
Killed and Serious Injury (KSI) Risk in Commercial Vehicles Collision on Expressway Environment

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

ISBN : 978-967-2988-33-5

This study aimed to evaluate the roadside safety on Malaysian expressway on crash severity in commercial vehicles and providing a wholesome view on the sequential crash factors. The study was based on crash data recorded between 2016 to 2018. A total of 33,883 crash data from June 2016 to June 2018 were analysed. About 62.7% of the crash were single vehicles crashes and of these, 11.6% only related to heavy vehicles. Nearly 2% of the single vehicle crash resulted in fatalities while 4% of the multi vehicle crash caused death. As heavy vehicle is the concern of this study, the only crash involving heavy vehicles were included. Approximately 12% of the single vehicle crash related heavy vehicles and nearly 30% of the multiple vehicle crash comprised of different types of heavy vehicles. About 76% of negligent attribute resulted in rear end crashes. In general, loss of control crashes were the dominated crashes in most of the critical reason categories (incompetence, mechanical failure, not at fault, reckless, unfit to drive and unknown factors).

MRR No. 420



Evaluation of Reflective Safety Vest Compliance Towards MS 1731:2004

Author(s) : Siti Atiqah Mohd Faudzi, Mohd Amirudin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Zarir Hafiz Zulkipli, Kak D-Wing, Iskandar Abdul Hamid, Yahaya Ahmad, Khairil Anwar Abu Kassim, Siti Zaharah Ishak

ISBN : 978-967-2988-34-2

Retroreflective clothing as a type of visibility aids is designed to increase the detection and recognition rate for vulnerable road users especially, during night-time. Retroreflective clothing is a simple and cost-effective way to increase the alertness of drivers about the presence of wearer. Higher levels of retroreflection provide greater contrast and visibility when seen in headlights during darkness. In 2004, SIRIM published the safety standard for high visibility warning clothing which is MS 1731:2004. It specifies the minimum performance requirements and test method for high visibility clothing. However, not every single high visibility clothing sold in the market complies with requirements as stated in MS 1731:2004. The performance of the non-certified retroreflective clothing in Malaysia is still a question mark. It is essential to conduct a testing on these non-certified clothing to fully understand the conspicuity performance for these kinds of clothing. Thus, a comparison between the conspicuity performance between the certified and non-certified retroreflective clothing has to be conducted. The general objective of this study is to assess the retroreflectivity of the standard and sub-standard retroreflective safety vest. The result shows that the usage rate of sub-standard retroreflective safety garments among companies in Malaysia is very high (74%) as most of the tested samples have low coefficient of retroreflection reading. Profiling on the tested retroreflective safety vest in market also shows 88% of samples that have a low coefficient of retro-reflection reading. 12% (6 out of 50) of market samples meet minimum MS requirement where all of them were from online market. The price of the safety vest purchased from online (15 samples) was relatively more expensive than the offline (35 samples) purchased where the price range was from RM12 – RM68 and RM5 – RM50 respectively. The result also shows that

price of safety vest does not reflect the standard conformity of a safety. Sub-standard safety vest with low reflection of the reflector could lead to conspicuity issue especially among motorcyclist which can be one (1) of the main contributing factors to road crashes.

MRR No. 421

Indoor Air Quality of Express Buses in Peninsular Malaysia

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

ISBN : -

n/a

MRR No. 423

Vehicle Violations at Signalised Pedestrian Crossing

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ISBN : 978-967-2988-37-3

The main objective of this study is to evaluate the vehicle violations in term of temporal and spatial violations at signalised pedestrian crossing, which is to determine vehicle red-light violations and to examine the misuse of pedestrian crossing. This study also conducted to identify the utilisation rate of pedestrian crossing. Five (5) locations in Kuala Lumpur were selected based on the similarity of built environment. Data collection was conducted through video observation during peak hour period (07:00 am to 09:00 am) and off-peak period (10:00 am to 12:00 pm). A total of 8,737 pedestrian and 14,701 vehicles were observed during both

peak and off-peak hour period. The variables recorded during observations were vehicles red-light running, the misuse of pedestrian crossing, volume of vehicles and pedestrians, pedestrian gender and estimated age and crossing used by pedestrian.

The results show that the number of pedestrians and vehicles is slightly higher during off-peak period as compared to peak hour. Irrespective with red-light violation at signalised pedestrian crossing, 3.08% or 951 vehicles were violating the red-light. When it comes to red-light violations by vehicle type, motorcycles show the highest percentage. As much as 6.7% from the total of 9,108 motorcycles were observed beating the red-light at signalised pedestrian crossing. In terms of spatial violations, 3.65% vehicles misuse the pedestrian crossings i.e. stopping on the pedestrian crossing during the red traffic signals and motorcycles indicates the highest percentage of pedestrian crossing misuse which is 11.44%. From the study, it shows that the utilisation rate of pedestrian crossing is at alarming rate. A total of 3,776 of the pedestrians does not use the pedestrian crossing while crosses the road. Meanwhile, only 56.8% (4,961) of pedestrians use the pedestrian crossing provided. Accordingly, some recommendations are proposed to enhance pedestrian safety at signalised pedestrian crossing under mixed traffic conditions.

MRR No. 424

Analyzing Characteristic of Side Impact Collisions involving Passenger Vehicles using Real World Data

Author(s) : Mohd Amirudin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Kak D-Wing, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-38-0

In Malaysia, 6,570 peoples were recorded involved in the road deaths for 2016. From that figure, 1,197 or 18.2% were involved with side impact collisions. Side impacts have always been somewhat of an engineering design challenge in terms of provision of good protection to vehicle occupants. In the main, this is because there is generally so little space between the occupant and the striking object which gives little scope for providing crash energy management unlike the situation in frontal impacts. Therefore, in many cases, the occupants can be subjected to a very severe impact to the side of the vehicle. An in-depth crash investigation study was conducted by using CRU database (Real World Data) to understand the mechanism and characteristics of crash, and to correlate impacts and damages profile to the injury outcome of the involved occupants related to the side impact crash. MIROS crash investigation database (MICARS) from 2007 until 2015 has been used for the data collection. MIROS had investigated 794 cases during that period for both East and West Malaysia and from that, 41 cases which involving passenger vehicles have been selected for the analysis purposes. As the result, the risk of serious or fatal injury to nearside occupants was eight (8) times higher compared to the far-side occupants. Besides that, the use of restraints system is does not shows the significantly associated towards the occupants' fatality. As the conclusion, the car manufacturers have to equipped all new passenger vehicle models with the passive safety features such as side and curtain airbags and also to increase the rigidity of the side structure of the said vehicles to reduce the injury severity level of the occupants. Besides that, the government needs to review all these issues together with the vehicle manufacturers in order to make it becomes a standard before comes to mandatory for all passenger vehicles in Malaysia. Thus, continuous efforts and commitment by car manufacturers and government are essential

in order to produce safer cars with proper and adequate active and passive safety features.

MRR No. 425

Motorcyclists Preferred Lateral Position on Rural Federal Roads in Malaysia

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

ISBN : 378-967-2988-39-7

This study was carried out to determine the lateral position of motorcyclists within the road cross-section. Observations on motorcyclists were carried out on Federal Roads at 13 locations located at Kedah, Penang, Perak, Selangor, Negeri Sembilan and Johor. Federal roads have various cross-section designs such as single or dual carriageways roads or roads with varies paved shoulder width and presence of motorcycle lane. This study observed the motorcyclists' lane and lateral position preference with respect to road cross-sections. Motorcyclists riding pattern at each location were recorded using video camera for one (1) hour during each peak and off-peak hour, and the lane and lateral position were determined from recordings. In addition, motorcyclists' spot speed were collected.

It was found that most motorcyclists would use the non-exclusive motorcycle lane (NEML) when available as observation showed 95% to 97% of motorcyclists used the NEML on a 2L1C sections with standard separator road markers. Motorcyclists' second preference was paved shoulder (PS) with a width of 1.9 m or more with good surface condition. However, if the NEML or PS was located on 4L2C section, the usage rate of NEML or PS was lower as some motorcyclists used the travel lanes. On 4L2C road sections without NEML or PS, motorcyclists tended to use slow lane (SL) as compared to fast lane (FL). In terms of lateral position, generally motorcyclists tended to stay away from hazards such as unpaved shoulder, physical median and opposite lane. On NEML or PS, motorcyclists tended to ride on the middle and right parts of the lane. On the SL, motorcyclists tended to ride on the left or middle parts of the lane which was similar on the FL.

Speed behaviour of motorcyclists was also measured using spot speed method. It was found that speed of motorcyclists on NEML or PS was significantly slower as compared to speed of motorcyclists on the main lane. This indicated that NEML or PS could influence motorcyclists to ride slower which is a positive factor in term of road safety. In addition, the NEML and PS separate motorcyclists from other motorized vehicles which could reduce the risk of crashes among motorcyclists. Therefore, the provision of NEML or sufficient PS could provide positive effects to the safety of motorcyclists.

The findings of this study may provide some insights to stakeholders on motorcyclists' riding patterns in a road cross section and for future researches to be carried out as currently, there is little information about the riding behaviour of motorcyclist on Malaysia roads.

MRR No. 427

Assessment Mechanism on Implementations of Proposed Recommendations from in Depth Crash Investigation Findings

Author(s) : Ahmad Noor Syukri Zainal Abidin, Kak D-Wing, Mohd Amirudin Mohamad Radzi, Siti Atiqah Mohd Faudzi, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

Since year 2007 till November 2017, MIROS have investigated a total of 29 national inquiry cases which mainly involved cases with national and public interest or cases which involved mass casualties. From the investigation findings, quite a number of proposed recommendations have been formulated and reported to the Ministry of Transport. Despite all the investigation works and recommendations being proposed, lack of monitoring and assessment activities by relevant agencies towards the implementation of the said recommendations have resulted in poor level of execution and response by the agencies towards the proposed recommendations. Furthermore, no method on continuous monitoring on the progressive status of the implementation was available and implemented. Without proper monitoring on the implementation of the proposed recommendations, it is doubtful that the highlighted issues from

the in depth investigations have been properly taken into actions and that the reoccurrence of such major crashes may still exist. Due to the needs of developing a systematic and structured monitoring mechanism for the proposed recommendations, this study was initiated. This monitoring mechanism is formed based on the five pillars (5) addressed under the Decade of Action (DoA) for road safety. The developed mechanism will serve as useful tool for future monitoring and assessment works conducted by any monitoring agencies.

MRR No. 428

An Understanding of Motorcycle Commuting Usage, Crashes and Injuries in Klang Valley

Author(s) : Mohd Hafzi Md Isa, Ahmad Noor Syukri Zainal Abidin, Azhar Hamzah, Mohd Syazwan Solah, Kak D-Wing, Zulhaidi Mohd Jawi, Nur Nazirah Mohd Nazri, Zarir Hafiz Zulkifli, Harun Bakar, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-40-3

Motorcycle has always been the preferred mode of transport for workers to travel to and back from work places due to its cheaper option and convenience to move around. This has led to a high number of commuting crashes involving motorcyclists as compared to other road users in Malaysia. Due to limited number of local and international studies on motorcycle commuting and crashes, this study was initiated to understand the motorcycle commuting usage, crashes and injuries in the urban setting area i.e. Klang Valley, Malaysia. To accomplish the specified objectives, this study utilized prospective data collection approach through interviews with workers who had been involved in motorcycle commuting crashes and were present during medical doctors' assessments for Social Security Organization's claims. Despite failing to obtain targeted 400 data and cover the whole Klang Valley area due to several unavoidable reasons, the researchers managed to interview 160 respondents at Hospital Tengku Ampuan Rahimah (HTAR). Key findings from this study revealed that most of the workers owned foreign motorcycle brands, bought their motorcycles as new with loan payments, took at least an hour to

travel to and back from works, exposed to busy traffic conditions and perceived higher risk to be involved in road crashes. Based on their previous crash experiences, most of the crashes occurred during morning rush hours to work, at intersections and busy areas, were side impact configuration and mostly against passenger cars, and were mainly due to human factors. Since all of the investigated cases were non-fatal cases, the injury patterns skewed towards the moderate-severe injury level of Maximum Abbreviated Injury Scale (MAIS) i.e. MAIS 2 which includes skin lacerations, slight opened wounds, dislocations and minor bone fragmentation. After taking into consideration all the findings, future studies and potential recommendations are proposed at the end of this report for consideration by related organizations and authorities.

MRR No. 429

The Effectiveness of the Zig-Zag Marking Approaching Pedestrian Crossing – A Case Study at Jalan Burma, Pulau Pinang

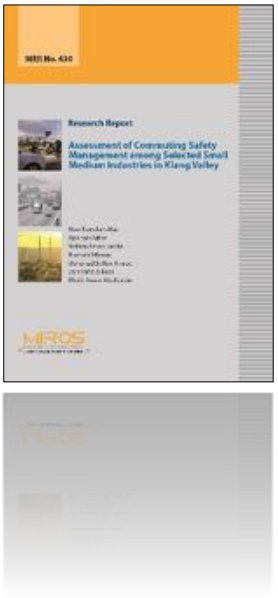
Author(s) : Mohd Shafie Nemmang, Nora Sheda Mohd Zulkiffli, Ho Jen Sim, Norfaizah Mohamad Khaidir, Syed Tajul Malik Syed Tajul Arif, Alvin Poi Wai Hoong, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-41-0

Zig-zag road marking normally painted in approaching pedestrian crossing and intersection. The purpose of the zig-zag marking is to inform road users that the area is prohibited for parking or overtaking to ensure the visibility and safety of pedestrians. The usage of zig-zag marking in other countries is not something new, but in Malaysia, none of the zig-zag markings was observed on the roads. With the aim to increase the safety of pedestrians at pedestrian crossing areas, the City Council of Pulau Pinang (MBPP) has decided to paint zig-zag marking in approaching selected pedestrian crossing. The zig-zag marking is hoped to increase awareness for the driver to reduce speed and alert the presence of pedestrians. Since this is still new in Malaysia context, the Malaysian Institute of Road Safety Research (MIROS) was invited to conduct a study in collaboration with MBPP to evaluate the effectiveness of the zig-zag marking. The study location was located in Jalan Burma, Pulau Pinang. The data collected on-site are vehicle

speed, traffic volume, braking behavior, pedestrian capacity, and public survey. The data collection was carried out before the installation of zig-zag marking and were compared with 1-day, 7-days, and 30-days after installation. The effectiveness was defined as: (i) a decrease in vehicle speed approaching the pedestrian crossing and (ii) an increase in motorist awareness in advance of the crossing locations. The results show that there are no significant differences in speed profile between before and after the installation. Public also unaware with the installation of zig-zag marking where most of them feel that the zig-zag marking unable to improve pedestrian safety. The insignificant results obtained may be due to the inappropriate study location i.e. too closed with adjacent intersection where the vehicle speed is.

MRR No. 430



Assessment of Commuting Safety Management among Selected Small Medium Industries in Klang Valley

Author(s) : Noor Kamaliah Alias, Aziemah Azhar, Wahida Ameer Batcha, Ilhamah Othman, Mohamad Suffian Ahmad, Zarir Hafiz Zulkipli, Khairil Anwar Abu Kassim

ISBN : -

n/a

MRR No. 432

Evaluation of the Effectiveness of OPS Bersepadu Chinese New Year 2019

Editor(s) : Syed Tajul Malik Syed Tajul Arif, Muhammad Marizwan Abd Manan, Low Suet Fin, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-44-1

This report contains evaluation study of the effects of OPS Bersepadu Chinese New Year 2019 (OPS CNY 2019). OPS CNY 2019 evaluation study was conducted on 1 January 2019 to 12 February 2019. 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 on enforcement and advocacy and road users' behavioural changes. Among the measured variables are vehicle speed, traffic volume, heavy vehicle banning, road safety information dosage, perception of being caught, child restraint system (CRS) usage, helmet wearing, seatbelt wearing and high profile crashes. 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 before and during OPS baseline period was observed.

The study shows that there is no significant mean speed reduction during OPS when the speed limit was reduced from 90 kph to 80 kph on federal roads. Meanwhile, there was overall volume decrease during OPS by 2.8% as compared to before OPS on observed federal road sections and increased compliance to the heavy vehicle banning strategy as compared to last year. There was a reduction of road users' perception on enforcement for this year as compared to last year Chinese New Year festive period. Child restraint system has seen an increase of usage however, the usage rate was still low and not exceeding 50%. Helmet usage rate was higher during OPS at 94.2% which was higher than last year at 92.7%. For seatbelt wearing, seatbelt for driver saw the increase of usage rate from 91.1% to 93.2%. However, for front passenger seatbelt saw a decrease in wearing rate from 66.5% to 61.2%. Rear passenger also saw a decrease in wearing rate from 3.8% to 2.5%.

Lastly, high profile crash investigations saw an increase in cases from six (6) before OPS to eight (8) cases during OPS.

These findings reveal that the OPS Bersepadu Chinese New Year 2019 road safety strategy has some positive effects on road users especially on vehicle banning, CRS usage rate, helmet and seatbelt wearing rate. However, it can be further improved in speed management, perception of being caught (POBC) and high profile crash. This report highlights the recommendations for improvement for future OPS.

MRR No. 433

Drivers' Behaviour Change towards the Warning Sound of the In-Vehicle Monitoring System

Author(s) : Nuur Sakinah Azman, Ahmad Azad Ab Rashid, Hizal Hanis Hashim, Muhammad Ruhaizat Abd Ghani, Sharifah Liew, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : -

This research aims to identify the drivers' behaviour change towards the warning sound of the In-Vehicle Monitoring System (IVMS). The study utilised data from a questionnaire and the IVMS comprising of the Advanced Driver-Assistance Systems (ADAS) and the On-Board Diagnostics (OBD). Fifteen (15) respondents participated in the questionnaire while 20 vehicles were installed with the IVMS devices. The questionnaire intended to determine the sensation seeking level and anger level of the respondents, while the data from the ADAS was used to observe the behaviour change. The results found that two (2) female drivers were high sensation seekers while two (2) male respondents and two (2) female respondents have a high level of anger when driving. A decrease of 20% in overall violations was also observed during the unblind mode whereas the percentage increased by 26% during the re-blind phase. Thus, this shows that there is a behavioural change among drivers as a result of the warning sound of the IVMS.

MRR No. 434

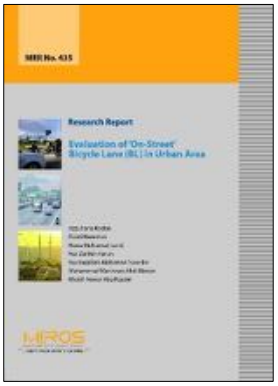
Effectiveness of OPS Hari Raya Aidilfitri 13/2018: An Evaluation Study

Editor(s) : Noor Faradila Paiman, Nuur Sakinah Azman, Mohd Rasid Osman, Low Suet Fin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-45-8

This report contains evaluation study of OPS Hari Raya Aidilfitri (HRA) 2018 that was started on 9 June 2018 and ended on 22 June 2018 with additional two (2) days, 23 and 24 June 2018 for vehicle banning strategy evaluation. The evaluation was conducted through several research projects. These projects support two (2) main indicators of the OPS HRA effectiveness i.e. road users' perception on enforcement and advocacy, and road users' behavioural changes. Among the measured variables are traffic volume and vehicle speed, seatbelt 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. The findings showed a positive effect on the Perception of being caught (POBC), seatbelt wearing rate for front and rear passengers, helmet wearing, vehicle banning strategy, the percentage of media messages received and an increase in enforcement visibility during the OPS period. However, road users did not comply to the speed limit and the use of the CRS is still relatively low during the OPS period. Overall, the OPS HRA 2018 showed a positive effect on road user behaviour although several improvements are still needed in order to achieve a satisfactory road safety target. The studies have proposed individual recommendations to improve the effectiveness of the OPS strategies, especially for those which do not show an improvement during the OPS period.

MRR No. 435



Evaluation of 'On-Street' Bicycle Lane (BL) in Urban Area

Author(s) : Azzuhana Roslan, Rizati Hamidun, Hawa Mohamad Jamil, Nur Zarifah Harun, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-46-5

Bicycle lanes reduce real and perceived risks for bicycle vs. other vehicle road crashes, reducing the load of traffic injuries and contributing to better cycling participation. This study aims to evaluate the utilization rate of on-street bicycle lane (BL) among Malaysian cyclist and identify the risk that might happen to cyclists as a result of misuse of the BL. This study also conducted an online survey among the public to identify their perception of safety towards the visibility of on-street BL. Total six (6) locations of on-street BL was observed. Result found the number of cyclists uses a BL was lower. However, an observation also found motorist tend to use a bicycle lane during peak hour. Cyclist stated they feel unsafe when riding either at bicycle lane. This might due to observation show most of the motor vehicle prone to park and drive thru the bicycle lane. Some pedestrian use bicycle lane as a walkway or jogging path. Cyclist also agreed law regarding cyclist/lane need to be improved.

MRR No. 436

Safe Cycling in Malaysia – A Documentary Perspective

Author(s) : Azhar Hamzah, Aqbal Hafeez Ariffin, Mohd Syazwan Solah, Noor Faradila Paiman, Zarir Hafiz Zulkipli, Khairil Anwar Abu Kassim

ISBN : -

Bicycling or cycling has been given less attention as a transport mode or for work commuting in Malaysia, for quite a number of years. The introduction of motorized vehicle such as motorcycles and cars may have been one (1) of the strong influencing factors for the decrease in use. Safety and environmental matters on road are another great concern among cyclists and has been widely studied in relevant literatures.

Cycling regulation addressing the users conducts on roads are explained in documents but there was some vague information with respect to sharing lanes or roads. Although cycle lane could be easily spotted in many cities, in many situations there were underutilized and defragmented from the main transport route, thus seems incomplete in connectivity. The effort and enthusiasm to promote cycling at municipal and local level is very inspiring and shall be supported by the relevant agencies. With respect to Malaysian Standards, there are a few relevant standards that addressed the cycle specifications and the safety items such as cycle helmet.

From road crash perspective, injury records have been showing a decreasing trend for the past decades and in-depth analysis may be able to uncover the causes for the reduction so that sustainable action could be planned.

Keywords: Cycling, cycle standards, cycle crash

MRR No. 437

When Do Malaysia Road Fatalities Start to Stabilize?

Author(s) : Rohayu Sarani, Akmalia Shabadin, Kamarulzaman Ibrahim, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

The Decade of Action for road safety 2012 to 2020 outlined five (5) pillars in reducing the sufferings and injuries due to road safety. Under the road safety management pillar, each country should be able to set road safety targets based on long term performance. Measuring of the long term performance requires analysts to determine the long term trend in the number of fatalities and the exposure variables. This research presents a review of the long-term trend in road fatalities and investigates of whether there is a turning point in road deaths, after considering a continuous increment in exposure, namely the number of registered vehicles and population. This changes definitely affect road safety, in the long run. This study utilizes time-series data of the population, the number of registered vehicles and the number of road deaths for the year 1972 to 2018. The series is compiled from three (3) different sources, Annual Road Accidents Statistics Malaysia, Road Transport Department and the Statistics Department of Malaysia. Reduction in road fatalities is measured by a reduction in personal risk. The personal risk is the ratio of the number of road deaths per 100,000 population. The motorisation rate is calculated by dividing the number of vehicles per 1,000 population. The objective of this study is to model personal risk, as a function of the motorisation rate. A piecewise regression model is fitted to the data and both independent variables (motorisation rate and turning point dummy variable) are significant in explaining the personal risk. A plot of personal risk as a function of the rate of motorisation showed that there are two (2) distinct trends of personal risk. From the early '70s throughout half part in the '90s, the coefficient of motorisation rate is positive. This indicated that for every one (1) unit increases in motorisation rate, the personal risk is expected to increase by 0.026. When the motorisation rate lapsed 363 vehicles per 1,000 population, the coefficient of motorisation rate is negative, where personal risk is expected to decrease by 0.01. Thus, Malaysia road

fatalities started to stabilized when the personal risk reached 30 deaths per 100,000 population and motorisation rate at 363 vehicles per 1,000 population. The personal risk, considering the increment in exposures shows that it has reduced since the year 1996.

MRR No. 438 (RESTRICTED)

Post-Crash: The Establishment of Photo Documentary on Road Crash Victims

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

ISBN : -

The seriousness road crash fatalities in Malaysia requires an out-of-the-box and creative approach to alleviate the situation. From education to engineering to enforcement, the softer approach such as the use of arts in communicating road safety would add to another dimension that leaves no stone unturned. This study explores the effectiveness of the post-crash images of road victims when used as a tool to communicate road safety awareness. Certainly, the photo documentary through series of photographs can be used for various campaign platforms.

Following approval either from victims or their respective family, a total of 20 subjects (road crash victims) were identified and documented in the form of 35 mm film photography and darkroom print. Each victim's, or the respective caretaker, was also interviewed in order to record the event that led to the crash and the post-crash implications to the victims and family.

The photos were captured with films and were self-processed in the darkroom, then printed on 16 x 20 inch Ilford Multigrade FB Classic Paper for exhibition at the Vehicle Safety Week in Melaka and Sekolah Kebangsaan Jalan Bukit 1, Kajang. To determine the effectiveness of the photographs in delivering road safety message, the audience were given a set of Google Form questionnaire via WhatsApp application. Forty-five (45) respondents answered the questionnaire which were made of 10 statements regarding the subject. The results indicated that majority of the respondents believed that black and white film photography can be an effective tool to promote a safer road. The respondents also agreed that similar exhibitions should be held more frequently.

In conclusion, the use of art, namely black and white photography on crash victims' sufferings can evoke audience's emotion. Therefore, these images should be extensively exhibited to sell the idea of safer roads for everyone. Besides, the use of these photographs should be amplified into other platforms such as books and social media for higher reach among intended audience.

MRR No. 439

A Study on Socio-economic Characteristics of Weekend Riders in Malaysia

Author(s) : Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Sharifah Allyana Syed Mohamed Rahim, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-47-2

In creating road safety infrastructure, advocacy, and strategies, Malaysia is severely lacking in understanding the socio-economic characteristics of weekend riders. This study identifies the major socio-economic factors affecting weekend riders in order to describe it fully and compare it to leisure riders in other countries. Although the subject matter drew a lot of reluctance from the public to complete the questionnaire, the results obtain are in line with the results compared with in Australia and the European Union. The study found that weekend riders are motorcyclists who ride for leisure, who are males above age 41 and generally ride solo or in small groups of up to five (5) riders.

MRR No. 440

Exploratory Study on Characteristic of Cyclist at Expressway

Author(s) : Azzuhana Roslan, Nur Zarifah Harun, Nora Sheda Mohd Zulkifli, Sharifah Allyana Syed Mohamed Rahim, Nurulhuda Jamaluddin, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-48-9

The government has imposed a ban on group biking on highways, especially those with three (3) lanes. The signage of bicycle bans has also been installed on the expressway. However, cycling at expressway is seen as a trend among Malaysians as a sports/leisure/physical activity especially among man. Therefore, this study was conducted to explore the characteristic of cyclist along selected rural expressway in Malaysia. The observation was conducted during peak and off-peak period on weekend. The data consist of traffic composition, vehicle speed and usage of personal protection equipment (PPE). Total three (3) expressway involve in this study which two (2) lanes expressway, three (3) lanes expressway and three (3) lanes expressway provided with motorcycle lane. Observation found that on expressway without motorcycle lane, over 90% of the cyclist use emergency lane as their cycling path. Meanwhile 100% of cyclist cycling at motorcycle lane at expressway built with motorcycle lane. Study also found the maximum speed of cyclist is 55 km/h. In terms of usage of PPE among cyclist, most of them use a bicycle helmet and wearing a proper attire with bright shirt. However, result show over 60% of them did not use any blinker at their bicycle.

MRR No. 441

Development of Mobile Application for Safer Riders Behavioural Scores (SCORES)

Author(s) : Mohd Firdaus Mohd Siam, Ahmad Azad Ab Rashid, Mohd Khairul Alhapiz Ibrahim, Noradrenalina Isah, Nuura Addina Mohamad, Low Suet Fin, Azhar Hamzah, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-50-2

Road accidents in Malaysia especially involving motorcyclists are extremely alarming. As a result, our country has been suffered significant losses especially in term of human capitals. Therefore, comprehensive and effective efforts must be taken by all parties either government or private organizations to address these critical issues. Malaysian Institute of Road Safety Research (MIROS) as the leading institution that focuses on road safety research in Malaysia has developed a mobile application approach as one (1) of the initiatives to overcome the problem. This report highlights the development of the mobile application that be able to measure safe riding skills among motorcyclists, which then called as Safer Riders Behavioral Scores (SCORES). The development involved the identification of four variables that contribute to safe riding skills which were stress, fatigue, situational awareness and hazard perception. The process of measurement, integration, analysis and results display of the identified variables were performed by the SCORES mobile application. The main page of SCORES contains evaluation components (i.e. rider details and all four variables) and information icons (i.e. contact us, application details, additional participants, main page, participant list with scores, server setting and user profile). All the recorded data can be accessed and downloaded from the secured server for further data analysis. It is hoped that the SCORES will give benefits to the society particularly motorcyclists for road safety betterment in Malaysia.

MRR No. 442

Study of Readiness on Malaysia Bus Star Rating (MBSR) Compliance among Participated Express Bus Companies in Malaysia

Author(s) : Wahida Ameer Batcha, Noor Kamaliah Alias, Ilhamah Othman, Aziemah Azhar, Ahmad Saife Salleh, Najwa Shaari, Norainy Othman, Mohamad Suffian Ahmad, Zulhaidi Mohd Jawi, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-49-6

Due to the importance of safe operation by the express busses, implementation of SSG was announced to be compulsory for all express busses in Peninsular of Malaysia in 2020. To make sure that this program could be implemented comprehensively, elements of SSG was integrated with SPAD ICOP (SPAD, 2016), and branded as Malaysia Bus Star Rating (MBSR). Prior to introduction of the MBSR, this study aims to identify readiness of express bus companies to comply to the MBSR. A cross-sectional study design was employed among participated express busses to meet the objectives. The study was carried out through site assessment as well as analysis of secondary data. Compliance of MBSR was assessed using pre-developed MBSR checklist. The site assessment was performed through document verification, interview session involving employer and employee representative as well as site inspection of office, depot and ticket counter. Meanwhile, the SSG compliance was analysed using secondary data retrieved from existing SSG database. A total of five (5) express bus companies participated in the study. As overall, the key finding revealed from the study are i) None of the participated express bus companies obtained any star in MBSR, ii) As compared to SSG, four (4) out of five (5) companies showed reduction on score of MBSR, iii) More than half of the companies did not comply elements policy, driver management, route and risk management, service performance as well as comfort with percentage ranged from 25% to 100 %. Thus, based on the the key finding highlighted, the study would like to recommend that review on the existing MBSR criteria should be consider to ensure MBSR is achievable without jeopardise safe operation by express bus companies in Malaysia.

MRR No. 443

Development of Malaysian Road Assessment Programme at School (MyRAP@School) – A Pilot Study in Selangor

Author(s) : Siti Zaharah Ishak, Akmalia Shabadin, Nor Aznirahani Mhd Yunin, Nur Zarifah Harun, Alvin Poi Wai Hoong, Muhammad Marizwan Abdul Manan, Hizal Hanis Hashim, Rizati Hamidun, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-51-9

Road safety is considered a major issue of public health, both at a global level, and in Malaysia. As road traffic crashes cause internal costs, directly and external costs, indirectly, the social and economic implications of road safety can affect the sustainable development of countries. In the Road Safety Plan Malaysia 2014 - 2020, several strategies have been introduced to improve road safety among schoolchildren. However, in order to make the road safety aim achievable, the three (3) E's - Enforcement, Engineering and Education measures – are to be combined. This paper briefs on the research framework for the development of Malaysian Road Assessment Programme for school.

The aim of this research is to develop a systematic database consists of star rating that represents the level of risk of road infrastructure around the school vicinity. This aim will be achieved through the development of a Standard Operating Procedure (SOP) for conducting systematic road assessment at school areas. An evidence-based intervention programmes based on iRAP Star Rating for Schools will be determined based on established criteria for each potential intervention programme and recommendation will be provided to relevant stakeholders. An integrated risk categorization matrix around school vicinity by integrating iRAP star rating for school model and the exposure model of schoolchildren will also be established.

This study was conducted at 58 schools consisting of primary and secondary schools with various built environment within Selangor. The outcome of this study is the Safer2School risk model where this model was developed by integrating the road engineering risk score and exposure factor by multiplying both the parameters. The intervention matrix was introduced and the suitable intervention program for schools will be suggested based on the score and the

exposure factor value. The motivation of having this models and tools established can led to the same approach to complete iRAP star rating at school to be implemented to nationwide.

MRR No. 444

Factors Associated with Stress among Commuting Motorcycle Riders in Malaysia

Author(s) : Nuura Addina Mohamad, Nurulhana Borhan, Noradrenalina Isah, Mohd Khairul Alhapiz Ibrahim, Ahmad Azad Ab Rashid, Mohd Firdaus Mohd Siam, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-52-6

Motorcycle riding is one (1) of the main public transport modes in Malaysia. The scenario has been plagued with the fluctuation in annual death rate on the road where majority of casualties come from motorcycle riders and pillions. Considering existing evidence about risk taking behaviour and physical discomfort among riders, the matter on stress while riding needs to be properly addressed. This study aims to understand the factor associated with stress among commuting riders. Driver Stress Inventory (DSI) is used to measures riding stress specifically from riding environment while Perceived Stress Scale (PSS) is utilized to examine perceived stress from life situations. Findings suggest that riding stress is prevalent among riders with the source of stress coming from aggression, dislike of riding, hazard monitoring, thrill seeking and proneness to fatigue. Demographic factors influencing riding stress include age, having children, marital status, work related ride, traffic violation and crash involvement. Riding stress shows no significant relation to riding exposure but has mild relation to perceived stress. Future studies on riding stress may want to look in-depth at the different group of riders affected by stress and specifically determine the external source of stress that may be affecting the motorcycle riders. The knowledge of stress among riders can be put to use by developing tools and designs to handle stress on the road.

MRR No. 445

Understanding Car User's Practices and Behaviour in East Malaysia from Automotive Consumerism Perspective

Author(s) : Iskandar Abdul Hamid, Zulhaidi Mohd Jawi, Mohd Hafzi Md Isa, Syed Tarmizi Syed Shazali, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim, Ahmad Noor Syukri Zainal Abidin

ISBN : 978-967-2988-53-3

This study is conducted to identify the car user's practices and behaviour in Kuching and Kota Samarahan, with focus on three (3) specific areas: car ownership profile; travel pattern and exposure; and cost of vehicle ownership (CVO). As a partial continuation of the previous study in Klang Valley, this study took the Kuching and Kota Samarahan car commuters as the representation of the above-mentioned practices and behaviour. As current data and other studies suggest that the ownership of cars in Malaysia is among the world's highest, this study is vital to explain the status quo of Malaysia's car users' ownership experience and its relationship with the effort to create a safe and sustainable road traffic system in the country. This study is intended to gain a better overview on the scenario of automotive consumerism in Malaysia by using Kuching and Kota Samarahan which representing rural and city areas in East Malaysia, in addition to Klang Valley automotive consumerism data which represent big cities and West Malaysia.

With majority of respondents were Malay and Local Ethnic, married and working with the government and private & GLC, their average income were between RM 3,000 and RM 5,000 per month. Majority of respondents were using new national cars (Proton and Perodua) by credit (hire-purchase) method and they don't have motorcycles. Majority of the respondents bought the vehicle based on their own decision, satisfied with it, and they don't have any specific ownership plan for the vehicle. The maximum travel time to and from work is 145 minutes with distance covered of maximum 150 km, while the stopovers were mostly not more than once. Majority agreed that the route taken for commuting were either not risky or unsure about the risk, and the traffic condition was either bad or unpredictable. Vast majority of respondents travelled during the weekend, and mean costs for monthly fuel and parking were RM 332.63 and RM 36.27, respectively.

MRR No. 446

Risk Taking Behaviour among Young Motorcyclist

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

ISBN : -

Motorcyclists represent an important concern from a road safety perspective. In Malaysia, road fatalities involving motorcyclists are the highest among the South East Asian countries. Young motorcyclists are known to engage in being risky behaviour on the road. This study is conducted to better understand the unique characteristics of risk-taking behaviours among young motorcyclist. The main objective of this study is to determine the risk-taking behaviour among young motorcyclist. This study focuses on secondary school students aged 15 to 18 years. A total of 921 students were involved in this study whereby they were gathered in school hall and classroom to participate in the study. ANOVA test conducted to determine the risk-taking behaviour among different age group of motorcyclist shows that there was a significant difference of age on risk riding behaviour [F (3, 917) = 3.595, p = 0.013]. Post hoc comparisons show that students aged 17 years old was significantly different compared to students aged 15, 16 and 18 years old. Path analysis is conducted to identify the factors that lead towards risk riding behaviour. It shows that sensation seeking has the highest standardised beta estimate on risk riding behaviour. The value of coefficient of determination, R^2 for risky riding behaviour is 0.87. This indicates the contribution of sensation seeking, personal traits, attitude and affective risk perception in estimating risk riding behaviour is 87%.

MRR No. 447

Perception and Knowledge of Retro-Reflective Marker (RRM) Usage on Heavy Vehicles

Author(s) : Mohd Rasid Osman, Mohd Amirudin Mohamad Radzi, Mohd Syazwan Solah, Ilhamah Othman, Ahmad Noor Syukri Zainal Abidin, Azhar Hamzah, Zarir Hafiz Zulkipli, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

In order to ensure the smoothness of implementation of the new policy, MS 828:2011, awareness among road users as the main stakeholders is crucial. Thus, to compliment the previous study conducted by MIROS on the current status of RRM usage, this study was initiated focusing on the usage of RRM for commercial vehicles in Malaysia. The aim of this study is to measure the lorry drivers' perception and knowledge to retro-reflective marker usage on heavy vehicles. The focus of this study mainly relates to identifying the level of knowledge possessed by lorry drivers and their perception with regards to RRM usage in Malaysia.

This study uses a cross-sectional study design which involves only one-time data collection. The design was selected to measure the lorry drivers' perception and knowledge towards RRMs usage on heavy vehicles by using a questionnaire survey as the primary data. It contained five (5) sections which included socio-demographics, knowledge of usage of retro reflective marker (RRM), perception and experience towards usage of RRM, enforcement activities towards usage of RRM and experience and perception of being caught.

Based on the results from this study, the majority of the lorry drivers have their own knowledge of usage of RRM in terms of installation, the importance of RRM and the benefits of using RRM. Besides that, for perception and experience towards the usage of RRM, findings from the study showed that 56.3% of the drivers admitted and believed that the installation of RRM on their lorries is important and can avoid rear end collision.

Findings from the study have also shown that 51.6% and 69.0% of the drivers admitted that the high frequency of enforcement activities towards the usage of RRM will increase the usage of standardized RRM and strongly agree on the enforcement activities

towards the usage of standardized RRM in order to increase the road safety level in the country respectively. Last but not least, also based on the study findings, most of the drivers (92.9%) have never been summoned by the enforcement agencies due to not installing the RRM to their respective lorries.

To conclude, the study provides useful insight to related agencies, particularly with regards to heavy commercial vehicle drivers' perception of the benefit and advantage of the RRM. This may help relevant stakeholders to strategize the implementation and advocacy programs related to RRM in Malaysia.

MRR No. 448

Child Restraint System (CRS) Use among Public in Klang Valley Towards the Year 2020's CRS Legislation

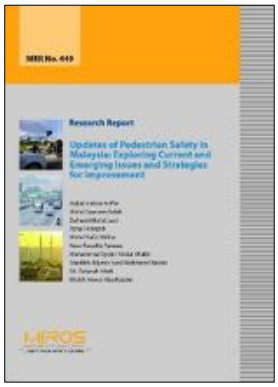
Author(s) : Nurulhana Borhan, Low Suet Fin, Mohd Khairul Alhapiz Ibrahim, Nuura Addina Mohamed, Mohd Firdaus Mohd Siam, Noor Faradila Paiman, Yahaya Ahmad, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-54-0

In early 2019, the Ministry of Transport introduced a government's initiative to reduce child injury in road crashes in Malaysia through a formulation of law to make the use of the child restraint system (CRS) in private cars as mandatory. The law was scheduled to be implemented beginning 1 January 2020. This study aims to determine the public perception on the use of a CRS in Klang Valley. Four hundred (400) respondents responded to a self-administered questionnaire distributed in both rural and urban areas in Klang Valley. The study found that more than two-thirds of the respondents were not aware of the legislation to make the use of the CRS mandatory. However, despite the low awareness of the legislation, the use of CRS among them was relatively satisfactory at 45% to 47% using rate. No significant differences in terms of CRS ownership were observed between respondents in the urban areas and those in rural areas. On the source of information on CRS, respondents in the urban area reported to have obtained the information through CRS salesperson while the respondents in the rural area preferred to get the information from social media. This study also revealed that the public would not restrain their children in a CRS if their children refuse to sit in the seat. In addition, the

majority of the respondents would not use a CRS if the CRS is in a different vehicle than the one they were driving. The majority of respondents had no specific preferences on the criteria of a CRS to be used. Based on the findings, this study recommends that campaigns should be conducted frequently and effectively throughout the country to increase awareness on the benefits of CRS and the planned legislation. The knowledge about CRS should also be spread out in terms of the correct installation in a vehicle and the choice of suitable CRS for children.

MRR No. 449



Updates of Pedestrian Safety in Malaysia: Exploring Current and Emerging Issues and Strategies for Improvement

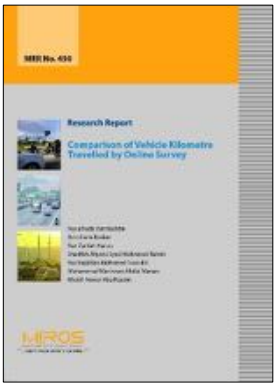
Author(s) : Aqbal Hafeez Ariffin, Mohd Syazwan Solah, Zulhaidi Mohd Jawi, Azhar Hamzah, Mohd Hafzi Md Isa, Noor Faradila Paiman, Muhammad Syukri Abdul Khalid, Sharifah Allyana Syed Mohamed Rahim, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-55-7

According to the recent WHO global status report on road safety 2018, more than half of the estimated 1.35 million deaths of the world's roads per year are among those of vulnerable road users (VRU) - motorcyclists (28%), pedestrians (23%) and cyclists (3%). In Malaysia, statistics revealed that the amount of road accident injuries and fatalities involving pedestrians are a serious concern and has remained as the third highest for many years. Despite efforts to improve pedestrian safety, the number of pedestrian deaths has shown slight improvements. This study was conducted to foster an understanding of existing and emerging pedestrian safety issues as well as explore the current and potential related strategies for improvement. The method used include FGDs and technical meetings with relevant stakeholders and individuals with expertise in pedestrian safety. Several important existing and emerging pedestrian safety issues as well as gaps identified are among all include inadequate enforcement of traffic laws, lack of pedestrian facilities in roadway design and land-use development, lack of awareness and education, human-related factors such as distraction and attitudes, and pedestrian-vehicle collisions. Recommended strategies and interventions for improvement must

cover all related aspects based on the 3E's approach for road safety: Enforcement, Education (human), and Engineering (road and infrastructure, and vehicle).

MRR No. 450



Comparison of Vehicle Kilometre Travelled by Online Survey

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

ISBN : -

The data of kilometre travelled are often used to indicate levels of road safety. New road safety targets can be determine based on deaths per billion kilometres travelled which describe the actual involvement in risky situations (Radin, 2005). The objective of this study is to assess impacts of online survey on socio-demographic profile into establishing the practical procedure for data collection of odometers reading, to compare the online survey over the interview survey in the VKT data collection procedure and to develop the optimal survey strategy on collecting VKT data. This study used the combination of questionnaire by online survey and social communication (WhatsApp) survey. The tool to develop the online questionnaire was the Google Form. It is because this study needs to collect the first and second odometer reading to calculate the difference of odometer reading to estimate the distance. The VKT online survey has a significantly higher proportion from centre area and significantly lower percentage of female respondents. Respondents from middle age group responded better on online survey. This study suggest that for data collection on VKT the mixed method (interview, telephone, mail and online survey) strategy could use to increase a sample.

MRR No. 451

Self-Reported Factors Associated to Non-Fatal Crash Involvement among Car Drivers and Motorcycle Riders

Author(s) : Nuur Sakinah Azman, Nor Fadilah Mohd Soid, Maslina Musa, Sharifah Liew, Roziana Shahril, Amelia Hazreena Abd Ghani, Normala Malik, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-56-4

The aim of this study is to analyse the factors associated to non-fatal crash involvement among car drivers and motorcycle riders involved in accident for the past five (5) years. The face-to-face interview approach was used in this study and the components of the questionnaire asked for the respondent's demographic details and details of the road crash they were involved in. The study took place from 2015 until 2018 and a total of 954 respondents participated in the study. The findings of this study showed that the highest causal factors related to the non-fatal crash involvement among car drivers and motorcycle riders are other factors than those listed in the table, apart from the crash not being caused by the respondents. The study also found that the majority of the crashes occurring among car drivers and motorcyclists from 2015 until 2018 were multiple-vehicle crashes. A large majority of the respondents who were motorcycle riders wore a helmet when the crash occurred, and that those who were drivers were mostly wearing their seatbelt. Most of the age groups of motorcyclist riders involved in road crash in 2018 sustained light injuries while most of the age groups of the car drivers involved in road crash in 2018 sustained no injuries.

MRR No. 452

Development of Malaysia Road Assessment Programme (MyRAP) Star Rating Model for Inter-Urban Expressway

Author(s) : Alvin Poi Wai Hoong, Sharifah Allyana Syed Mohamed Rahim, Akmalia Shabadin, Norfaizah Mohamad Khaidir, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-58-8

Since the launch of the iRAP Malaysia Programme in 2016, MIROS had evaluated a total of 2,370 km of inter-urban expressways using the Version 3.02 star rating model. Due to the globalized nature of the model in assessing the risk for numerous countries, the results were found not representing the actual safety performance of the expressways. Based on an analysis between the star ratings and crash data, some of the star rating results did not match the actual crash records i.e. high star rated sections were observed to have high crash rates and vice versa. This can be true in the sense that some other unique factors were not included in the model. Judging from the fact that the road and traffic environment differs from country to country, there is a need to improve the accuracy of the model in assessing the crash risk by incorporating risk factors that reflect the local experience. Therefore, this study attempts to revise the iRAP model by incorporating several new risk factors in the iRAP model developed using Malaysia crash data. Using crash data along the PLUS E1 and E2 expressways, risk factors for number of lanes and percentage of vehicle were developed and adopted in the new model. The baseline risk scores for a total length of 1,234.7 km (12,347 segments of 100 m each) were added with risk scores related to rear end crash types and new star ratings were generated. The relationship between the new star ratings and crash data was examined through the Spearman's Rank correlation test. The new risk factors (or crash modification factors) related to rear end crash types developed for number of lanes increased the risk scores for road segments with more than two (2) lanes by a scale of 1.3. In other words, the risk of rear end crashes on roads with more than two (2) lanes increases by 30% compared to roads with only two (2) lanes. This is reasonable in the sense that a significant proportion of heavy vehicles were observed to occupy

lanes other than the slow lane, especially the middle lane. As more lanes are provided, the likelihood of rear end crashes between heavy vehicle and other vehicles increases on that particular road segments, judging from the fact that there is huge speed differential between these two vehicle types. The risk of rear end crashes was also found to increase on road segments with higher percentage of heavy vehicles in the traffic stream. Using less than 10% of heavy vehicles as the base, the risk increases by as high as 100 times for road sections with more than 20% of heavy vehicles. The risk factor for roads with between 10% and 20% of heavy vehicles was five (5). Star ratings generated under the new model showed an increase of 1-star and 2-star road segments as additional risk scores were added. In total, 483.7 km of road length (39% of total studied length) were downgraded to lower star ratings with the inclusion of rear end risk scores. In both the existing and new models, there were significant association between crash rates and star ratings where crash rates reduce for each star rating upgrade. The new model however was found to be better in estimating crash rates based on the higher value Spearman coefficient.

MRR No. 453

A Study of the Availability of Event Data Recorders (EDRs) on New Car Models Sold in Malaysia

Author(s) : Khairil Anwar Abu Kassim, Yahaya Ahmad, Muhammad Shafiq Ahmad Laili, Mohd Hafiz Johari, Najihah Wahi, Nuur Sakinah Azman, Salina Mustaffa

ISBN : -

This study has been conducted with the aim of determining Malaysia's readiness to introduce a legislation mandating the fitment of the Event Data Recorder (EDR) on new car models sold in the country. EDR is a device that can store data in the short period of time before, during and immediately after a vehicle crash. Using the Bosch Crash Data Retrieval (CDR) tool to access the EDR data, the weaknesses of the vehicle safety systems can be identified and corrected, hence leading to an improvement to vehicle-related regulations. In the United States, South Korea, Japan and China, the use of EDR has been mandated to assist in the

work of various parties including crash investigators, car manufacturers, government bodies, law enforcement agencies, car insurance companies and the general public. In European countries, the use of eCall with features similar to the EDR is mandatory for all new passenger cars (M1) and light commercial vehicles (N1). As a research institute whose role is to elevate road safety standards in Malaysia, MIROS has been conducting road crash investigations to complement the efforts carried out by the Royal Malaysia Police (PDRM). However, these road crash investigations have been conducted manually and through data collected from the scene of the accidents. By retrieving the information stored in the EDR, it may be possible for MIROS to conduct further research on the primary causes of road crashes and issues related to vehicle safety. Nevertheless, the availability of the EDR on new car models sold in Malaysia must first be ascertained through the current study.

MRR No. 454

Study on Private Vehicle Roadworthiness in Malaysia

Author(s) : Mohd Syazwan Solah, Azhar Hamzah, Aqbal Hafeez Ariffin, Noor Faradila Paiman, Muhamad Arif Fahmi Abdul Wahab, Zulhaidi Mohd Jawi, Iskandar Abdul Hamid, Mohd Hafzi Md Isa, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

Three (3) main factors contribute to a road traffic crash and one (1) of them is due to a vehicle defect. Even though the percentage is low as compared to human behaviour factors or road defects, the results of the road crash are still the same. This study objective to determine vehicle defects that potentially lead to crash by using Periodical Technical Inspection (PTI) database. To establish these objectives, the type of vehicle involved is a private passenger vehicle that undergoes the selected inspection in PTI (voluntary and routine inspection). Also, this study predicted the probability of a vehicle failure based on the PTI database. From the analysis, the study found out that the most common vehicle defects were wheel (tyre worn out) and structural integrity issues. Moreover, the result shows that the probability of failure is higher at the early stages (year one) among vehicles sent for voluntary inspection

(more than 50%) compared to those undergoing routine inspection (20%) which indicate that even the aged of vehicle consider new, the roadworthiness of it is very poor. It might due to usage, maintenance, or other related factors.

MRR No. 455

Travel Survey among E-Hailing Driver

Author(s) : Nurulhuda Jamaluddin, Sharifah Allyana Syed Mohamed Rahim, Nur Zarifah Harun, Azzuhana Roslan, Askiah Jamaluddin, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Nuur Sakinah Azman, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : -

The e-hailing as public transport was force on 12 July 2018 under the Land Public Transport Act and Commercial Vehicle Act. E-hailing is the process of ordering transportation to pick up by using a device such as a smartphone. Using a smartphone application, a passenger can use the transport apps to request a ride. The apps provider sends the request to the nearest available driver to accepts or decline the trip. According to Grab, in 2018, there are 2.7 million drivers across the network, and over 90 million mobiles download their apps. This study aims to identify the characteristic of the e-hailing driver such as age, gender, marriage status, work time and determine the distance travel by e-hailing drivers. A hundred (100) of e-hailing drivers have participated in this survey. The respondents fill in the questionnaire, which is divided into two (2) parts. Part A is e-hailing driver information, and Part B is a travelled log during weekdays and weekends. On weekdays, the result shows only a small number of drivers drive less than 5 km per trip, and the average trip is six (6) per day.

MRR No. 456

The Evaluation for Accessibility of Pedestrian Crossing Facilities in Kuala Lumpur

Author(s) : Nur Zarifah Harun, Sharifah Allyana Syed Mohamed Rahim, Nora Sheda Mohd Zulkiffli, Nurulhuda Jamaluddin, Azzuhana Roslan, Rohayu Sarani, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-57-1

The aim of this study is to assess the pedestrian crossing facilities whether it is accessible to persons with disabilities (PWD) and to evaluate the compliance of the facilities to the available guidelines during design stages. Ten (10) signalized pedestrian crossing in Kuala Lumpur were selected based on the similarity of the built environment. To gather the exposure data, on-site data collection was conducted during peak hour periods (07:30 am to 09:30 am) and off-peak hour period (10:30 am to 12:30 pm). A total of 9,450 pedestrians was observed during data collection. The variables recorded during observations were pedestrian crossing facilities, pedestrian volume, count and review of existing guidelines towards pedestrian crossing facilities. A total of 17 legs of signalized pedestrian crossing from ten (10) locations were evaluated. The results show that push-button and pedestrian traffic signals are available at all legs of signalized pedestrian crossing (100%, n = 17). Meanwhile, curb extensions and traffic signals countdown timers are not available at all legs of signalized pedestrian crossing (0%, n = 0). Apart from that, most facilities provided are curb cuts/ramp (94%, n = 16), zebra crossing (94%, n = 16), tactile (88%, n = 15) and bollard (76%, n = 13). Other facilities that are least installed at every study location are audible devices (41%, n = 7), pedestrian crossing sign (35%, n = 6) and fence or barrier (24%, n = 4). In conclusion, for compliance with the guidelines, all study locations are not fully accessible to the visual and physical PWD because there are inadequate facilities at the study locations. In compliance with the guidelines provided, all ten (10) locations indicate that there are some deficiencies in facilities provided and did not meet the specifications. Accordingly, some recommendations are proposed to enhance PWD pedestrian safety at signalized pedestrian crossing under mixed traffic conditions.

MRR No. 457

'Where Should I Ride?': A Study on Issue of Motorcyclists' Unknown Position on the Road

Author(s) : Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Mohd Yusof Abd Ghani, Rohayu Sarani, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-59-5

Motorcyclists in Malaysia do not know where exactly their safest position on a lane should be when riding in mixed traffic situation. This study examines the issue from a public policy standpoint using three (3) out of six (6) of the policy analysis processes; rather than a social science or engineering analysis. The question of where should a motorcyclist ride on an expressway lane is studied with the aim of a prescriptive conclusion (answering the issue in question) by questionnaire responses of over 1,400 respondents and interview of road authority.

MRR No. 458

Identifying Behavioural Factors amongst Young Motorcyclists

Author(s) : Sharifah Liew, Maslina Musa, Nor Fadilah Mohd Soid, Nuur Sakinah Azman, Normala Abdul Malik, Roziana Sharil, Amelia Hazreena Abdul Ghani, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : -

Malaysia is among the ASEAN countries with the third-highest death rate caused by road accidents with 23.6 per 100 000 deaths after Thailand (32.7) and Vietnam (26.4) (WHO, 2016). In 2018, 59.8% (3,755) fatalities involved mostly young motorcyclists with the highest number of deaths at 781 among riders between the ages 16 and 20 years, followed by 584 deaths between the ages of 21 and 25 in the country (RMP, 2018). The main objective of this research is to find out whether the behavioural factors such as aberrant behaviour, risk taking and speeding intention could increase the risk on the road among young motorcyclists. The research was conducted using the semi-quantitative approach based on self-reported questionnaires. In total, 921 students from 32 secondary schools in rural and urban areas were involved in this study. Results showed that most of the participants were

unlicensed (62.4%) and the mean of first ride was 12.75 years old. Furthermore, most of the parents (62.6%) had no objection to their children riding unlicensed on the road. The finding shows that there was a significant relationship between aberrant behaviour, errors, lapses and violations ($p < 0.05$). However, the research found that there was no significant difference between aberrant behaviour, errors, lapses and violations between the ages of 16 and 18 years. In addition, the research found that there were significant differences ($p < 0.05$) between accident involvement and the behavioural such as aberrant behaviour, risk taking and speeding intention among secondary school students. The current minimum licensing age for motorcyclists should be maintained at 16 years as the findings showed there were no significant differences in terms of behaviours such as aberrant behaviour, risk taking and speed intention among ages 16 and 18 years. The authorities and stakeholders should work hand in hand to organise road safety programmes related to road safety in schools. All students should be encouraged to join the programme including those who are entitled to get their licenses and those who are not (below eligible age to get license). We cannot stop them from riding illegally, but we can educate and expose them to the related knowledge and make them understand how important road safety is to save their lives. The programmes should be implemented in all schools in Malaysia with the objective to reduce the fatality rate among young motorcyclists.

MRR No. 459

Relationship between Riding Exposure and Situation Awareness among Motorcyclists

Author(s) : Mohd Khairul Alhapiz Ibrahim, Ahmad Azad Ab Rashid, Nuura Addina Mohamad, Noradrenalina Isah, Mohd Firdaus Mohd Siam, Low Suet Fin, Zarir Hafiz Zulkipli, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-60-1

This study was conducted to determine riding exposure factors that may affect motorcyclists' situation awareness (SA). A video-based SA assessment tool that utilises the footage of local motorcycle riding scenarios was developed and used to assess performances in SA among motorcyclists in Klang Valley, Selangor. A total of 212 participants completed the assessment. A Pearson correlation analysis revealed that riding exposure in the form of average monthly riding hours was significantly correlated with SA performances. Motorcyclists with more monthly riding hours tended to have higher scores in the correct responses to SA queries. A significant correlation was also observed between the participants' age and the overall SA scores. The relationship between age and situation awareness (SA) was found to be independent of the participants' riding experience. The findings of this work support consideration of motorcyclists' SA in training and testing for motorcycle riding license. Considering the impact of age and riding exposure on motorcyclists' SA, the present study recommends that the learner motorcyclists to be trained and tested for a competency related to SA to increase their readiness to ride safely on Malaysian roads.

MRR No. 460

Fatigue Evaluation of Motorcycle Riders

Author(s) : Noradrenalina Isah, Mohd Khairul Alhapiz Ibrahim, Mohd Firdaus Mohd Siam, Nuura Addina Mohamad, Ahmad Azad Ab. Rashid, Aizzat Syazwan Amir, Mohamad Firdaus Izhar, Nurulhana Borhan, Low Suet Fin, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-61-8

The aims of the study were to evaluate the fatigue level among Malaysian motorcyclists. To date, no extensive research has been carried out to evaluate fatigue among motorcyclists in Malaysia. This is a descriptive and cross-sectional study using a self-administered questionnaire. A total of 212 motorcyclists in Klang Valley were selected as the respondents using purposive sampling method. The Fatigue Severity Scale (FSS) and the Chalder Fatigue Scale (CFS) were used to describe fatigue symptoms commonly seen in subjects and measure the severity of fatigue. Both scales were successfully tested in this study, and results indicate good internal consistency and reliability of the Malay version of FSS and CFS within the population of Malaysian motorcyclists. For the FSS, this study has found that almost half of the respondents to experience clinically significant fatigue (44.8%), where their fatigue levels were visible and severe while the rest did not experience fatigue (55.2%). As for CFS, it was also shown that almost 30% of respondents had experience obvious and severe fatigue. The results of this study indicate that motorcyclists were at a high risk of experiencing fatigue when riding. Nearly half of the motorcyclists (40.6%) admitted that they rode while feeling fatigued in the past month. Interestingly, 5.7% of the respondents agreed that they had fallen asleep while riding. A small number of respondents (7.5%) reported to have involved in fatigue-related crashes in the past years. These findings will be beneficial to the policy-makers and stakeholders in developing a comprehensive fatigue management system targeting motorcycle riders. Given the situation, it is a high time that all relevant stakeholders take prompt actions and shoulder the responsibilities in handling this issue to reduce the annual road fatalities involving motorcyclists in Malaysia.

MRR No. 462

A Delphi Study on Assessment of Context, Input and Process Domains of Commuting Safety Support Program (CSSP) Training Program in Malaysia

Author(s) : Norainy Othman, Ilhamah Othman, Iffatul Aula Jamzuri, Zarir Hafiz Zulkipli, Khairil Anwar Abu Kassim

ISBN : -

This study employed Delphi method to obtain a consensus from experts panel about areas under context, input and process domain of Commuting Safety Support Program (CSSP) training program that are most in need of revision in future. The Delphi study allows an aggregation of opinions and extracts underlying areas in a structured manner. Specific objectives of the study were to ascertain the appropriateness of context, input and process domains of CSSP training program towards the program's objectives; and to analyse the appropriateness of input and process domains of CSSP training program towards andragogy teaching. Three (3) experts participated in the study. Assessment of CSSP training program's context, input and process domain was conducted in two (2) rounds Delphi using questionnaire form. Data was analysed in two (2) ways: descriptively and qualitative text analysis. Consensus from experts panel indicated that three (3) areas under context domain were less appropriate towards objectives achievement. Whereas, nine (9) areas of input domains were rated less appropriate towards program's objectives and andragogy teaching concept, and three (3) aspects of process domain need to be revisited for the appropriateness towards achieving program's objectives and andragogy teaching concept. The consensus would serve as a guideline or reference to CSSP team in future improvement or revision of the training program.

MRR No. 463

Comparison of OEM against Non-OEM Wheel Stud for Replacement and Its Standard Compliance

Author(s) : Fauziana Lamin, Afiqah Omar, Mohd Rasid Osman, Yahaya Ahmad, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-62-5

Wheel separation incident due to stud failure results in a massive road casualty. Currently, there is limited information on the factors that contribute to this failure. In this study, assessment on OEM and non-OEM wheel studs for replacement was conducted. Physical evaluation was carried out on both OEM and non-OEM products, including inspection of design and measurement of thread diameter. Metallographic aspect was also analysed to confirm its compliance to the SAE J429 standards. As a result, possibilities in replacement was highlighted and relevant deficiency was recognised. These findings provide important information of the uncertainties during wheel stud replacement. It also signifies that a safe practice of wheel maintenance should be well promoted to ensure dissemination of the relevant crucial information on wheel maintenance involving studs.

MRR No. 464

Development and Validation of Hazard Prediction Test for Motorcyclists

Author(s) : Ahmad Azad Ab Rashid, Mohd Khairul Alhapiz Ibrahim, Low Suet Fin, Zarir Hafiz Zulkipli, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-63-2

The capability to anticipate hazards on the road is a critical competency for safer riders. To date, hazard prediction test in Malaysia has not been developed and validated for motorcycle riders. The study investigated the basic effect of the on-road exposure and experience on the in-house developed hazard prediction test, as the litmus test of validation. The test adopted what-happen-next procedure involved 24 real riding clips as the stimuli. Analysis of 131 participants within Klang Valley revealed the mediation effect of non-correct judgments to the riding experience and hazard performance relationship. The results

supported the "*alah bisa tegal biasa*" (overconfident) effect found previously and suggested proper communication to aware the riders on the potential unconscious bias they are facing.

MRR No. 465

Identification of Intersection Treatment based on Best Practices for Bicycle Lane

Author(s) : Hawa Mohamed Jamil, Norfaizah Mohamad Khaidir, Akmalia Shabadin, Azzuhana Roslan, Nur Fazzillah Mohamed Noordin, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-64-9

Bicycling has the ability to improve mental well-being, promotes weight loss, saves time and reduce pollution just to name a few. However, bicyclist faced more danger and will suffer higher risk of injuries than motorised vehicles since they are slower in speed and smaller in size which also put them in the vulnerable road users' category. Recently in Malaysia, people are starting to choose cycling as their means to commute to work, for leisure and recreation purposes and also for sports. Understanding ways of making bicycling safer thus increase the usage is vital in promoting a sustainable city.

This study aims to propose intersection treatment for bicycle lane based on best practices overseas. Site considering urban and suburban settings, 3-legged and 4-legged, signalized and unsignalized were selected. Observation of bicyclists behaviour, road geometry, characteristics, traffic signal configurations were carried out on site. A total of 131 bicyclists were observed and the larger group was dominated by male with 86.3%. Younger people were also noticed to ride bicycle more with 61.8% as compared to older generation. This could be due to current trend of cycling to promote health and for recreation purposes.

By looking at overseas literatures on the best practices, it became apparent that visibility of the bicyclists are very important at the intersection. Amongst treatment that can be suggested to increase visibility includes the provision of advanced stop line or bike box in front of motorized vehicle and before pedestrian crossing. In addition, proper signage and road markings are also vital for safe navigation at the intersection. For complex intersection special

treatment such as stage crossing or pocket lanes can be applied. However, proper studies are needed to ensure the application on Malaysian traffic and road users are compatible.

People cycle for various reasons. These reasons may possibly involve cycling to work or for health and leisure purposes. However, there are many other factors that can motivate people to switch their mode of transport to bicycle such as proper cycling facilities, safety and comfortability, to name a few. Results of the study can be further enhanced with interview survey carried out to bicyclists to obtain their perception of safety, security, comfortability of bicycle lane especially pertaining to intersection design.

MRR No. 466

The Effectiveness of Commuting Safety Support Program in Enhancing the Level of Commuting Safety Management among Industries in Malaysia

Author(s) : Ilhamah Othman, Norainy Othman, Wahida Ameer Batcha, Noor Kamaliah Alias, Harun Bakar, Rashidi Ismail, Zarir Hafiz Zulkipli, Khairil Anwar Abu Kassim

ISBN : -

Introduction: Commuting accidents has been increased year by year since the last 15 years. It was increasing almost 100% from 2003 to 2018 and has recorded to 35,195 cases in 2018 (SOCSO, 2018). Commuting accidents have given enormous impact to the company which their workers involved in the accident. Based on the alarming number of commuting accidents involving workers, MIROS together with SOCSO through smart partnership have started one (1) initiative to support the prevention program for commuting accident. The initiative has been branding as Commuting Safety Support Program (CSSP). It is an intervention-based training program which conducted to employers and workers in industry. This project was initiated based on the two (2) years of the implementation of the CSSP 2017 to 2018. **Objective:** The general objective of the project is to assess the effectiveness of CSSP in enhancing the commuting safety management in industries. Specific objectives were to determine the profiling of each company which have joined CSSP, to compare the difference of commuting accidents and participants' riding behaviour before

and after the CSSP, to determine the level of commuting safety management among companies through star rating and to identify the relationship between level of commuting safety management and commuting accident. **Methodology:** Data collection was conducted based on online survey and secondary data retrieval which data from CSSP 2017 and 2018 were retrieved and analysed by a trained research assistant. Data then been further analysed by a research officer and a research report is produced. **Results and Discussion:** Distribution of companies, facilitators and workers involved in CSSP for 2017 and 2018 were 115, 1,187 and 3,644. Number of commuting accidents before CSSP were 281 (2017) and 167 (2018) and after CSSP were 245 (2017) and 159 (2018). These findings show a reduction and decreasing trend for commuting accident in both years which reduction of 12.8% (2017) and 4.2% (2018). The highest level of commuting safety management for both years were at 3-star level which 31.6% (2017) and 37% (2018). In addition, there is a significant relationship between level of commuting safety management (star rating) and commuting accident trend with p value < 0.05 and odds ratio 0.21 (0.05 - 0.95). This indicates that commuting safety management level (star rating) is inversely correlated with commuting accidents and this results is positive. **Conclusion and Recommendations:** It can be concluded that Commuting Safety Support Program is effective to enhance the level of commuting safety management by reducing the number of commuting accidents of the participating company after the program. However, the findings of this study is limited to before and after the program period of three (3) months and the analysis only covers within the participating companies. Thus, further study should be conducted in the future to compare the commuting accidents and level of commuting safety management between participating and non-participating companies in order to obtain a better and accurate results.

MRR No. 467

Beyond ASEAN NCAP: An Overview of ASEAN NCAP Assessment Beyond Crash Testing

Author(s) : Khairil Anwar Abu Kassim, Yahaya Ahmad, Mohd Hafiz Johari, Najihah Wahi

ISBN : 978-967-2988-65-6

While most brands including Toyota, Honda, Nissan, Proton, Perodua, Mitsubishi, Volvo, Hyundai and Ford and others have been favorable toward ASEAN NCAP's work, there are some who do not wish to partake in the crash testing. Perhaps due to lower number of sales in the ASEAN region, these manufacturers are unwilling to sponsor their cars to be crash tested by ASEAN NCAP. Hence, this research aimed to estimate the star rating of the non-tested ASEAN NCAP vehicles under the 2017 – 2020 protocols. The data were acquired from the websites of other NCAPs. Information from the other NCAPs such as the star rating awarded, the year of the crash test, the variant tested, and the safety specifications of the of the vehicles shall be collected. Based on the result, there are 23 brands and 135 models involved in Beyond NCAP Assessment. Out of 135, 10 have underwent the ASEAN NCAP crash testing under the 2017 – 2020 protocols. The estimated star rating were 99 models acquired 5-star, 23 models acquired 4-star, 3 models acquired 3-star, 2 models acquired 2-star, and 4 models acquired 1-star and 0-star respectively.

MRR No. 468

The Effectiveness of Helmet and Safety Vest Wearing among Workers Commute to Work in Bangi

Author(s) : Noor Kamaliah Alias, Aziemah Azhar, Wahida Ameer Batcha, Ilhamah Othman, Najwa Shaari, Zarir Hafiz Zulkipli, Ahmad Azad Ab. Rashid, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : -

n/a

MRR No. 471

Motorcycle Injury Patterns, Risk Factors and Interventions in Malaysia: A Systematic Literature Review and Qualitative Study

Author(s) : Mohd Hafzi Md Isa, Zulhaidi Mohd Jawi, Azhar Hamzah, Sharifah Allyana Syed Mohamed Rahim, Aqbal Hafeez Ariffin, Norainy Othman, Muhammad Syukri Abdul Khalid, Mohd Syazwan Solah, Nur Nazirah Mohd Nazri, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : 978-967-2988-66-3

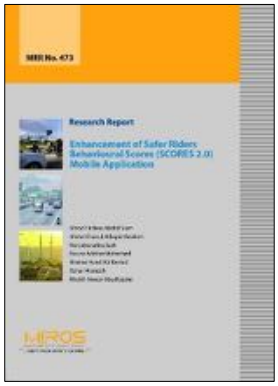
Malaysia is one (1) of the fastest-growing nations in terms of economic growth and motorization. Subsequently, road safety, especially concerning motorcycle safety, has become a public health burden to the country. While various initiatives have been introduced, the frequency of crashes and injuries involving motorcycle riders and pillions in the country is still high and shows no sign of declining. Thus, this study was initiated to investigate the epidemiological patterns and risk factors of motorcycle injuries, as well as gaps in existing and potential interventions related to motorcycles in Malaysia. In order to accomplish these objectives, this study used two (2) different approaches: (i) systematic literature review; and (ii) focus group discussion.

The systematic literature reviews found out that the most common body regions leading to motorcycle fatalities are head, thorax, and multiple body regions, and for non-fatal injuries, the most common body regions are lower extremities. There are three (3) main factors associated with motorcycle crashes and injuries: (i) exposure to risk (e.g., young, male, single, ethnic group, income level, higher traveling distance, shift works, wee or night hours, road types and rainy conditions); (ii) crash involvement (e.g., unlicensed, speeding, texting while riding, riding under influence); and (iii) crash severity (e.g., helmet wearing, collided with heavy vehicles, head-on collisions).

Several gaps and potential challenges in the existing interventions have been identified from the focus group discussions. Among the issues are lack of riding exposure on actual roads during motorcycle training at driving institutes, similar training module for high cc motorcycle (B license) with low cc motorcycle (B2 license), no strict pre-requisite requirement to obtain B license, lack of restriction on L license holders, specific lane positioning for motorcycles, and poor conditions of motorcycle lanes. The panellists have also proposed several recommendations, which may require further studies.

After taking into consideration all the findings, future studies and potential recommendations are also proposed at the end of this report for consideration by related organizations and authorities.

MRR No. 473



Enhancement of Safer Riders Behavioural Scores (SCORES 2.0) Mobile Application

Author(s) : Mohd Firdaus Mohd Siam, Mohd Khairul Alhapiz Ibrahim, Noradrenalina Isah, Nuura Addina Mohamad, Ahmad Azad Ab Rashid, Azhar Hamzah, Khairil Anwar Abu Kassim

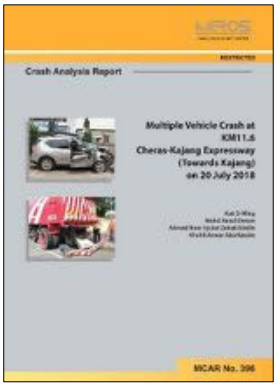
ISBN : 978-967-2988-67-0

Malaysian Institute of Road Safety Research (MIROS) has embarked on the development of mobile application approach as one (1) of the efforts to overcome the problem pertaining to motorcycle crashes in Malaysia. This report focuses on the enhancement of the mobile application that can measure safe riding skills among motorcyclists, which then called Safer Riders Behavioral Scores (SCORES). The enhancement involved the identification of the possible upgraded components from previous development which were fatigue, situational awareness and account setting. The process of measurement, integration, analysis and results display of the identified components were performed by the SCORES mobile application. All the recorded data can be accessed and downloaded from the secured server for further data analysis.

MIROS Crash Analysis Report (MCAR)

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

MCAR No. 396
(RESTRICTED)



Multiple Vehicle Crash at KM11.6 Cheras-Kajang Expressway (Towards Kajang) on 20 July 2018

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

ISBN : -

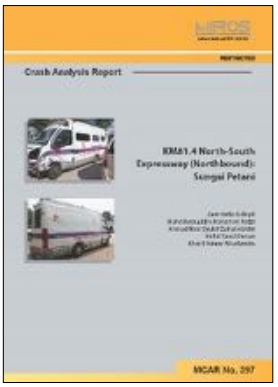
On 20 July 2018, a fatal multiple-vehicle crash has occurred at KM11.6 Cheras-Kajang Expressway (Grand Saga Expressway) involving a sport utility vehicle (SUV) and a road sweeper at approximately 0040 hrs. Before the crash occurred, the road sweeper was operating at the fourth lane of the expressway at a low speed which was 30 km/h towards Kajang direction. The SUV was also travelling on the fourth lane but failed to avoid impacting at the rear-end of the road sweeper and end up underride the road sweeper. This driver of SUV was killed in the collision.

A crash investigation was conducted to determine the contributing factors to the crash. Physical evidence of the crash site and the damaged vehicles were obtained for purpose of 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 is taken. Further to that, recommendation would be provided accordingly to prevent similar crashes in the future.

Two (2) main issues were identified from the crash investigation, which were crash compatibility and reckless driving behaviour of the SUV driver. The available physical evidence indicated that the road sweeper has equipped with rear-end reflective markers and arrow lights which provide sufficient conspicuity. In addition, the crash site was illuminated with street lighting, thus, the visibility and conspicuity of the road sweeper was not an issue. Thus, with such given conditions, it is a strong indication that the driver was driving under influence or driving under fatigue condition, which would significantly increase the reaction time of the driver to response with the slow-moving vehicle. In term of crash compatibility, the road sweeper was equipped with a rear underrun protection device (RUPD) to help to prevent underrun accident. Nonetheless, the crash accident was a small overlap frontal collision in which only the nearside structure of the RUPD loaded

with impact loading. Therefore, the nearside structure of the RUPD deformed severely and failed to stop the SUV from going below the structure of the road sweeper.

MCAR No. 397 (RESTRICTED)



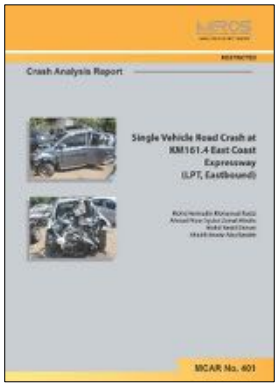
KM81.4 North-South Expressway (Northbound): Sungai Petani

Author(s) : Zarir Hafiz Zulkipli, Mohd Amiruddin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

A fatal road crash was reported to occur at KM81.4 North-South Expressway (PLUS) approximately at 18:25 hours on 18 July 2018. The crash involved an ambulance from Hospital Sultan Abdul Halim (HSAH) Sungai Petani, Kedah. The ambulance was occupied with a driver, a hospital attendant, a patient, the patient's wife, a medical doctor and a staff nurse during the crash. The crash happened when the ambulance was travelling toward Hospital Sultanah Bahiyah (HSB) in Alor Setar, Kedah, loss control and crashed into the median road divider at the KM81.4 and eventually flipped and landed on a ditch at left side of the highway. The kinematics of the crash suggest that the inciting event was the explosive disintegration of right rear ambulance tyre, causing loss of control and the subsequent crash of the ambulance. The maintenance schedules and monitoring standards appear to have been followed, suggesting that the inciting event may not be completely preventable. However, some of the maintenance and monitoring processes may have lacked sufficient attention to detail, which is an area for improvement. The lack of and failure to use seatbelts and patient restraints, resulted in injuries which would likely have been less aggravated or preventable if they had been used.

MCAR No. 401
(RESTRICTED)



Single Vehicle Road Crash at KM161.4 East Coast Expressway (LPT, Eastbound)

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

ISBN : -

On 3 June 2018, a fatal road crash occurred at KM161.4 East Coast Expressway (LPT, Eastbound) involving a passenger car (Perodua Myvi) with registration number CDA 2126. This crash happened during fine weather condition. The crash happened at 8.49 am and involved four (4) fatalities and two (2) injuries. The deceased and injured passengers were sent to Hospital Maran.

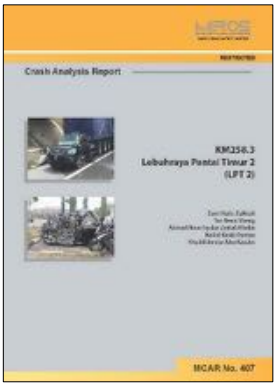
During the crash event, the said vehicle was travelling on the slow lane before it veered towards the left side of the road before impacted with the concrete curb and side swept with the first shoulder guardrail railing. Then, the driver performed a corrective manoeuvre to steer the vehicle back to road path and the effect from the over corrective manoeuvre from the driver was caused him to react on second corrective manoeuvre towards the left side of the road. Because of that, the vehicle impacted with second shoulder guardrail railing and penetrated through the front windscreen at the driver side towards rear nearside window.

Several identified issues are highlighted in this report among other included vehicle overloading, driver fatigue, the installation method of road side longitudinal barrier and over speeding. After taking into consideration all the findings and issues, several recommendations are proposed at the end of this report for consideration by the related authorities. The proposed recommendations are listed below:

i. To strengthen the speeding enforcement along LPT in order to curb the speeding behaviour of the road users. Based on the finding from this crash, the 85th percentile speed is 126 km/h and it was exceeded the speed limit along the crash site which is 110 km/h.
ii. To inspect all stretches along the LPT expressway for inappropriate barrier end treatment type and change it according to specifications by the related stakeholders.

MCAR No. 407

(RESTRICTED)



KM258.3 Lebuhraya Pantai Timur 2 (LPT 2)

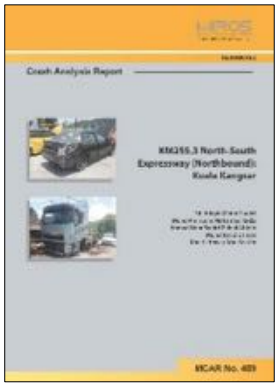
Author(s) : Zarir Hafiz Zulkipli, Tan Kean Sheng, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

A fatal road crash was reported to occur at KM253.8 approximately at 2.00 pm on 14 October 2015. The crash involved a passenger car and a lorry-trailer. The passenger car was a Toyota Camry occupied with one (1) driver and five (5) passengers during the crash. The crash happened when the passenger car was travelling towards Kuantan, lost control and crashed into the rear of the lorry-trailer which was parked at the emergency lane. The Toyota Camry had gone under the trailer and caused the entire occupant to be crushed inside the car. According to the police, all the passenger car occupants died at the scene due to severe head and body injuries. The lorry-trailer driver escaped uninjured and was reported to be asleep in the lorry trailer when the crash occurred. Among issues identified was abuse of the emergency lane facility by the truck driver for resting. In addition, Electronic Stability Control (ESC) may help drivers in this case, to avoid crashes by reducing the danger of skidding or losing control because of over-steering.

MCAR No. 409

(RESTRICTED)



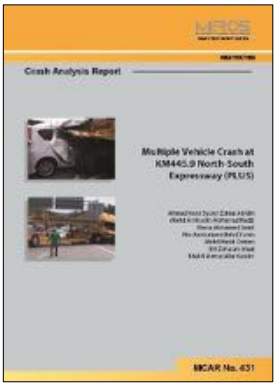
KM255.3 North-South Expressway (Northbound): Kuala Kangsar

Author(s) : Siti Atiqah Mohd Faudzi, Mohd Amirudin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

ISBN : -

A fatal road crash happened at KM255.3 North-South Expressway on 6 October 2018. The crash involved three (3) passenger cars (Perodua Myvi, Proton Saga and Kia Forte) and one (1) trailer. The trailer was occupied with a driver and fully loaded with iron ore. The five (5) fatalities were reported to be from the passengers of Kia Forte. The crash happened when the trailer which was believed to be travelling at the slow lane suddenly veered to the fast lane and hit the rear offside of Proton Saga. While the trailer was veering to the right, the trailer also hit the rear side structure of a Perodua Myvi. The Perodua Myvi was believed to have been avoiding the sudden veering of the trailer yet the trailer still hit the Perodua Myvi. The Perodua Myvi was at the middle line (between fast and slow lane) during the impact. Subsequently, the trailer hit the rear nearside of the Kia Forte at the fast lane and pinned the car to the median concrete barrier and dragged the car to its final rest position. During the incident, the car was believed to be travelling along the fast lane. Due to the spark from the dragging effect, the Kia Forte was caught on fire at the final rest position. All the occupants of the Kia Forte were trapped in the car and burnt. The driver of the trailer escaped uninjured. Throughout the investigation, numbers of factors and recommendations have been identified in this case.

MCAR No. 431 (RESTRICTED)



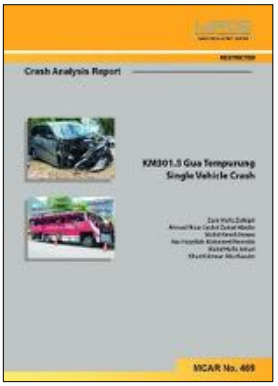
Multiple Vehicle Crash at KM445.9 North-South Expressway (PLUS)

Author(s) : Ahmad Noor Syukri Zainal Abidin, Mohd Amiruddin Mohamad Radzi, Hawa Mohamed Jamil, Nor Aznirahani Mohd Yunin, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

n/a

MCAR No. 469 (RESTRICTED)



KM301.5 Gua Tempurung Single Vehicle Crash

Author(s) : Zarir Hafiz Zulkipli, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Nur Fazzillah Mohamed Noordin, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : -

A fatal road crash was reported to have occurred at KM301.5 approximately at 4.25 pm on 17 March 2014. The crash involved a passenger car bearing registration number WVX 2168 and a bus express. The passenger car was a Toyota Avanza occupied with one (1) driver during the crash. Meanwhile the bus express was occupied with a driver and two (2) passengers. The crash happened when the passenger car was travelling toward Ipoh lost control, hit the roadside barrier and stopped in the middle of the road. To avoid the passenger car, the express bus travelling behind had swerved off its travelling lane and crashed into the bridge parapet and then plunged down into the ravine. The express bus driver died instantly after the crash while the driver of the passenger car escaped unhurt. Among issues highlighted in the case were the substandard

bridge parapet which was not adequate to contain heavy trucks and buses. In addition, the bus superstructure was weak and failed at the pillars welding joint.

MCAR No. 472 (RESTRICTED)

KM15 New Pantai Expressway (NPE)

Author(s) : Zarir Hafiz Zulkipli, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Nur Fazzillah Mohamed Noordin, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : -

A fatal road crash was reported at KM15.6 on New Pantai Expressway (NPE) at approximately 2.00 pm on 13 June 2015. The crash involved a passenger car and the median guardrail. The passenger car was a Perodua Alza occupied with one (1) driver and three (3) passengers during the crash. The crash happened when the passenger car was travelling toward Kuchai Lama, lost control and crashed into a road divider at the New Pantai Expressway (NPE). The driver aged 36 died on the spot while his child sitting at the rear seat aged 3 died at the University Malaya Medical Centre. According to the police both fatal victims died due to the severe head injuries. The other two (2) passengers, the driver mother aged 64 and his other daughter aged 4 escaped with minor injuries. Issue identified for this case is the substandard guardrail installation which exposed the end treatment on the approach side.

MIROS Evaluation Report (MER)

MERs are reports on evaluations of process, products or programmes that are related to roads and road safety. The evaluations may be initiated internally, or upon request by external parties. Most of the reports are available for the general public, but those commissioned by external parties are generally "**RESTRICTED**".

MER No. 375
(RESTRICTED)

Study on Roads and Infrastructure for Electric Bicycle Use in Malaysia

Author(s) : Ramizam Noor Zaman, Norfaizah Mohamad Khaidir, Abdul Rahmat Abdul Manap, Mohd Syazwan Solah, Azhar Hamzah, Karen Goonting, Fuad Abas, Jamilah Mohd Marjan, Wong Shaw Voon

ISBN : -

The Government of Malaysia has decided that electric bicycles should be regulated like conventional bicycles. Although this policy decision places electric bicycle regulation within the jurisdiction of local governments and hence within the purview of the Ministry for Local Government, in the interest of being informed of the road safety aspects of electric bicycle use, the Ministry of Transport has requested for MIROS's advice on the following:

i. whether the current roads in Malaysia are suitable for electric bicycle use from a road safety perspective; and
ii. what is suitable road infrastructure for electric bicycles?

There are no specific design guidelines for electric bicycles lanes in Malaysia. There are, however, guidelines in a few local authority areas such as Penang and Putrajaya, which govern bicycle facilities and infrastructure. Therefore, as a matter of common sense and prudence, guidelines for bicycle lane design, construction and use from Malaysia and other countries would be instructive in advising on facilities/infrastructure for electric bicycle use.

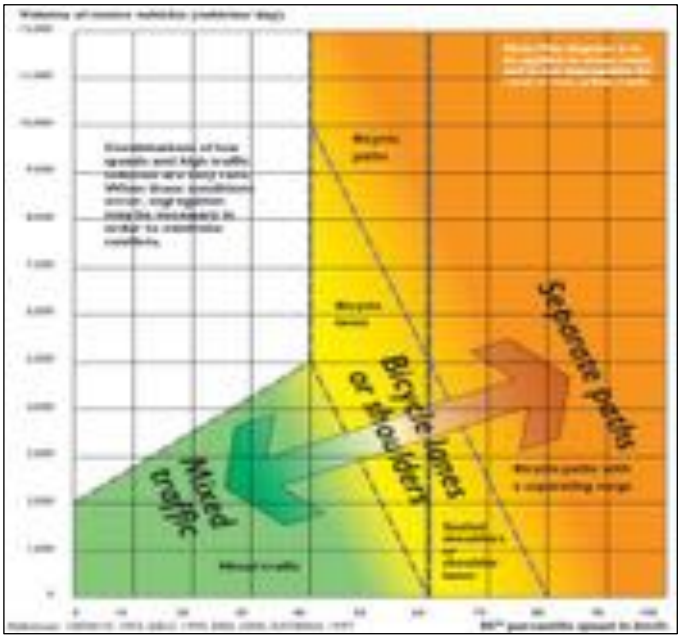
The challenging issue is in the management of crash and injury risks of electric bicycle users when they are on the roads. With varying options of segregation such as exclusive or shared lanes that would come with alternative separation mechanisms such as physical or visual schemes, further work is very much needed to identify and understand the optimum or blended ways for the safe use of electric bicycles.

Conclusions: The present study has reviewed design guidelines and standards from various countries and has reached the following conclusions.

i. That existing bicycle lanes in Malaysia which meet international design standards, such as in Penang and Putrajaya, could be used for electric bicycles as well;

ii. In principle, it may also be possible for electric bicycles to use the existing shared lanes (i.e. shared by bicycles and pedestrians).

Recommendations: It is recommended that the chart below be used as a basic guide to determine the type of bicycle infrastructure that needs to be provided.



From the chart it shows that at lower vehicle volume and at lower traffic speed, the bicycle is allowed to be mixed with traffic. This type of facility can be considered for use within residential areas where traffic volume and operating speed are low and cyclists are more aware of other road users since there is no special lane provided.

In the chart, bicycle lanes are another facility that can be considered if the vehicle volume ranges from middle to high and speed ranges from low to high. This type of facility allows cyclists on the same carriageway but separated from the main traffic by the continuous or discontinuous road marking on the carriageway.

In Malaysian context, the traffic composition is different from other countries, especially New South Wales, Australia, where the chart was developed. Motorcycles have been the most convenient and economic mode of transport in Malaysia. Based on the 2010 vehicle registration information provided in the Road Traffic Volume Malaysia (RVTM) there were about 40% newly registered motorcycles in 2009 and 2010. Based on similar sources, it was

found that the percentage of motorcycles on the road was about 14% on some federal and state roads in Malaysia.

Therefore, the presence of this mode of transportation on the road sharing the same carriageway may cause the misuse of bicycle lanes provided. This will create speed differential conflicts between cyclists and motorcyclists, and pose a significant road safety risk to the cyclist. Therefore bicycle lanes which are mixed with other traffic are not recommended to be constructed. Rather, shared use paths, which are paths that cyclists share with pedestrians, can easily be achieved by converting or upgrading existing sidewalks or walkways. The minimum width of such shared use paths should be 1.8 m with roadside kerbs as recommended by the American Association of State Highway and Transportation Officials (1999).

MER No. 376 (RESTRICTED)

Preliminary Findings from MIROS Road Safety Audit Database

Author(s) : Norfaizah Mohamad Khaidir, Nor Aznirahani Mhd Yunin, Hawa Mohamed Jamil, Nora Sheda Mohd Zulkiffli, Jamilah Mohd. Marjan

ISBN : -

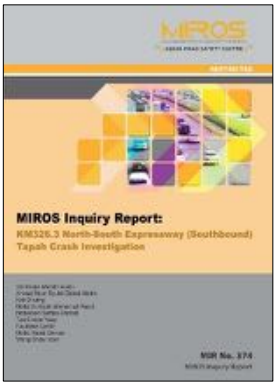
The development of Road Safety Audit (RSA) Database is a proactive step taken by the Malaysian Institute of Road Safety Research (MIROS) in order to make use of the RSA data and findings. The database benefits the users by providing common engineering deficiencies identified on Malaysian roads, identifying critical issues for the development of impactful researches that could lead to road safety improvement in Malaysia, helping policy makers make decision on newly-proposed policy, and provide information to road authorities in prioritizing the countermeasures needed to improve roads in Malaysia. The technical report on the development of the database summarizes the structure of the database, explanation on the criteria considered in the database, and the preliminary findings from the 50 audits conducted in MIROS since 2008. In brief, a total of nine (9) categories were identified to be considered in the database; general information, road alignment, cross section, auxiliary lane, intersection, visual aid, vulnerable road user, road side safety and road surface. The future plan for the database is to link the findings with the accident

database, as evidence to the common deficiencies that contribute to certain types of crashes.

MIROS Inquiry Report (MIR)

MIRs are reports on selected crashes/cases that are considered high profile and of national interesting nature. It starts off as a briefs report for internal evaluation, which is the expended 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. 374
(RESTRICTED)



KM326.3 North-South Expressway (Southbound) Tapah Crash Investigation

Author(s) : Siti Atiqah Mohd Faudzi, Ahmad Noor Syukri Zainal Abidin, Kak D-Wing, Mohd Amirudin Mohamad Radzi, Mohamad Suffian Ahmad, Tan Choon Yeap, Fauziana Lamin, Mohd Rasid Osman, Wong Shaw Voon

ISBN : -

On 15 January 2015, a tour bus with registration number PHX8739, owned by LBS Travel Sdn Bhd, was involved in a fatal crash at KM326.3 North-South Expressway (Southbound) near Exit 132 Persimpangan Tapah. The crash was reported to occur at 1.15 am and the weather at that time was reported to be fine. The bus was travelling on the fast lane when it struck a detached wheel base on the road. The tyre marks on the road adjacent to the centre of the road indicated that the detached wheel contacted with the bus at the frontal nearside wheel. Subsequently, the front nearside wheel was locked due to collision with the detached wheel causing the bus to swerve in the direction of the road shoulder. The bus was forced to turn left and move to the slow lane and then enter the road shoulder at an exit angle of 18.9°, covering a distance of 40.3 m.

A passenger car was parked on the unpaved road shoulder when the incident happened. The bus failed to avoid a collision with the passenger car and impacted the passenger vehicle at a 4 o'clock direction. Significant offside damage was found on the car. Then, the bus pushed the passenger car all the way to a downhill slope for a distance of 26.4 m before collided with the concrete structure of the drain which resulted in a major intrusion on the nearside portion of the car. Despite impacting the concrete drain, both of these vehicles did not stop but continued moving up to an embankment.

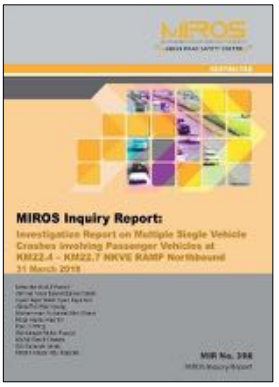
After traveling 11.1 m uphill to the embankment, the passenger car crashed through barbed wire installed at the top of the embankment and came in contact with the trees on top of the embankment. The contacts with the trees prevented both vehicles from moving forward and consequently, the bus experienced a quarterly rollover in a clockwise direction and also took a slight spin

in an anti-clockwise direction. Before the bus came to a rest, the rooftop and front side structure of the bus at the nearside crushed to the ground due to the rollover event causing serious deformation to the frontal end of the bus, specifically on the offside section.

The detached wheel was suspected to have come from a trailer. PLUS confirmed that they received a call from a trailer's driver at about 1.10 am, reported a detached wheel on the highway. During the inspection of the trailer, the trailer was found to be equipped with dual wheels configuration, and vehicle damage assessment performed by the team found that both rear nearside wheels were detached. In addition, the team found the drum assembly missing from the axle while the axle itself was tied to the trailer's body using a belting, to hold it in position. By using the approach of backward analysis, the computation of the impact speed was calculated. The minimum speed of the bus when it struck the detached wheel was 86.46 km/h - 95.80 km/h. Based on the scientific analysis and reconstruction of the case the following approaches and recommendations have been identified for consideration by all relevant authorities.

i. Improve current procedures and response time of hazard and obstacle removal on road
ii. Intensify lighting source for under bridge highway stretches to increase sight distance
iii. Ensure fire resistance capability for material used in public use vehicle
iv. Mandate the use of washers on bolt and nut joints for heavy vehicle wheel assembly
v. Implement ICOP Safety, Health and Environment for all bus operators

MIR No. 398
(RESTRICTED)



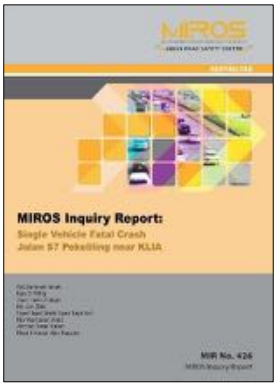
Investigation Report on Multiple Single Vehicle Crashes involving Passenger Vehicles at KM22.4 – KM22.7 NKVE RAMP Northbound 31 March 2018

Author(s) : Iskandar Abdul Hamid, Ahmad Noor Syukri Zainal Abidin, Syed Tajul Malik Syed Tajul Arif, Alvin Poi Wai Hoong, Muhammad Ruhaizat Abd Ghani, Hizal Hanis Hashim, Kak D-Wing, Siti Attiqah Mohd Faudzi, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

On 31 March 2018 between 1713 hrs and 1820 hrs, three (3) Perodua Myvi and one (1) Honda City involved in four (4) separate single vehicle crashes at KM22.7 North-South Expressway towards Jalan Duta Toll Plaza. The incident resulting one (1) fatal injury of PLUS Ronda personnel. The investigation and analyses conducted include analysis of the crash site, speed calculation, road safety assessment and on the current Standard Operating Procedure (SOP) for PLUS incident management. From analysis of the crash site, details on geometry was obtained, chronology of events were established, physical evidences of crash events were collected and recorded, and location of vehicles started to skid were identified. From speed calculation, the average travelling speed of the involved vehicles were found to be more than the posted speed limit at the road stretch. From road safety assessment, the crucial finding is the importance to improve skid resistance and to introduce speed management measure. From the investigation, it was found that the SOP for incident management for PLUS also needs to be reviewed and improved.

MIR No. 426
(RESTRICTED)



Single Vehicle Fatal Crash Jalan S7 Pekeliling near KLIA

Author(s) : Siti Zaharah Ishak, Kak D-Wing, Zarir Hafiz Zulkipli, Ho Jen Sim, Syed Tajul Malik Syed Tajul Arif, Nor Kamaliah Alias, Ahmad Saife Salleh, Khairil Anwar Abu Kassim

ISBN : -

A fatal crash involving an employee bus resulted in 12 fatalities. This crash occurred at Jalan S7 Pekeliling near KLIA on 7 April 2019 at 11:10 pm. Before the crash, the employee bus was travelling with 44 occupants (including driver) from Nilai to Cargo Post 3 KLIA. During the journey to the planned destination, the bus was supposed to take the third exit at a roundabout. However, the bus driver did not take the normal daily route, instead, he has taken the second exit at the roundabout, which travelled straight toward a T-junction. While approaching the T-junction, the bus did not make any turning and continued to move forward and encroached on road curb before plunged into the concrete drain. The impact has caused severe deformation at the frontal structure of the bus and most of the seats were detached from its original position. From the GPS record, it showed that the bus was travelling at approximately 42.9 km/h. Therefore, no issue of speeding was found in this crash.

From the analysis of crash, three (3) main issues were identified as contributing to the occurrence of the crash and crash severity. The first issue is that the driver was driving under influence and it is the main contributing factor of the crash. The report of the Department of Chemistry Malaysia showed that the blood alcohol content of the driver was higher than the permissible limit. This indicated that the driver was probably driving the bus with impaired judgement, blurred vision and dizziness. This explained why the driver missed the exit at the roundabout and did not take any evasive action to avoid plunging into the concrete drain.

The second identified issue was poor safety management by the bus operator. From audit finding, it showed that the bus operator did not practice the requirement of OSHA ICO SHE 2010. In their operation, no assessment was conducted on driver fitness and condition before the bus took off. If proper driving procedure was in place, the safety officer could have prevented the driver who was

under the influence of alcohol from driving the bus. In other words, the presence of the proper safety management system in a bus operator is an essential monitoring method to control abnormal condition of drivers and prevent crashes similar to this crash.

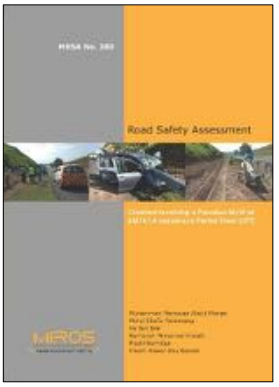
Lastly, the third issue found was corrosion of bus structure and weak seat anchorage. In vehicle inspection, it was identified that the bus structure was severely corroded which could greatly weaken the strength of the bus in absorbing impact force. The structure of seat anchorage failed to stay intact during the impact event signified that it is very likely not comply with the requirement of UN R80. With high strength bus structure and strong seat anchorage, both of these additional safety features can significantly reduce injury severity of the bus passenger, even in the event similar to this crash. A good seat anchorage is the pre-requisite condition for seatbelt to prevent passenger from throwing forward from the seat. Without a good seat anchorage, it is meaningless to install seatbelt in the bus. Therefore, to ensure all passengers can be restrained properly, a strong seat anchorage is a must.

To prevent the same tragedy from occurring again, it is recommended to enhance the implementation of OSHA ICOP SHE 2010. A new approach to monitoring the implementation status of bus operator should be established, in order to ensure effective implementation of this regulation. Relevant authorities should conduct continuous monitoring and assessment on all bus operators to ensure requirements of the regulations comply. Besides that, it is recommended to establish a new requirement to ensure all old buses with age more than 10 years old to perform body refurbishment before it was allowed to be utilized for transporting people. The refurbished bus must fully comply with the requirement of UN R66 and UN R80. This recommendation can ensure that all aging buses can be structurally enhanced with improved crashworthiness.

MIROS Road Safety Assessment (MRSA)

MRSAs are audit reports on roads in Malaysia. It 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. 380 (RESTRICTED)



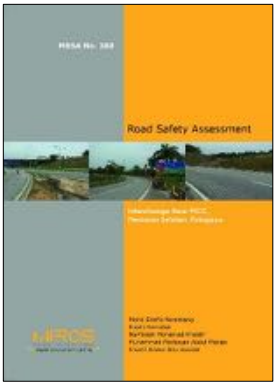
Crashed Involving a Perodua Myvi at KM161.4 Lebuhraya Pantai Timur (LPT)

Author(s) : Muhammad Marizwan Abdul Manan, Mohd Shafie Nemmang, Ho Jen Sim, Norfaizah Mohamad Khaidir, Rizati Hamidun, Khairil Anwar Abu Kassim

ISBN : -

Malaysian Institute of Road Safety Research (MIROS) has assessed the road environment and infrastructure after the fatal accident on 3 June 2018 occurred at the KM161.4 Lebuhraya Pantai Timur, LPT (Eastbound) connecting Kuala Lumpur and Kuantan near Maran. The road stretch is a four (4) lane dual carriageway with a lane width of 3.5 m. The study on speed shows the operating speed was 126 km/h which was higher than the speed limit. While, some deficiencies were observed during the inspection especially on guardrail such as discontinuity barrier, inappropriate guardrail end treatment, improper guardrail flaring, improper guardrail installation and inconsistent guardrail post spacing. Therefore, this RSI recommend the replacement of guardrail as per standard and specification as it vital importance to safeguard the road users.

MRSA No. 388 (RESTRICTED)



Interchange Near PICC, Persiaran Selatan, Putrajaya

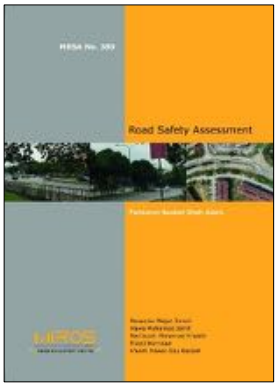
Author(s) : Mohd Shafie Nemmang, Rizati Hamidun, Norfaizah Mohamad Khaidir, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

ISBN : -

Malaysian Institute of Road Safety Research (MIROS) received the public complaint on road safety issue at an interchange near PICC, Putrajaya (Dengkil bound). MIROS take proactive initiatives to investigate road deficiencies in order to solve the road safety issue. Therefore, the road safety assessment (RSA) was carried out on 24 September 2018. An investigation at the site was conducted on vehicle speed, road layout and road deficiencies. The result showed that the road user tends to speed even at the curve area where their operating speed posted was more than the speed limit. The road deficiencies observed on site were associated with poor maintenance on the road which is on road drainage, improper

guardrail and unprotected sump. The recommended countermeasures proposed will act as a guide to relevant parties for further action. By addressing these issues and implementing the right countermeasures, it will increase the safety issue for the road users.

MRSA No. 389
(RESTRICTED)



Persiaran Bestari Shah Alam

Author(s) : Nusayba Megat Johari, Hawa Mohamed Jamil, Norfaizah Mohamad Khaidir, Rizati Hamidun, Khairil Anwar Abu Kassim

ISBN : -

A road safety assessment was conducted at Persiaran Bestari Shah Alam in February 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.

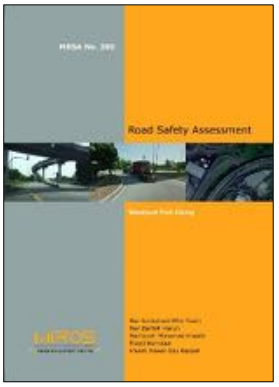
Below are several key findings identified:

i. There are more than 90% of pedestrians recorded crossing Persiaran Bestari but no proper pedestrian crossings provided
ii. Average speed at curves and intersection is more than posted speed limit (60 km/h), with a maximum speed of 85 km/h obtained
iii. Unsuitable kerb provided at walkways and missing drainage cover

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

i. Provide pedestrian crossing, preferably signalized crossing, at bus stops location
ii. Provision of speed humps and transverse bar at location with a high number of pedestrians
iii. Termination of walkway by ramp (the maximum ratio of rising to length being 1:12) or kerb should be flushed on to the same level as the roadway

MRSA No. 390
(RESTRICTED)



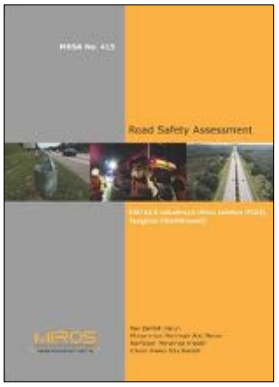
Westport Port Klang

Author(s) : Nor Aznirahani Mhd Yunin, Nur Zarifah Harun, Norfaizah Mohamad Khaidir, Rizati Hamidun, Khairil Anwar Abu Kassim

ISBN : -

The objective of a port is to ensure efficient and speedy transfer of goods from inland transport to maritime transport and vice versa. As the development of the infrastructure contributes tremendously to the efficient distribution of cargo from Port Klang to the respective hinterland, several discussions with PKA was conducted. Based on these discussions, a road safety assessment was carried out by the Malaysian Institute of Road Safety Research (MIROS) on 15 January 2018. The aim of the RSA is to identify road engineering deficiencies that can be improved to achieve the objective of the port. The road safety assessment conducted included a detailed examination on any potential hazards in the vicinity of the assessed area and also traffic study. Several recommendations for improvement such as fixing the traffic lights that are not functioning and providing sufficient signage was proposed. Regular maintenance is required and should be scheduled accordingly in order to ensure the safety of road users within the area and also ensure an efficient and speedy transfer of goods.

MRSA No. 415
(RESTRICTED)



KM163.8 Lebuhraya Utara Selatan (PLUS), Tangkak (Northbound)

Author(s) : Nur Zarifah Harun, Muhammad Marizwan Abd Manan, Norfaizah Mohamad Khaidir, Khairil Anwar Abu Kassim

ISBN : -

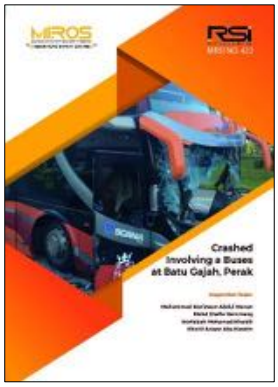
A Road Safety Assessment (RSA) at KM163.8 Lebuhraya Utara Selatan (PLUS), Tangkak (Northbound) was performed on 25 June 2018. The purposes of the RSA are to identify any road safety problems within the area and to recommend safety measures to improve the safety of road users. Traffic volume survey was conducted during the off-peak hour (11:00 am to 1:00 pm). Meanwhile, for spot speed study, one (1) hour observation for the speed of vehicles was measured during an off-peak hour period. The assessment exercises include a detailed examination of any potential hazards near the assessed area. From the assessment, it is shown that 73.9% of the total traffic composition at the crash site is influenced by cars, MPVs, and vans. A total of 20.2% of the traffic composition involving lorries, 4.5% buses and only 1.4% of motorcycles were recorded. From speed study, the presence of speeding vehicles along the crash site is alarming (34.2% are above 110 km/h for overall vehicle and 78.9% of buses travel above 90 km/h). In addition, some road deficiencies have also been identified such as no reflective device install at the End-Terminal of the barrier. Referring to the assessment made, several recommendations for improvement have been proposed. The proposed countermeasures can be implemented to improve the safety condition within the assessed vicinity.

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. 422

(RESTRICTED)



Crashed Involving a Buses at Batu Gajah, Perak

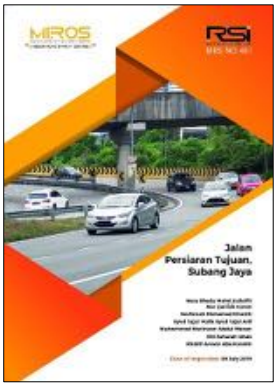
Author(s) : Muhammad Marizwan Abdul Manan, Mohd Shafie Nemmang, Norfaizah Mohamad Khaidir, Khairil Anwar Abu Kassim

ISBN : -

This report highlights the road deficiencies found during the Road Safety Inspection (RSI) conducted approximately 500 m at the crashes area involving a bus at Batu Gajah, Perak. MIROS take the proactive initiatives to investigate the road safety issue at the location of crash where the buses crashed into the concrete barrier. An investigation at the site was conducted on vehicle speed, road geometry and road deficiencies. The result shows that speeding behaviour is not a major issue as the percentage of vehicle speeding is lower. However, the road shown a deficiency such low visibility during night-time due to poor street lighting and faded road marking. Concrete barrier at the median also exposing danger to the driver due to discontinuity of concrete barrier. The recommended countermeasures proposed will act as a guide to relevant parties for further action. By addressing these issues and implementing the right countermeasures, it will increase the safety level for the road users.

MRSI No. 461

(RESTRICTED)



Jalan Persiaran Tujuan, Subang Jaya

Author(s) : Nora Sheda Mohd Zulkiffli, Nur Zarifah Harun, Norfaizah Mohamad Khaidir, Syed Tajul Malik Syed Tajul Arif, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

ISBN : -

A Road Safety Inspection (RSI) was carried out by Malaysian Institute of Road Safety Research (MIROS) on Persiaran Tujuan, Subang Jaya on 9 July 2019. The inspection was performed upon the request by the assemblywoman (ADUN) of Subang Jaya to resolve road safety issues in six (6) locations. The aims of this inspection are to:

i. Identify risky road behaviour and road user exposure;
ii. Identify the road environment and engineering deficiencies; and
iii. Recommend potential countermeasures to increase road users' safety.

The spot speed measurement revealed that a majority of road users exceeded the speed limit in all six (6) locations. The traffic volume study recorded cars, MPVs and vans as having the highest vehicle percentage in all the inspected areas followed by motorcycles, heavy vehicles and also pedestrians. Through on-site observation, it was found there were several road safety issues that needed rectification. In general, the issues included road signages, road markings, W-beam guardrail, public transport infrastructure and visibility within the areas. The main findings and recommendations are as follows:

1. Recommended short-term countermeasures incurring low cost

No.	Areas of improvement	Location
1.	Improve signages e.g. speed limit sign and warning sign	1, 3, 5 & 6
2.	Reinstate road markings e.g. lane marking, directional arrow, edge line etc	1 & 4
3.	Trim tree foliage which obstruct user's view	1
4.	Periodic maintenance e.g. within bus stop area	5
5.	Repair damaged e.g. drain cover and pedestrian fencing	2 & 5
6.	Increase police enforcement e.g. speeding issues, illegal U-turn, red light running	1 & 2

2. Recommended medium-term countermeasures incurring medium cost

No.	Areas of improvement	Location
1.	Manage roadside hazards e.g. install proper barrier end treatment and install standard continuity of W-beam guardrail	1, 4, 5 & 6
2.	Install road rumble strips to reduce speeding issue	1
3.	Provide proper facilities e.g. accessible pedestrian crossing, sufficient width of motorcycle box and kerb and shrub to avoid vehicle stop to drop school student	2 & 3

3. Recommended long-term countermeasures incurring high cost

No.	Areas of improvement	Location
1.	Provide wider lane for bus to pick up and drop off passenger	2, 3 & 4

The recommendations as stated above were proposed to help improve the safety aspects of the areas inspected.

MRSI No. 470

(RESTRICTED)

KM13.7 Maju Expressway (South Bound)

Author(s) : Sharifah Allyana Syed Mohamed Rahim, Nurulhuda Jamaluddin, Ahmad Azad Ab Rashid, Mohd Hafiz Johari, Khairil Anwar Abu Kassim

ISBN : -

On 14 January 2020 a Road Safety Inspection (RSI) took place at KM13.7 Maju Expressway (MEX) heading to Kuala Lumpur International Airport (KLIA). The inspection was responding to a high-profile fatal crash involving an international badminton player at the location. The deceased was the driver of the van and remaining four (4) of passenger sustained a minor injury.

The inspection revealed notable findings, as detailed below:

i. Spot speed measurement shown more than 38% of passenger car travelled over the posted speed limit. All heavy vehicles, however, complied.

ii. The difference between the average speed for passenger cars and for heavy vehicles was 17.3 km/h, leading to crash compatibility.

iii. Cars, MPVs and vans constituted as much as 86%, i.e. the highest within all inspection areas, followed by 8% of motorcycles and 6% of heavy vehicles.

Subsequently, the following suggestions are recommended potential countermeasures:

i. It is suggested to increase enforcement activity and visibility of police within the area.

Other Publications

Other publications are miscellaneous publications that were not written for one of the MIROS reports series.

Pelan Keselamatan Jalan Raya Malaysia 2021 – 2030

Author(s) : Kementerian Pengangkutan Malaysia (MOT), Institut Penyelidikan Keselamatan Jalan Raya Malaysia (MIROS), Jabatan Pengangkutan Jalan Malaysia (JPJ)

ISBN : -

Perjalanan yang selamat sepatutnya satu (1) keperluan asas kepada semua. Untuk mencapai hasrat ini, kerajaan Malaysia telah melaksanakan dua (2) pelan keselamatan jalan raya dalam dua (2) dekad yang lepas. Perlaksanaan pelan ini telah berjaya menambah baik tahap keselamatan jalan raya dan menjadi permulaan untuk menjalankan intervensi melalui pendekatan sistem selamat. Usaha ini harus diteruskan oleh semua pihak bagi membina satu (1) sistem keselamatan jalan raya yang menyeluruh untuk mencapai hasrat sifar kematian di atas jalan raya.

Pada masa kini, kematian nahas jalan raya masih lagi satu (1) isu yang serius di Malaysia. Setiap tahun, lebih daripada 6,000 orang terbunuh di atas jalan raya. Golongan kanak-kanak dan belia yang bakal menjadi pemimpin negara pada masa akan datang merupakan golongan yang paling berisiko, dan nahas jalan raya ialah penyebab kematian utama untuk golongan ini. Walaupun kita telah berjaya mengurangkan jumlah kematian nahas jalan raya berturut-berturut untuk 4 tahun sejak tahun 2017, kita masih ada banyak ruang penambahbaikan untuk memaju ke arah sifar kematian di atas jalan raya. Bagi menentukan hala tuju untuk 10 tahun yang akan datang, kita perlu membangunkan satu (1) pelan yang menyeluruh dan holistik, untuk meningkatkan tahap keselamatan jalan raya dari pencegahan perlanggaran sehingga pengurusan pasca nahas jalan raya yang lebih berkesan.

Dalam Pelan Keselamatan Jalan Raya (PKJR) 2021 – 2030, kita telah menetapkan satu (1) visi yang berimpian tinggi, iaitu “Malaysia, sebuah negara tiada kematian di jalan raya”. Visi ini adalah sejajar dengan visi sifar yang diamalkan oleh negara maju yang lain seperti Sweden, Belanda dan New Zealand. Di bawah visi sifar ini, mana-mana nahas jalan raya yang menyebabkan kematian ataupun kecederaan adalah tidak boleh diterima dalam sistem perjalanan. Dengan ini, kita perlu lebih proaktif dalam mewujudkan sistem

perjalanan yang lebih selamat bagi memberi perlindungan kepada pengguna jalan raya.

Kita turut menetapkan misi untuk pelan baharu ini, iaitu "Membudayakan keselamatan jalan raya ke arah kesejahteraan negara". Misi ini bukan sahaja berhasrat untuk meningkatkan kesedaran pengguna jalan raya, tetapi juga untuk menjadikan keselamatan jalan raya sebagai budaya untuk pengeluar kenderaan, pembina infrastruktur jalan raya, pihak berkuasa, komuniti setempat, tempat kerja, sekolah sehingga ke unit keluarga. Kita perlu menjadikan keselamatan jalan raya sebagai satu (1) norma baharu dalam kehidupan harian untuk menghasilkan satu (1) masyarakat yang meletakkan keselamatan jalan raya sebagai satu (1) prioriti. Sebagai penanda aras pencapaian visi dan misi ini, kita telah meletakkan pengurangan 50% jumlah kematian nahas jalan raya pada tahun 2030, berasaskan jumlah kematian pada tahun 2019 sebagai sasaran kita. Dengan erti kata lain, kita perlu mengurangkan jumlah kematian nahas jalan raya kepada 3,142 orang pada tahun 2030. Sasaran yang ditetapkan ini juga selari dengan sasaran Tindakan Sedekad Global bagi Keselamatan Jalan Raya yang Kedua yang telah diumumkan oleh pihak Pertubuhan Bangsa-Bangsa Bersatu (UN).

Bagi mencapai sasaran yang ditetapkan, kita akan fokus kepada sepuluh (10) bidang keutamaan (BK), iaitu tadbir urus yang responsif, pemantauan dan penilaian yang efektif, penunggangan motosikal yang lebih selamat, pengurusan kelajuan, perjalanan pekerjaan yang lebih selamat, perjalanan kanak-kanak dan belia yang lebih selamat, infrastruktur yang lebih selamat, penggunaan kenderaan yang lebih selamat, mikromobiliti yang lebih selamat dan pengurusan pasca kemalangan. Sepuluh (10) bidang keutamaan ini merupakan satu (1) sistem yang berintegrasi antara satu sama lain. Tadbir urus yang responsif adalah diperlukan untuk memastikan semua intervensi yang dijalankan dalam setiap BK mendapat sokongan perundangan, sumber manusia dan kewangan yang mencukupi. Selain itu, pemantauan dan penilaian yang efektif juga berperanan untuk mengenalpasti tahap keselamatan jalan raya melalui bukti saintifik, dan menilai keberkesanan intervensi yang telah dilaksanakan.

Sebagai jenis kenderaan yang paling berisiko, pelan baharu ini telah mewujudkan satu (1) bidang keutamaan yang khas untuk

penunggangan motosikal dan berfokus kepada dua (2) skop, iaitu pengurangan konflik trafik dan peningkatan tahap keberkesanan teknologi. Intervensi yang paling efektif untuk mengurangkan konflik trafik motosikal adalah meletakkan penunggang motosikal di lorong motosikal di kawasan yang mempunyai trafik motosikal yang tinggi. Walaupun intervensi ini melibatkan kos yang sangat tinggi, tetapi ia boleh mengasingkan motosikal dengan kenderaan lain yang bersaiz jauh lebih besar bagi mengelakkan perlanggaran motosikal. Selain itu, penggunaan teknologi pada motosikal dan kenderaan lain juga memainkan peranan yang penting. Penggunaan sistem brek anti-kunci (ABS) pada keadaan kecemasan boleh memastikan keseimbangan penunggang motosikal dan memendekkan jarak hentian. Dengan ini, intervensi mewajibkan pemasangan ABS pada motosikal baharu boleh membantu penunggang motosikal untuk mengelakkan perlanggaran. Di samping itu, pendidikan secara formal dan tidak formal yang berterusan serta penguatkuasaan yang lebih efektif juga merupakan unsur yang kritikal untuk mengurangkan kesilapan dan kecuaian penunggang motosikal dan pengguna jalan raya yang lain terutamanya terhadap golongan kanak-kanak dan belia.

Usaha untuk membudayakan keselamatan jalan raya perlu bermula daripada kerajaan Malaysia. Amalan pengurusan keselamatan jalan raya seperti memeriksa kenderaan kerajaan secara berkala, memberi latihan pemanduan berhemah kepada pemandu dan memantau kelajuan pemanduan kenderaan perlu diwajibkan di semua agensi kerajaan bermula daripada kerajaan pusat. Amalan kerajaan ini akan dijadikan teladan kepada sektor swasta dan industri bagi mempergiatkan sistem pengurusan keselamatan jalan raya. Pihak kerajaan juga boleh menjadikan amalan pengurusan keselamatan jalan raya sebagai salah satu syarat wajib perolehan berkaitan dengan pengangkutan darat dan logistik. Intervensi ini akan turut memperbanyakkan bilangan syarikat yang sudi memasukkan keselamatan jalan raya dalam sistem pengurusan mereka. Sekiranya intervensi ini dapat dijalankan secara berterusan, seluruh rantaian nilai operasi harian akan mengaplikasikan prinsip sistem selamat melalui proses perolehan, pengeluaran, perkhidmatan dan pengedaran. Dalam proses memperluaskan amalan terbaik ini, budaya keselamatan jalan raya akan terbentuk di sektor kerajaan dan sektor swasta.

Pengurusan kelajuan juga dijadikan satu (1) fokus utama untuk mencapai sasaran yang ditetapkan. Pandu laju bukan sahaja akan meningkatkan risiko perlanggaran tetapi juga meningkatkan tahap kecederaan kepada mangsa yang terlibat. Sekiranya kelajuan trafik di Malaysia dapat dikurangkan ke paras yang selamat, banyak nyawa boleh terselamat daripada nahas jalan raya. Penggunaan Sistem Keselamatan Kesedaran Automatik (AwAS) telah terbukti berkesan untuk mengurangkan kelajuan kenderaan di Malaysia. Dengan ini, sistem AwAS patut diperluaskan lagi di lebih banyak kawasan agar isu memandu melebihi had laju jalan dapat diatasi. Selain itu, penggunaan teknologi seperti sistem Adaptasi Kelajuan Pintar (ISA) di kenderaan komersial dan persendirian juga boleh membantu menurunkan kelajuan kenderaan. Sistem ini boleh memberi amaran kepada pemandu sekiranya memandu melebihi had laju ataupun mengurangkan kelajuan kenderaan secara automatik. Penggunaan teknologi secara meluas akan dapat mengurangkan kelajuan kenderaan dengan efektif.

Untuk memastikan apa yang telah digariskan dalam Pelan Keselamatan Jalan Raya 2021 – 2030, kita tidak boleh bergantung kepada Kementerian Pengangkutan atau sektor kerajaan sahaja, kerjasama dan sumbangan daripada semua pihak adalah sangat kritikal bagi menyempurnakan sistem keselamatan jalan raya di Malaysia. Dengan ini, pelan tindakan yang melibatkan semua pihak perlu dibangunkan sebagai satu (1) garis panduan dan mekanisme pemantauan tahap pencapaian kita. Kita perlu turut melibatkan dan menggalakkan komuniti setempat untuk menjalankan pelbagai program keselamatan jalan raya secara proaktif. Satu komuniti yang memandangkan keselamatan jalan raya sebagai budaya mereka akan membentuk satu norma baharu yang menganggap pematuhan terhadap keselamatan jalan raya sebagai satu nilai yang murni dan patut dihormati. Dengan penglibatan semua pihak dalam sistem keselamatan jalan raya ini, visi sifar kematian nahas jalan raya boleh dicapai.

Tatacara Penulisan Surat Rasmi dan Memo; Panduan bagi Kakitangan MIROS

Author : Nurmaizah Jamsuri
ISBN : 978-967-2988-35-9

Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera,

Saya panjatkan kesyukuran ini ke hadrat Allah SWT kerana dengan izin-Nya, hasrat untuk menghasilkan buku yang bertajuk **"Tatacara Penulisan Surat Rasmi dan Memo"** ini dipermudahkan dan dapat dilaksanakan.

Setinggi-tinggi terima kasih diucapkan kepada YBrs. Ketua Pengarah, PPj. Kehormat (PA), Ir. Ts. Dr. Khairil Anwar Abu Kassim kerana sentiasa memberi sokongan dan ruang kepada semua warga MIROS untuk menyumbangkan idea, kepakaran dan tenaga dalam usaha ke arah kemajuan MIROS yang berterusan. Cadangan YBrs. Ketua Pengarah agar buku panduan ini diterbitkan akhirnya dapat direalisasikan.

Buku ini mengandungi informasi dan perkara-perkara asas yang perlu diketahui sebelum menulis surat rasmi dan memo seperti definisi, tujuan, ciri-ciri, dan jenis-jenis surat rasmi dan memo. Selain itu, rujukan dan contoh-contoh surat dan memo juga disediakan. Semoga buku ini dapat memenuhi keperluan semasa warga MIROS dalam urusan komunikasi harian.

Akhir kata, ingin saya rakamkan ucapan terima kasih yang tak terhingga khas buat sekretariat yang telah banyak membantu dari awal penubuhan Jawatankuasa Pemantapan Prosedur dan Pengurusan Dokumen Pejabat (JPPPDP) pada bulan Jun 2020. Ucapan terima kasih ini juga dirakamkan khas untuk Encik Awaludin Bakar, Fasilitator yang telah berkongsi ilmu dan kepakaran beliau melalui kursus yang diadakan, serta Unit Penerbitan MIROS yang membantu sehingga kerja-kerja penerbitan buku ini selesai. Semoga usaha murni ini dapat sama-sama kita teruskan pada masa-masa akan datang. Saya doakan semoga semua terus maju jaya!

Sekian, terima kasih.

Study on Motorcyclists' Interaction Risks at Hard Shoulder Lane

Author(s) : Rizati Hamidun, Sharifah Allyana Syed Mohamed Rahim, Hawa Mohamed Jamil, Ho Jen Sim, Norfaizah Mohamad Khaidir, Mohd Khairul Alhapiz Ibrahim, Roziana Shahril

ISBN : -

Increasing demand of motorcyclists travelling along the hard shoulder lane (HSL) or emergency lane have created risks among the motorcyclists, stalled vehicle occupants (either breakdown or working vehicles) and the maintenance workers. Though proper traffic management plans (TMP) are in place, the fatal accidents between motorcyclists and working vehicles are still on the rise in the past few years.

Acknowledging the potential hazards on losses of human lives at the work zones along the HSL, UEM Edgenta has taken the initiatives to review the existing TMP as well as understand the risk of collisions from user's and worker's perspective. The aim of this study was to enhance the safety level at work zone and safeguard the workers and motorcyclists.

This project evaluates the work zone safety from four (4) aspects: crash history, review of TMP procedure, site observation and interview survey. The data collection spanned between year 2020 and 2021 where the time, location and data were significantly affected by pandemic Covid-19. Nonetheless, the recommendations proposed are based on evidence collected and at the best knowledge of the team members.

The crash history related to motorcycle crashes on HSL between year 2018 to 2020 were gathered to provide an understanding of the characteristics of crashes occurred in the past. Based on the data, it is highlighted that most of the crashes occurred during activation/ deactivation of TMP and when mobile work/PIT/ERT was conducted on HSL.

The TMP procedures adopted by UEM Edgenta, MHA, ATJ 2C/85, PLUS highway as well as MUTCD were discussed briefly. The elements adopted in these procedures were compared to identify any lacking or best practice embraced by other authorities.

The site observation involves two (2) major tasks: vehicle operational characteristics study and the naturalistic riding study.

The vehicle operational characteristics study examines the speeds of motorcyclists when approaching the work zones and other variables such as volumes and conflicts were also observed. The results reveal that the motorcyclists were travelling fast (more than 85 km/h for 85th) despite the advisory speeds of 80 km/h erected 300 m before the work zone. Specifically, about 41% of the motorcyclists that ride on HSL changed their lane to SL at a distance of 50 m and less from the safety vehicle (SV). On the other hand, the naturalistic riding study concluded that while most of the test rider did not immediately reduce their riding speed when approaching work zone, it is of utmost importance to ensure the visibility of the signage and sufficient warning of the lane closure and presence of obstacles (SV, equipment, etc.).

The rider perception survey which involves the commuter motorcyclists on Malaysia highways note that the risk of a collision between a motorcyclist and the safety vehicle at the work zones was mainly due to the motorcycle cannot anticipate the speed of the safety vehicle and did not expect the vehicle to be stopping. The interview survey with the workers reveals that some of workers were aware of their lives are at risk when working at site.

By and large, based on the findings, it is recommended that the traffic safety at work zone along the HSL can be improved by using the hardware and soft skills. Hardware such as crash cushion, speed management, sound alertness, speed indication can be used to enhance the motorcyclists' alertness. In long term, it is wise to provide exclusive motorcycle lane for the motorcyclists. Besides, education on the speed management and proper use of HSL should be made known to the public.

Road Safety Inspection: Raised Up Pedestrian Crossing at Persiaran Sultan Salahuddin Abdul Aziz Shah, Precinct 1, Putrajaya and Proposal on Implementation of On-Street Parking along Boulevard Persiaran Perdana Precinct 3, Putrajaya

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Planning, designing and constructing road infrastructure should give priority to the safety and comfort for all group of road users including those are vulnerable such as pedestrians and cyclists. Concerning on the potential crash occurred at the new facilities provided, this project evaluates the safety condition of the two (2) locations based on the Road Safety Inspection (RSI) procedures: (i) new signalised pedestrian crossing with speed hump/platform at 'Tangga Putrajaya Steps' Persiaran Sultan Salahuddin Abdul Aziz Shah, Precinct 1, and (ii) proposed the onstreet parking at Boulevard Persiaran Perdana, Precinct 3, Putrajaya.

Based on site inspection, the new crossing facility and proposed on-street parking located on the major road with high-speed condition. High number of bus and cyclists' activity was also observed at both locations which potentially create conflicts due to sight obstruction, low visibility, road curvature, roadside hazard, many access, inadequate warning signs, road user violation, traffic signal and operation. Recommendations suggested are based on the road deficiencies identified during inspections and in line with established guidelines Arahan Teknik Jalan (ATJ) and other reliable sources.

Notes

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