# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

# THE STUDY ON THE EFFECT OF SIDE MIRROR POSITION TO THE MOTORCYCLE VIEW AND BLIND SPOT AREA

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Automotive Technology with Honours.

by

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This report is submitted to the Faculty of Mechanical Engineering Automotive Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Mechanical Automotive Technology with Honours. The member of the supervisory is as follow:

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# ABSTRAK

*Terdapat banyak saiz kenderaan darat seperti motosikal, kereta, lori dan bas yang mempunyai titik buta sendiri. Lebih besar saiz kenderaan tersebut, semakin tinggi titik buta kenderaan tersebut. Dalam kes ini, kebanyakan kemalangan di Malaysia adalah berkaitan dengan penunggang motosikal dan perkara ini akan difokuskan terlebih dahulu. Sudut pandangan yang terhad memerlukan tambahan cermin, kamera, sensor untuk mengenalpasti titik buta. Salah satu idea dicetuskan untuk melakukan analisis terhadap titik buta bagi penunggang motosikal. Beberapa jenis pengumpulan data darii ujikaji dan ujian telah dijalankan untuk menyelesaikan objektif kajian ini. Selain itu, ia juga dapat menyelesaikan masalah penunggang motosikal apabila mereka ingin memotong kenderaan lain dari arah tepi, belakang, dan sebagainya. Kesimpulannya, penemuan kajian ini boleh menjadi tanda aras bagi pengajian masa depan untuk mencari teknologi yang lebih baik untuk mengatasi masalah titik buta bagi penunggang motosikal*



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## ABSTRACT

There are many sizes of land vehicles such motorcycle, car, lorry and bus having their own blind spot. The larger the vehicle size, the higher the blind spot area. In this case, most of the accidents in Malaysia were related to the motorcyclist, motorcycle cases will be focus more. Insufficient view angle coverage and overall field of view have been discovered, suggesting the need for additional mirrors, camera, blind spot sensor to cover the blind spot zones. One of the ideas was triggered to do blind spot analysis on motorcycles. Several types of data collection from experiments and tests have been conducted to complete this study's objectives. Moreover, it can also solve motorcyclist problems if they want to overtake other vehicles from the side, back and so on. To conclude, this study's findings can be a benchmark for future studies to find better technologies to overcome motorcyclists blind spot problems.




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## DEDICATION

I would like to dedicate this research to my favourite supervisor Dr. NurHazwani Binti Mokhtar who gives me additional knowledge to help in this research.



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## LIST OF SYMBOLS

| | |
|---|---|
| m | Meters |
| $m^2$ | Area |
| % | Percent |
| cm | Centimeters |
| ft | Feet |
| cc | Cubic Centimeters |



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## LIST OF ABBREVIATIONS

| | |
|---|---|
| ASEAN | Association of Southeast Asian Nations |
| PDRM | Polis Diraja Malaysia |
| MIROS | Malaysian Institute of Road Safety Research |
| LED | Light-emitting Diode |
| JKJR | Jabatan Keselamatan Jalan Raya |
| WHO | World Health Organization |
| MAW | Motorcycle Approach Warning |
| CMC | Connected Motorcycle Consortium |
| ABS | Anti-lock Braking System |
| ACC | Adaptive Cruise Control |
| MSC | Multimedia Super Corridor |
| LCA | Line Changing Assist |



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# CHAPTER 1
# INTRODUCTION

## 1.0 Background

Malaysia has the highest risk of road death among Association of Southeast Asian Nations (ASEAN) countries and motorcyclists are involved in more than 50 % of road accident deaths. The data were gathered from the Polis Diraja Malaysia (PDRM), government and national or international research institute. The Malaysian Institute of Road Safety Research (MIROS) developed a system in 2008 in order to simplify the use of data by automating requests for data query. In order to generate analysis and findings, this system builds on the information obtained by the traffic police from the existing national road accident data. Recently, in 2015, a new system version has been introduced with numerous improvements, like a mobile eat data collection application to facilitate on-site data collection. Furthermore, the Malaysian Authority (MHA) launched an initiative in 2015 to collect road crash data in Malaysia, in close coperation with with MIROS. These data include only main roads, but nevertheless represent a significant added value to the data collected on road safety in Malaysia.



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Motorcycle blind spot area depends on two main factors that is the height of the motorcyclists and the size of side mirror to see how far the other vehicle from back view of motorcycle. As an average height of Malaysian is 150 cm, it is importance to have blind spot awareness. This is very important as for motorcylist with height below 150 cm, the blind spot area is subjected to increase. This will alert the motorcyclists if there any potential collision object within the blind spot area.

## 1.1 Project Objective

Development the study of effect of blind spot to the motorcyle crash based on objectives such as the following:

**i.** To study factors for motorcycle crash based on road crash statistics.

**ii.** To study latest technology on motorcycles to avoid road accidents.

**iii.** To investigate motorcyclist blind spot area based on side mirror positioning.



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## 1.2 Problem Statement

The aim of this research is to investigate the motorcycle blind spot area by using static road test and grid modelling test. The experiment need to be done carefully to make sure understanding about how to determine blind spot area. This will focus more on blind spot area for motorcyclist depends on side mirror view effect to the rear object. Besides that, it show how to determine the distance whenever the rear object in blind spot or not. This information is important to alert the motorcyclist to avoid near miss accident in real road situation.



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# CHAPTER 2
# LITERATURE REVIEW

## 2.0 Overview

The blind spot zone is an area for the motorcyclist, where an object can't be seen by the motorcyclist. In the rear-facing areas the blind spot zone is generally located on both sides. During the change of track the motorcylist can't see vehicles approaching, which may in turn cause an accident. The motorcyclist's visibility in the area of the blind spot was often studied because detection and warning systems are important to develop. Researchers employed different techniques to determine the blind spot area. McNelly et al.(2015) Population Models for Platzer viladate the blind spot method in the car's side mirror, focusing on driver and motorcyclist restraint. For vehicles with a minimum length of 13 ft for 90 %of the population, Placer's method has been used to remove side mirror blind spots.

Figure 2.1: Blind spot area



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