

**UNIVERSITI TEKNOLOGI MARA**

**PREDICTIVE MODEL OF  
HEAVY GOODS VEHICLE (HGV) -  
MOTORCYCLE  
CRASH SEVERITY AFFECTED BY  
ROAD FACTORS IN MALAYSIA  
USING MULTIPLE LOGISTIC  
REGRESSION METHOD**

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## **ABSTRACT**

This study explores into the critical domain of road characteristics influencing crashes involving motorcycles and Heavy Goods Vehicles (HGVs). A comprehensive analysis of eight key road characteristics related to HGV-motorcycle crashes is presented. The primary objective is to examine the severity of motorcycle crashes in relation to HGV crashes and to identify and clarify the significant road factors that contribute to these fatalities. The study acts as a preliminary investigation with the goal of laying the groundwork for later research projects that would improve the state of Malaysian roads. The methodology employed involves a meticulous analysis of road crash data spanning three years (2015-2017). The significant factors affecting crash severity were identified using descriptive and simple logistic regression analysis. More than 60% of the cases resulted in fatalities, which highlights a bleak information. The identified key road factors include straight roads, paved shoulders, flat surfaces, smooth road surfaces, bitumen road surfaces, dry conditions, and single lanes. Using multiple logistic regression, a prediction model for the severity of crashes involving HGVs and motorcyclists was developed, and the model fit the data with a fair degree of accuracy. The final model highlights that most severe crashes manifest in one-way lanes, sloped conditions, paved roads, and bends. This subtle insight into the details of road characteristics provides a foundation for local authorities to enhance road safety measures. The study helps in filling a significant research gap on the significance of road characteristics to HGV crashes. With a thorough and in-depth analysis of the road factors related to HGV-motorcycle crashes, this study contributes significant additional insights to a body of literature. The study goes beyond simple recognition by providing practical insights for managing and planning road safety in the Malaysian environment. Through its multifaceted approach, the research not only enhances our understanding of the dynamics of HGV crashes but also provides practical recommendations to improve road safety outcomes in the Malaysian context.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Heavy goods vehicles (HGVs), characterized by a maximum gross weight of 3.5 tonnes, are commonly used for transporting goods by road. The substantial weight of these trucks can contribute to early road deterioration and collisions, especially on roads not designed for heavy truck traffic. The impact of HGV crashes goes beyond the immediate incident, significantly affecting the safety of other road users due to the high mass of HGVs, resulting in severe consequences. According to a report on road crashes in European countries, HGV-related crashes caused 4,500 deaths, constituting 18% of road crash fatalities in 2013. In Sweden, a notable increase in road accident fatalities has been observed, with half of these fatalities linked to HGV accidents (Hamidun et al., 2019).

The most recent traffic accident data for 2019, sourced from the Ministry of Transport Malaysia Official Portal Yearly Statistic of Transport website, highlights an upward trajectory in road accidents spanning the years 2010 to 2019. Figure 1.1 illustrates a notable increase, with the number of road accidents reaching 567,516 cases in 2019, compared to 414,421 cases in 2010. Figure 1.2 provides a visual representation of annual road accident fatalities during the same period, fluctuating between 6,000 and 7,000. The peak was observed in 2016, with 7,152 recorded fatalities, subsequently decreasing to 6,167 in 2019. This data suggests a recent decline in the number of deaths over the past few years.