UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF HEAVY GOODS VEHICLE (HGV) ACCIDENT SEVERITY PREDICTION MODELS

NOR IZZAH BINTI ZAINUDDIN

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ABSTRACT

Heavy Goods Vehicles (HGVs) play a crucial role in regional freight movement and economic development but pose significant risks in traffic collisions, often leading to more severe injuries compared to other vehicle types. This research aims to explore the influence of road and environmental characteristics on the severity of HGV-related crashes within the Malaysian road network. By analyzing crash data collected from the Royal Malaysia Police and MIROS Road Accidents Database System (MROADS) for the period 2015-2017, the study examines 3,663 HGV crash records using binomial logistic regression to predict crash severity, categorized as either fatal or non-fatal. The analysis identifies eleven significant factors among the fifteen variables examined, including road surface quality, road geometry, lane marking, shoulder type, control type, road type, traffic system, weather conditions, time of day, day of the week, and various states in Malaysia. In contrast, factors such as area type, location type, speed limit, and light conditions were found to be statistically insignificant in predicting fatal outcomes. Three empirical models were developed in this research, each demonstrating high accuracy in predicting the severity of HGV crashes. The significant factors identified can be leveraged to mitigate the risk of severe injuries and fatalities. These findings are crucial for assisting relevant authorities in the strategic planning and design of road elements, with a particular focus on enhancing HGV safety by addressing key variables. In conclusion, the study underscores the importance of targeted interventions and informed policymaking in reducing the severity of HGV-related crashes. Continued and advanced research in this area is imperative to ensure secure and sustainable urban freight operations while fostering a safer driving environment. These insights can contribute to the development of more effective safety measures, ultimately reducing the societal and economic impacts of HGV-related traffic collisions.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

This chapter discusses the research background, problem statement, aim and objectives, research questions and framework, scope and limitations of the study, significance, and implications, and finally, the thesis outline.

1.2 Background of Study

Road traffic crashes, also known as road accidents or traffic collisions are a significant global public health and safety concern. They result in human casualties, property damage and economic losses; impacting individuals, communities, and societies (Kareem, 2003; Masuri et al., 2017).

Road traffic crashes are a global issue affecting countries of all income levels. According to the World Health Organization (WHO), approximately 1.35 million people die annually in road traffic crashes worldwide, making it one of the leading causes of death globally, particularly among young adults and children. Road traffic injuries are currently estimated to be the eighth leading cause of death across all age groups globally and are predicted to become the seventh leading cause of death by 2030.

Low- and middle-income countries bear a disproportionate burden, accounting for over 90% of road traffic fatalities, despite having less than 60% motor vehicle ownership than high-income countries (World Health Organization & United Nations, 2021). However, road traffic crashes remain a significant concern even in developed nations due to the associated social, economic, and public health implications (World Health Organization, 2018).

The Federation of Malaysia comprises Peninsular Malaysia and the states of Sabah and Sarawak on the island of Borneo. Located 7 degrees north of the Equator, Peninsular Malaysia is separated from the states of Sabah and Sarawak by the South China Sea. The study area for this study consists of the Malaysia road network linking Johor Bahru in the south with Kangar in the north and Kota Bharu on the East Coast, including road networks in the states of Sabah, Sarawak and Labuan. As for the year