

Rumble Strips: A Human Factors Perspective towards a Sustainable Road System

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ABSTRACT

Prior research substantiates the belief that human factors contribute to up to 90% of all traffic accidents. The failure to consider cognitive ergonomics in road safety initiatives will continue to cause traffic fatality, especially on straight roads. Since drivers and road safety practitioners cannot wholly avoid driver's non-compliance, skill-based errors, and mistakes, road designs should aim to reduce the severity of repercussions resulting from human errors. For example, in the case of a momentary lapse of attention leading to lane departure, drivers should be able to correct their maneuvers. A human-centered traffic system approach of road design may reduce the severity of accidents caused by human error. An investigation of road crashes in Malaysia conducted by the Malaysian Institute of Road Safety Research revealed that 66% of road crashes in Malaysia are opposite-direction head-on crashes and run-off-road (roadway departure) crashes. Installing Lane Departure Warning System such as Centerline Rumble Strips (CLRS) and Shoulder Rumble Strips (SRS) can reduce these types of crashes and compensate human errors on the road. Rumble strips alert drivers that they are deviating from their lane by providing both tactile and auditory warnings. Although the effectiveness of rumble strips is well documented in prior researches, the practice of installing rumble strips is still scarce in Malaysia. This paper highlights how rumble strips can mitigate the consequences of the human errors, in the hope that the information can help road safety researchers, authorities, and practitioners move forward in the implementation of interventions towards sustainable road system.

Keywords: Sustainable Development Goal, Road Safety, Centerline Rumble Strips, Shoulder Rumble Strips, Human Factors

INTRODUCTION

Road Safety as a Sustainable Development Goal

Road accident is the leading cause of fatal injuries globally (Makinde & Oluwasegunfunmi, 2014) with the estimated deaths at over 1.35 million annually (World Health Organization, 2018). In 2004, the World Health Organization (WHO) recognized road traffic injuries as the ninth top causes of death. They predicted that they would become the fifth most frequent causes of death by 2030 (World Health Organization, 2009). This projection is alarming because, in a more recent WHO Global status report on road safety report, it was noted that traffic accidents had become the eighth leading cause of death worldwide. Currently, it is the leading cause of death for people from 5 years of age until 29 (World Health Organization, 2018). High traffic fatality rate due to unsustainable transportation was mentioned as one of the main challenges of sustainable development, therefore addressing road safety is not only relevant but also should be a key priority (United Nations, 2017). While sustainable transportation has no definitive definition, it was

unanimously recognized that a sustainable transportation system should effectively and efficiently provide safe and equitable access to essential services, while promoting economic and environmental sustainability (Jeon, Amekudzi, & Vanegas, 2006).

The burden of traffic fatality falls disproportionately on the lower income countries (Asian Development Bank, 2019). According to the World Health Organization (2018), although low-income countries constitute only 1% of the world's vehicles, they account for 13% of the total traffic fatality. Internationally, non-fatal traffic injuries recorded 20 to 50 million casualties (Rohayu, Sharifah, Jamilah, & Wong, 2012). Locally, prior research has also confirmed that traffic accident is one of the leading causes of death and injuries in Malaysia (Kareem, 2003). Enhancing road safety is the responsibility of all citizens. Eusofe and Evdorides (2017) suggested that decreasing the reliance on government sources can improve the sustainability of the transportation system in Malaysia. This article takes heed of this suggestion and provides suggestions to enhance road safety from the perspective of Human Factors.