MODELING CRUCIAL ROAD ENVIRONMENT RISK FACTOR FOR DEVELOPING ASIAN COUNTRIES USING PRINCIPAL COMPONENT ANALYSIS

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ABSTRACT

Traffic accidents in developing countries imposed serious effect especially in terms of its economic turnover on medical supplies and vehicles parts (Bener, A., et al. 2003). Bener, A., et al. (2003) who had done extensive works in proposing a strategy to improve road safety in developing countries concluded that Malaysia is also one of the most prominent countries in this issue. He summarized that by looking at the motorization levels and fatality rates for various countries within 1988 – 1998, Malaysia has reported to have about 1111.0 vehicles / 10,000 persons with 2.43 fatalities were recorded for every 10,000 persons. As such, this study aims to investigate crucial road environment factors for Asian developing countries by taking Malaysia Federal Road network as study area. Fourteen road environment attributes were selected based on specific criteria with an aim to improve the overall environment condition of the road. Crash data were supplied by Malaysian Royal Police Force (PDRM) and the rest of the data were mainly collected using video-logs and on-site measurement methods. Three stretches of roads comprises of 315.5 km of federal roads were selected as study areas. A test vehicle attached with video-camera was driven along this road where the road environments were recorded. By employing principal component analysis, crucial road environment factors as well as specific attributes that constantly contributed to safety problem of this road were identified. Four road environment factors namely roadway, roadside, road infrastructure and road operational environment have collectively been identified as the most crucial road environment factors for federal roads. Identifications of these factors are very useful since it would be a better reference in identifications of risky environment factors that need urgent treatment.

Keywords: Malaysian Federal Road, road environment, risk factor

INTRODUCTION

The contribution of road environment towards crash occurrences has been accepted by many researchers based on evidence that complexity of road environment is highly related in producing great risk to drivers (Rudin-brown et al., 2014). In general terms, road environment is defined as the road aspects related to the design and engineering elements of the road system, the safety implications of traffic and the users of that system, as well as the interaction of these components with the adjacent land use (Road environment safety – A practitioner's reference guide to safer roads. NSW, 2006). In comparisons to developed countries, the influence of road environments toward crash occurrences in developing countries is relatively higher since the majority of the road networks in these countries are crossing different geographic and demographic areas that would create exclusive road environment profiles. Malaysia's road network is one of those developing countries that were affected by its road environment conditions.

Federal road is one of the most popular and longest road networks available in Malaysia. The road was firstly designed to cater the needs for long distance travelling purposes for medium to high speed vehicles but since most parts of the federal roads are crossing different types of development from major towns to small villages, from