Motorcycle accident prediction model for junctions on urban roads in Malaysia

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Abstract
The exclusive motorcycle lanes have been implemented along the major trunk roads in Malaysia. The tracks were aimed at addressing motorcycle accident problems along the routes. However, not much work has been done to address motorcycle accident problems at junctions. This paper presents a prediction model for motorcycle accidents at junctions on urban roads in Malaysia. The models were developed using the Generalized Linear Modeling approach. The final model reveals that motorcycle accidents are proportional to the power of traffic flow. The estimates indicate that an increase in non-motorcycles and motorcycles entering the junction is associated with an increase in motorcycle accidents. Non-motorcycle flow on major road had the highest effect on the probability of motorcycle accidents. Approach speed, lane width, number of lanes, junction control, shoulder width and land use were also found to be significant in explaining motorcycle accidents. The final model should allow traffic engineers to establish appropriate junction treatment that is specifically designed for motorcycle lane facilities at junctions.

Keywords – motorcycle accidents, generalized linear models, cross-sectional analysis, junction accidents, motorcycle accident model, junction treatment

1. Introduction
Motorcycle accidents continue to be a problem in many countries. The fatality rate (death per 10,000 registered motorcycles) among motorcyclists found higher than those of four-wheeled motor vehicle occupants [2;4;5;6;18;21;30]. However, in-depth studies in this particular area can hardly be found. In Malaysia, the population of small motorcycles (100-125cc) constitute more than half of total vehicles and contribute more than two third of casualties (death, hospitalized and slight injury) to total traffic accidents. In the 1990-2000 period, about 3,000 motorcyclists were killed and about 30,000 were injured every year. On that period, annual fatality and injury rates (per 10,000 registered motorcycles) for motorcyclists were 7.4 and 73.5, respectively [22]. Given this scenario, the exclusive motorcycle lanes alongside major trunk roads have been constructed in the country. Numerous studies have been carried out to evaluate the impact of these lanes on motorcycle accidents [23;25;26] following the provision of such facilities. These studies revealed