Evaluation of Criteria for Setting Speed Limits to Sri Lankan Highways (Built-up Areas)

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Abstract

The speeds of vehicles are the most pivotal factor in most road traffic accidents. Enforcing a suitable speed limit is a tool for enhancing road safety. However, the currently available posted speed limits are placed without much scientific investigation. Those limits are merely decided by selecting a vehicle category. According to the Gazette of the Demographic Socialist Republic of Sri Lanka, No.1763/26, June 22, 2012, it was divided all vehicles into two vehicle categories and proposed only two-speed limits for the built-up areas. Such as 40 km/h for motor tricycles, special purpose vehicles, and 50km/h for all other vehicles. However, it is understood that road geometry, roadside environment, vehicle density, accident rates, average daily traffic values, etc, should be considered. The current study is having the aim of investigating the influence of such factors on speed limits. For that, ten site locations with different geometric characteristics, vehicle composition, and accident rates were selected in built-up areas. Using speed guns, the speeds of randomly selected vehicles were recorded. Totally, 3000 vehicle speeds were collected.

Initially, vehicles were divided into four categories as motor-bikes, three-wheelers, light vehicles, and heavy vehicles and performed ANOVA to find out whether there exists any difference in 85th percentile speed value between each vehicle category. The intention was to group the vehicles into similar speed clusters. It was identified that motor-bikes and light vehicles like Car/ Van/ Jeep are be selected as one cluster while three-wheeler and heavy vehicles like Buses/ Light good vehicles/ Heavy good vehicles as the other clusters. Next, in order to identify the influential factors towards the speed limit of each cluster, a correlation with each factor for the speed was observed. From the results, the speed limit of motor-bikes, three-wheelers, and light vehicles are heavily correlated with factors such as lane width, bicycle lane width, shoulder width, parking width, and the road markings, whereas the speed limit of heavy vehicle category is greatly correlated with the one-way or two-way operation and the roadside activity apart from the above factors.

Finally, a multiple linear regression model for each vehicle cluster was fitted and validated. The most influential factor in deciding the speed limit is the availability of bicycle lane irrespective of the vehicle cluster. Besides, not only for heavy vehicles but also three-wheelers and light vehicles, the roadside activities are also negatively contributed to deciding the speed

limit. These developed models are useful to review the existing posted speed limits in built-up areas.

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