Development of Speed Prediction Model for Horizontal Curves under Mixed Traffic Conditions

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Abstract

Speed is one of the well-known causes for crash. Radius of horizontal curve significantly affects vehicle speed. Drivers unable to manage speed within a curve can get into accident. The fatal crash rate in horizontal curve is higher than the straight section. Therefore, safety at horizontal curve is considered as serious matter of concern. Traditionally, safety is analysed by speed differentials. The differences in operating speed between successive highway elements can be used as a measure to evaluate geometric design consistency and safety. Researchers have studied homogeneous traffic with strong lane discipline to predict vehicle operating speed in two lane highways. However, Indian traffic operates differently than the one in western countries due to wide variation in vehicle's operating and performance characteristics, and weak lane discipline. However, in India studies to predict operating speed model for four lane divided road is limited. It motivated authors to develop operating speed prediction model for four lane divided highway. In this study, car speed data at the center of seven horizontal curves in a four-lane divided highway have been collected. The 85th percentile speeds at five sites are analysed to develop a linear speed prediction model for car. The developed model depends on curve radius and is validated at two different sites. Results show that I-value is lesser than 0.2, which confirms the applicability of the developed model.

Keywords: Car speed; Horizontal curve; Speed prediction model; Weak lane discipline; mixed traffic flow.

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