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Thesis

Driver Speed Behaviour on Freeway Deceleration Speed-Change Lanes

Abstract

Deceleration speed-change lanes (SCLs) and exit ramp terminals on freeways are typically designed to allow vehicles to depart off the freeway in an organized and efficient driving manner. Freeway diverge areas with adequate SCL lengths should enable the exiting drivers to diverge off the freeway through traffic, decelerate to the desired ramp speed, and exit the freeway safely and comfortably. Safety problems can be expected if drivers are forced to reduce speed on the main traffic lanes or to decelerate at a very high rate. In Canada and the US, the current design guides suggest that operation and safety could be enhanced on freeway SCLs by increasing their lengths. In this study, the driver behaviour at freeway diverge areas was examined using data collected on thirteen exit ramp terminals on Highway 417 in the City of Ottawa, Canada. The speed, geometric, and traffic data were collected and employed to model 85^{th} percentile speeds and deceleration rates using linear regression analysis. The modelling attempts integrated in this study resulted in 34 statistically significant predictive models at 5% level of significance. Design charts were developed for easy use by highway professionals.

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