

Modeling the Operating Speed in Tangents and Curves of Four-lane Highways Based on Geometric and Roadside Factors

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Abstract

Operating speed is an index that represents drivers' speeding behaviors on different highways and shows the comfort and safety levels they experience. Many models had been proposed in previous studies to predict operating speed and most of these works had used geometric, with few of them conducted using roadside variables to predict operating speed. Also, the operating speed study in multilane rural highways had been gained less attention by researchers. In this study, two four-lane rural highways (Kole jub-Borujerd and Borujerd-Khorramabad) had been surveyed for analyzing the operating speed. More than 13,800 spot speed data was gathered in 108 tangent and 30 curve segments. Two linear regression models were developed to predict operating speed in the tangent and curve segments using geometric and roadside factors simultaneously with the acceptable R-squared statistic (0.730 and 0.854 respectively). The results showed that segment length, guardrail median, and flat roadside configuration have a positive effect while slope, accesses density, curvature, and adjacent land use length have a negative effect on operating speed. Moreover, the sensitivity analysis demonstrates that the effect of slope on operating speed in curves is twice comparing to its effect in tangents; while, operating speed in tangents is approximately 2.5 times more sensitive to access density than operating speed in curves. Thus, it can be concluded that not only geometric features affect operating speed but also roadside features affect it. The outcomes of this study can be useful in design and safety planning studies of rural multilane highways.

Keywords: Operating speed; roadside features; geometric features; speed prediction modeling; four-lane highways

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