Abstract

Noureldin Nagy Sheta

A Computer Simulator to Study the effect of the Spiral curves on driver's speed behavior on Two-Lane Rural Highway

There are many studies that have been conducted to improve the highway design consistency. Most of these studies are based on spot speed data collection, which is done by measuring the speed at specific locations such as in the middle of the tangent and the center of the horizontal curve. However, the maximum and minimum speeds don’t correspond to the center of tangents and curves, respectively. In this study, a computer simulator was used to produce a continues speed profile to facilitate analyzing the driver speed behavior for various pathway scenarios. In the current stage of development, the focus was to evaluate the effect of the transition (spiral) curve existence in the highway alignment on the driver speed magnitude. Measurement is taken at five specific locations for each segment of the tested two-lane highway. These points are located before, during and after the curve. A comparison was made to illustrate the role of spiral curve existence on the magnitude of driver’s speed. Using this comparison, the usefulness of the alignment with transition curve can be evaluated in contrast to the alignment without transition curve. The following variables were considered in this analysis: 1) curve radius, 2) deflection angle and 3) direction of driving. Briefly, the usefulness of the spiral curve was significant in the small curves and big deflection angles.