

Passing Sight Distance: Adequacy of AASHTO Criteria for Two Lane Roads in Sri Lanka

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Abstract

Freedom of overtaking maneuvers on a two-lane highway indicates the Level of Service of that particular highway according to the Highway Capacity Manual, 2010. Therefore, an adequate minimum Passing Sight Distance (PSD) would economically increase the percentage of passing zones, ultimately the highway capacity as well. Initially, American Association of State Highways Officials (AASHTO) provided a guidance for minimum PSD design criteria for passenger cars in 1954. Later, more conservative and comprehensive models and concepts were presented by Lieberman (1982), Glennon (1988), Hassan et al., (1996), and Harwood et al., (2008) etc. Typically, the effectiveness of analytical models was evaluated based on the realization of safe overtaking mechanism with a wide range of human and vehicle related parameters.

This paper will present an analytical model derived and validated using empirical data for passenger cars and evaluation of the suitability of AASHTO and proposed model for local traffic conditions. The field investigation was done using two test vehicles and a GPS data logger, on selected A & B class highways in Western and Southern Provinces of the country. The modal basis – idealized overtaking maneuver – was developed with field observations and consequently validated with empirical data. When compared to the resultant PSD values with AASHTO, new model clearly presented significantly conservative values than AASHTO for design speeds less than 80km/h. To evaluate both models for safety, a reliability index was calculated relevant to the actual PSD demand on local highways. According to the results reliability of AASHTO model extremely depreciated with increasing design speed while new model reach to a constant value at around 60km/h. Therefore, as a conclusion the adaptation of AASHTO guidelines for highway design purposes can be justifiable and recommended for Sri Lanka for design speeds less than 70km/h in the context of safety, but not conservative at lower design speeds in maximizing capacity of two lane highways.

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