

Development of Traffic Simulation Model to Evaluate the Capacity of Weaving Sections

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Weaving sections have proved to be one of the bottleneck locations for many motorway sections mainly due to the intensive number of lane changes occurring at such areas. Simulation models have proven to be the most suitable methods of evaluating weaving capacity. However, many of the existing simulation models suffer from certain limitations such as the unrealistic representation of driver's behaviour in terms of the longitudinal movement (car-following algorithms) or the lateral movement (lane changing algorithms). Moreover, the field data used for the calibration and/or validation processes might be limited in terms of the sample size used or in not correctly interpreting the data. Therefore, this study has been aimed at developing a simulation model: starting with the car-following and lane changing algorithms and ending by calibrating and validating this model with field data from a variety of sites. The data has been gathered for more than 50 hours of video recordings to cover more than seven sites of different configurations. The developed model has been compared with other traffic simulation software such as the S-Paramics which is widely used in industry. The results suggest that the developed model gave better results compared with S-Paramics in mimicking reality. Moreover, the results from this model have been compared with the methods used by the American Highway Capacity Manual as well as other models used in the USA such as INTEGRATION. The results suggest good agreement with these models. The developed model will help in studying the effect of each factor that influences capacity of weaving sections, such as the volume ratio (VR) the length of weaving section and the ratio of heavy good vehicles (HGVs).



Figure 1 Weaving movements.

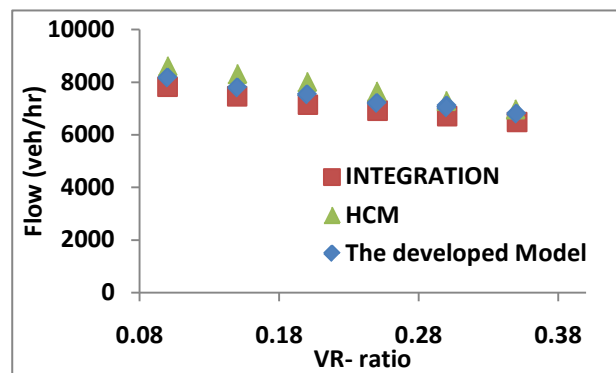


Figure 2 Comparison with other models.

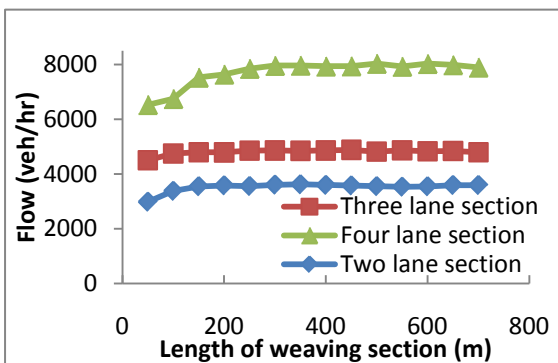


Figure 3 Effect of weaving length.

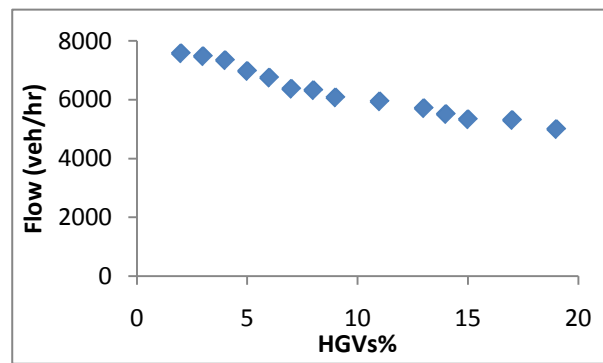


Figure 4 Effect of HGVs on the capacity.