Estimation and Comparison of Delay at Signalized Intersections Based on Existing Methods

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Abstract : Delay implicates the time loss of a traveler while crossing an intersection. Efficiency of traffic operation at signalized intersections is assessed in terms of delay caused to an individual vehicle. Highway Capacity Manual (HCM) method and Webster's method are the most widely used in India for delay estimation purpose. However, in India, traffic is highly heterogeneous in nature with extremely poor lane discipline. Therefore, to explore best delay estimation technique for Indian condition, a comparison was made. In this study, seven signalized intersections from three different cities where chosen. Data was collected for both during morning and evening peak hours. Only under saturated cycles were considered for this study. Delay was estimated based on the field data. With the help of Simpson's 1/3 rd rule, delay of under saturated cycles was estimated by measuring the area under the curve of queue length and cycle time. Moreover, the field observed delay was compared with the delay estimated using HCM, Webster, Probabilistic, Taylor's expansion and Regression methods. The drawbacks of the existing delay estimation methods to be use in Indian heterogeneous traffic conditions were figured out, and best method was proposed. It was observed that direct estimation of delay using field measured data is more accurate than existing conventional and modified methods.

Keywords : delay estimation technique, field delay, heterogeneous traffic, signalised intersection
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