INDOT Research

TECHNICAL *Summary*

Technology Transfer and Project Implementation Information

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Predicting Traffic Conditions at Indiana Signalized Intersections

Introduction

The Highway Capacity Manual (HCM) recommends the use of locally measured capacity parameters for the design of signalized intersections. Currently, national default capacity parameters are widely used for their convenience and because it is difficult to measure the parameters. This research sought to determine Indiana-specific capacity parameters. Site-specific characteristics were investigated to determine the factors that influence parameter variability. Improvement in the quality of delay predictions was demonstrated when using the developed Indiana parameter values in lieu of the default values.

Findings

The capacity parameters investigated include the base saturation flow rate, start-up lost time, green time extension, and heavy vehicle equivalency factor. The state average capacity parameter values for Indiana are comparable to the HCM recommended default values. Also, peak hour factor (PHF) was calculated for a number of intersections.

From the estimated parameters, the base saturation flow rate and PHF had a high variability across locations. Population size and lane position in a lane group were found to have effect on the saturation flow rate while time of day, population size, and volume had a considerable effect on PHF.

Control delay was calculated to evaluate the benefit of using local capacity parameter values. For this task the Highway Capacity Software (HCS 2000) was used. The capacity parameters evaluated were base saturation flow rate, start-up lost time, and green time extension. The delay prediction using the local capacity parameters on average had a lower mean error when compared with delay predictions using the default parameter values. Also, the local parameters produced lower variability compared to the default parameters. PHF should be predicted whenever traffic counts are not available.

Implementation

The research report includes a stand-alone document that provides the Indiana values of capacity parameters and an equation to calculate the Peak Hour Factor. The local values are tabulated in a convenient format and can be used in capacity and delay predictions with the Highway Capacity Software, Synchro, and CORSIM.

After approval, the document will be circulated among Indiana Department of Transportation operation, design, and planning units. The circular will also be provided to the Metropolitan Planning Organizations and other local agencies.

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