RESEARCH
PROJECT CAPSULE [19-2SS]
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TECHNOLOGY TRANSFER PROGRAM

Determining Louisiana's Roundabout Capacity

JUST THE FACTS:

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18 months

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POINTS OF INTEREST:

Problem Addressed / Objective of Research / Methodology Used / Implementation Potential

PROBLEM

Roadway intersections are a major safety concern. Traffic flow at intersections is normally regulated by traffic control devices (e.g., signals, stop signs). As an alternative to these traffic control devices, roundabouts are becoming more popular.

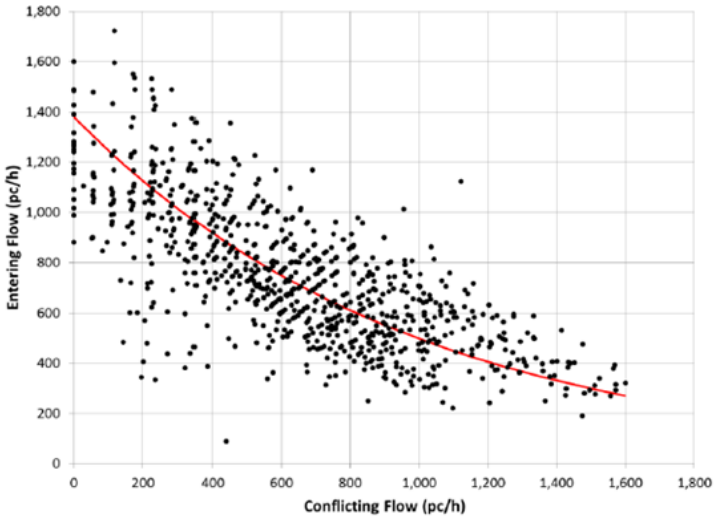

Figure 1
HCM lane capacity for roundabouts

General characteristics of modern roundabouts are circular shape, yield controls on entry, and geometric features that create low-speed environments. Although geometry has a clear effect on roundabout capacity, driver behavior is the main factor affecting roundabout performance.

The two most recent versions of the *Highway Capacity Manual (HCM), HCM 2010* and *HCM Edition 6*, use the same basic model for determining roundabout capacity (see Figure 1), and both recommend local calibration to best reflect driver behavior. SIDRA, a widely used software approved by the Federal Highway Administration (FHWA) for roundabout analysis, uses an Environment Factor to account for criteria that have not been modeled explicitly.

To date, no effort has been made to collect data on Louisiana drivers for calibration of the HCM models or to validate the SIDRA Environment Factors. This study will collect local field data with the objective of determining capacities, delays, and levels of service for selected roundabouts in the state.

OBJECTIVE

The primary objective of this project is to use local data to determine Louisiana roundabout capacities and compare with software outcomes currently being used in the planning and design of modern roundabouts in Louisiana.

METHODOLOGY

Initially, the research team will review available literature regarding the HCM roundabout capacity models and SIDRA estimation procedures. Current global research on local calibration efforts will be documented.

The research team will then select about 10 roundabout sites that meet criteria such as single-lane and mutually-perpendicular approaches, flat longitudinal gradients, availability of camera-mount location, and existence of congestion or queues for some portion of day. For this study, the research team is interested in site parameter values that can be compared with software outcomes.

Traffic data and inventory data will be collected, primarily through video recording systems mounted at each site. Data on vehicles in the circulating lane and on the approach lane will be used to determine circulating flow volume and entry lane volume. Inventory data will be retrieved from available site plans, as-built plans, or scaled aerial photos and corroborated with direct site measurements when possible.

The research team will analyze the collected data and compare with output from HCM models and SIDRA estimation procedures. HCM capacity models will be calibrated based on Louisiana data.

The SIDRA Environment Factor currently being used by DOTD will be evaluated to determine if outputs compare favorably with roundabout capacities for the Louisiana sites.

IMPLEMENTATION POTENTIAL

The study results will enhance the planning and design of roundabouts in Louisiana, and will enable a more complete and reliable assessment of modern roundabouts in the state. The results may also lead to updated policy on what SIDRA Environment Factor is appropriate for roundabout analysis in Louisiana.