



RESEARCH PROJECT CAPSULE [21-3SS]

September 2020

TECHNOLOGY TRANSFER PROGRAM

Evaluating Permitted/Protected Versus Protected Left Turn Signals in Louisiana

JUST THE FACTS:

Start Date:
August 1, 2020

Duration:
24 months

End Date:
July 31, 2022

Funding:
80/20 SPR

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POINTS OF INTEREST:

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

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PROBLEM

Provision of left turn signals at signalized intersections are necessary to prevent delays and crashes for left turning traffic but may adversely affect the operation of the intersection by increasing delay to through traffic, decreasing the intersection capacity, and reducing the overall efficiency of the signal coordination. The Louisiana Department of Transportation and Development (DOTD) has its own traffic signal manual, which sets guidance for protected only or permitted/protected left turn movements. The purpose of this study is to develop guidance on when to consider protected only versus permitted/protected versus permitted only (with left turn lanes) based on collecting and analyzing safety data, operational attributes, and geometric features of various signalized intersections all over Louisiana

OBJECTIVE

The primary objective of this project is to study the safety and operation of existing signal intersections (protected only versus permitted/protected left turns versus permitted only but with left turn lanes) along with their geometric features, as described in the DOTD Traffic Signal Manual, with the view to develop guidance on when it is appropriate to install each signal type. The research will answer whether or not the signal type affects the intersection control delay as well as if the signal type affects crash type and frequency. It will also investigate which geometric features significantly impact on the choice of signal type and if flow characteristics (traffic volumes) influence crash characteristics, and ultimately the choice of signal type. Finally, the research will explore when it is most appropriate to install a specific signal type considering operation and safety concerns.

METHODOLOGY

To achieve the objectives of the study, the research team will conduct a literature search on signal types and their benefits and will discuss the operational and safety impacts of changing from one signal type to the other. The team will then design a qualitative survey that will be sent out to state departments of transportation nationwide to obtain information on whether a statewide policy or guidance on implementing left-turn phasing modes exists. Also, an inventory will be compiled of all signalized intersections along state-owned and maintained roadways in Louisiana. The research team will then use this information to develop a sample list of signalized intersections. Following agreement on the sample list, the team will begin deployment of video cameras at the selected locations to collect field data to be analyzed for the study. The video data will then be analyzed for the necessary parameter data that will be used to calculate the delays experienced by the affected approach lanes for each signal type. A safety analysis will be conducted to identify which variables to include in the analysis, and to determine common crash characteristics of each signal type. The analysis will also help to establish whether there is a correlation between geometric features and the crash characteristics. The research team will then undertake a combined analysis of the data retrieved from all sites. Lastly, a final report and technical summary will be prepared.

IMPLEMENTATION POTENTIAL

Potentially, the results obtained from this study can lead to better assessments of where to implement permitted, permitted/protected, or protected-only signals throughout the state. Installing the right kind of signal at Louisiana intersections may not only benefit travelers by reducing time delays and providing improved safety, but may additionally lead to a more efficient use of fossil fuels and reduced air pollution.