

JOINT TRANSPORTATION RESEARCH PROGRAM

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Alternate Interchange Signing Study for Indiana Highways

Introduction

INDOT is responsible for maintaining and constructing all interstate, US Routes, and State Routes in Indiana. Drivers on these highways rely on guide signing to make lane changes and routing decisions. Current highway interchange guide signing is designed based on established standards, but some drivers have expressed that signing is confusing, not intuitive, or not explanatory enough. The main objective of this research is (1) to understand signing issues from the perspective of the driver and (2) develop improvement recommendations for interchange sign design in Indiana that will aid driver understanding and improve the safety and efficiency of highway traffic operations.

To understand the potential disconnect between sign designers and drivers, the Transportation and Autonomous Systems Institute (TASI) at Indiana University-Purdue University Indianapolis (IUPUI) collaborated with INDOT to conduct a new research project entitled, *Alternate Interchange Signing Study for Indiana Highways*. This project will develop improvement recommendations for interchange signing in Indiana that will enhance the safety and efficiency of highway traffic operations.

Findings

The first step of the project was to design a survey with specific questions aimed at understanding signing locations that are not ideal from the driver perspective. Due to the Covid-19 pandemic, face-to-face promotion of the survey became impossible, making an online survey the

only option. The survey was created on the server via an online tool called Qualtrics, and Institutional Review Board (IRB) approval was obtained.

The survey was distributed through email, social media, online newspapers, and a survey company. Email distribution received a response rate of around 2% and proved to be the most effective distribution option. The other distribution methods did not have much success. As a result, 84 valid survey responses were returned. It was determined that the low response rate was potentially due to the survey format since it required the participants to provide information in written format and not multiple choice. The survey also required the participants to identify specific signs at specific locations using map tools. Although the number of valid survey responses did not turn out to be as high as we initially expected, they did cover all major Indiana cities and returned useful and actionable information for INDOT; therefore, the data collection is considered successful.

All survey cases were examined by three TASI researchers independently, including information about the surrounding area of the signs indicated in the survey. Some survey responses were interpreted and supplemented as the initial response was partial or unclear.

The survey results showed the following.

- Drivers usually do not know the interchange types as they approach an interchange on the freeway.
- Drivers are most interested in which lanes they should be in when approaching an interchange, even in advance of typical signing locations.
- Drivers do not like signs that require cognitive work since that can delay their driving decision by creating uncertainty.

- Different drivers need different types of information on signing, such as cardinal direction, destination name, road name and lane assignments. Therefore, a perfect sign for one driver may be confusing or information overload for another driver.
- In some instances, a driver who is familiar with the area is more confused by the signs due to the sign information contradicting the driver's knowledge pertaining to directionality and geometry of the junction.

For each customer signing issue identified in the survey results, suggested remedies pertaining to sign layout, location, or type were logged in the case information. The result was submitted to the Study Advisory Committee (SAC) for comments, and the SAC's comments were integrated with TASI's result in the report.

Implementation

INDOT has modified some sign layouts and locations during recent signing updates and will consider future

actions for the suggested locations based on each survey case. INDOT will also apply lessons from this study to future interchange signing design by coordinating with project design teams, traffic engineering, and FHWA engineers, and reviewing interchange modification proposals and the design standards group.

Recommended Citation for Report

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Road signs at busy intersection in Indianapolis, Indiana.



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