Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

5-9052-01: A Data-Driven Safety Analysis (DDSA) Framework for the Beaumont District

Background

This project conducted a pilot project to assess how evolving safety analysis techniques can be embedded into Texas Department of Transportation (TxDOT) district activities, including operations and the project development process. The purpose of applying a data-driven framework is to identify ways to better integrate safety assessment into identifying the locations and types of projects that can improve safety and to evaluate safety aspects of already planned construction, reconstruction, and maintenance activities.

What the Researchers Did

Researchers developed a framework for incorporating data-driven safety analyses into district activities, which is comprised of four basic elements:

1. Describing District Safety Issues.

2. Screening the Network to Identify Locations with Potential for Safety Improvement.

3. Prioritizing Targeted Categories of Safety Improvements.

4. Integrating Safety into the Project Development Process.

Researchers used several visualization techniques to describe district safety issues. An inventory of roadway intersections and segments was compiled to develop safety performance functions for rural and urban two-lane, multilane and freeway segments, and rural and urban signalized and unsignalized intersections. Safety performance functions help establish benchmarks that allow the district to identify roadway segments and intersections that have the potential for safety improvement.

Researchers created several spreadsheet tools that allow analysts to compare segment and intersection crash history to the benchmarks. Researchers also compiled several tools that can be applied in a systemic manner to address crash issues that are typically not concentrated in particular locations. These tools allow districts to identify locations that have the characteristics associated with crash types. Spreadsheet tools were developed to address narrow roadways, pedestrian crashes, wet weather curve crashes, cross-median crashes, and horizontal curve safety.

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Researchers also provided a step-by-step process to help TxDOT transportation professionals select suitable safety assessments methods throughout the project development tasks, primarily focused on the following project development phases:

- Planning and scoping.
- Alternatives identification and analysis.
- Preliminary design.
- Final design.

Researchers developed a user guide to demonstrate how data-driven safety analyses can be used to improve safety on TxDOT roadways. The user guide explains how each of the four data-driven safety analysis elements can be applied and provides detailed explanations of the spreadsheet tools.

What They Found

The techniques were successfully applied within the Beaumont District to identify overall crash issues and form prioritized lists of roadway segments and intersections with:

- High potential for safety improvement
- Characteristics associated with:
  - Wet weather crashes.
  - Pedestrian crashes.
  - Cross-median crashes.
  - Horizontal curve crashes.
- Benefit-to-cost ratios greater than one based on safety impacts of widening.

What This Means

Tools that assist TxDOT professionals with performing safety evaluations of roadways and projects within their districts can be successfully developed and tailored to district-specific safety issues. The tools are straightforward and require no specialized training other than instructions on how to complete data fields in a spreadsheet. The tools can be applied comprehensively to develop candidate locations for further analysis and project development, or to analyze specific projects already under development. The tools and techniques can be used to develop district-wide safety plans

For More Information

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