NJ-2023-001 January 2023

Research at a Glance

Technical Brief

BUREAU OF RESEARCH

Predictive Safety Tool Research

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The New Jersey Department of Transportation (NJDOT) engaged Cambridge Systematics (CS) in learning what predictive safety analysis tools are available in the market and how they are being used by State Departments of Transportation (DOT). These tools have proliferated since the American Association of State Highway and Transportation Officials (AASHTO) released the Highway Safety Manual (HSM) in 2010.

Research Problem Statement

The NJDOT presently has the data and capabilities to make use of the predictive methods in the HSM to quantify safety performance, prioritize locations for safety investments, and select the most efficient countermeasures. However, there is a need to understand the benefits, limitations, and best practice paths to implementation for the tools currently in use. This research is being compiled to review the different approaches that States have taken to implement the HSM methodologies and will be used to inform the NJDOT as it completes the next phase of its predictive safety planning process.

Research Objectives

The goal of the predictive safety tool research is to help New Jersey meet its safety targets and reduce transportation fatalities and serious injuries on all public roads, including non-State-owned roads. The use of predictive safety tools can help reach that goal by expanding the data and capability of the NJDOT to conduct safety analyses that predict future crashes and implement the most effective safety measures to reduce those crashes.

Methodology

This research was conducted in two phases. The first phase consisted of a desk scan of predictive safety tools offered by AASHTO and the Federal Highway Administration (FHWA) and those developed by State DO Ts. The second phase reported on practitioners' experience implementing the HSM predictive safety process and using HSM predictive safety tools through dispersing a survey and conducting six follow-up interviews with predictive safety practitioners at different DOTs.

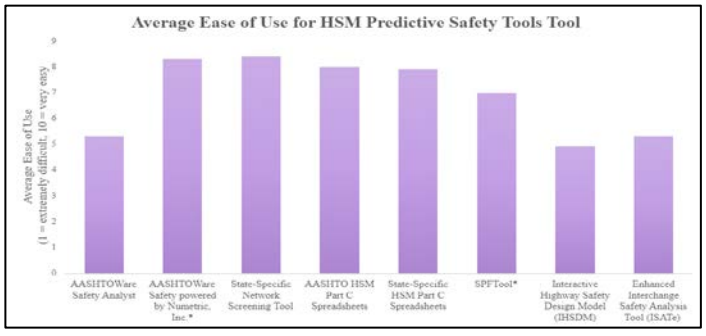
Results

The results of the desk scan involved researching nine types of tools, including tools offered by AASHTO, tools created by DOTs to conduct different HSM analyses, and tools that create specific inputs into the HSM process. These tools revealed the following themes:

- **HSM Process Component** – The types of tools available are defined by which process of the HSM they address (i.e. HSM Part B, Part C., etc.).
- **National vs. State** – National tools cover the most common roadway and safety elements. State tools are customized to the specific data collected by each DOT.
- **In-House vs. Outsourced** – Many agencies devote significant resources to creating their own tools, while others utilize consultant. Other tools are made available by outside firms (such as Numetric, Inc.) that provide specialized knowledge of data-handling and tool customization.
- **Data Specificity** – The categories of data required for HSM processes are broadly the same: roadway characteristics, traffic volume, and observed crashes. However, there is variability among the specific attributes collected by States and the information required to complete an analysis.

The results of the outreach made clear the value that safety practitioners see from investing in HSM predictive methods and tools. In the survey, for instance, when asked whether certain efforts were worth the cost, all practitioners reported they were. Additionally, the survey resounds, and interviews found:

- Data needs are more intensive for network screening (i.e., HSM Part B) processes compared with project-level predictive safety (i.e., HSM Part C) analyses.
- Missing traffic volumes, especially along minor roads and along roadways that are not within the jurisdiction of State DOTs, is a common data gap. Using existing infrastructure, such as radar or cameras, is an emerging practice to augment traffic counts.
- Adapting data to the LRS can be challenging but there are technical workarounds.



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This brief summarizes FHWA-NJ-2023-01, "Predictive Safety Tool Research", produced through the New Jersey Department of Transportation Bureau of Research, 1035 Parkway Avenue, P.O. Box 600, Trenton, NJ 08625 in cooperation with the U.S. Department of Transportation Federal Highway Administration.

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