



RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,
RESEARCH & INNOVATION

TECHNICAL SUMMARY

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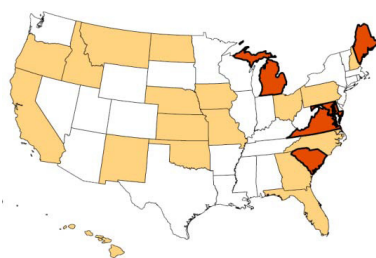
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PROJECT COST:

\$28,403



Twenty-two states (shaded yellow and red) responded to an email survey about current crash analysis systems, and five (in red) were studied in-depth.

Developing a State-of-the-Art Crash Analysis System

What Was the Need?

To reduce fatal and serious injury crashes and overall crash frequency on Minnesota roads, Mn/DOT collects data on automobile crashes such as their location and how they occurred. To store and analyze this data, engineers use a crash analysis system—software that can help them determine where crashes are most common and how roads can be improved to reduce crash frequency. Mn/DOT's current crash analysis system, called the Transportation Information System, or TIS, is a mainframe database that has been in use for more than 30 years.

Since the TIS was created, crash analysis systems have become more complex and capable, and the [FHWA has developed multiple crash tools](#) in collaboration with other states. Improved data management, an increase in the depth of data sources and the use of roadway geometric data allow these tools to provide more accurate information on crash trends and countermeasures. Mn/DOT is planning to replace its TIS with a platform that integrates with these tools and takes advantage of the latest developments in crash analysis. Mn/DOT needed to better understand the available technologies.

An up-to-date crash analysis system will be easier to use, more responsive to the needs of decision makers and will help Mn/DOT increase the safety of its transportation system by determining with greater precision where and how roadways need to be improved.

What Was Our Goal?

The objective of this research was to identify and assess existing crash analysis software tools being used in other states to determine the safety analysis capabilities that should be considered when replacing Mn/DOT's TIS.

What Did We Do?

Researchers began by conducting Web research to identify the crash analysis software systems used by other state agencies as well as the vendors that supply them. Then they reviewed agency Web resources detailing the use of such software, and searched the Internet for examples of Request for Proposal and Request for Information documents related to highway safety analysis software.

Researchers also presented an interactive poster at the 2010 Association of Transportation Safety Information Professionals Traffic Records Forum to discuss the completeness of their Web review with participants and learn about systems unknown to them. Feedback from crash analysis experts in both the public and private sector at this poster session formed the basis of a follow-up email survey of state safety engineers regarding the features of crash analysis systems currently being used or developed by their agencies.

What Did We Learn?

Researchers identified 39 states with a crash analysis system, and identified and summarized the capabilities of 13 available commercial, federal and pooled fund crash analysis software products (collectively abbreviated CFPF). They used this information to develop a list of features and capabilities that best matched Mn/DOT's goals for its new system.

The study found that a system should support new, robust approaches to highway safety like systemic procedures, which help to determine how to distribute low-cost treat-

“This preliminary investigation allowed us to validate our hypothesis that no one turnkey crash analysis system will meet all of our needs. Now we can focus on finding a combination of systems and customizations.”

—Bradley Estochen,
ITS Project Manager,
Mn/DOT Office of Traffic,
Safety and Technology

“A new crash analysis system will both reduce the time it takes Mn/DOT to analyze crash data and improve the safety of Minnesota’s transportation system through mitigation or proactive projects, saving lives and millions of dollars.”

—Reginald Souleyrette,
Associate Director, Iowa
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Systemic treatments such as rumble strips are important to reducing fatalities on rural roads prevalent in Minnesota. Mn/DOT’s new crash analysis system will be designed with the processing power to determine where such treatments are needed.

ments such as rumble strips and high visibility signage over the entire roadway system. They are important for rural roads, which while accounting for the majority of automobile fatalities in Minnesota, cannot be analyzed in the traditional way for high-crash locations, or “black spots,” because of their low volume of traffic.

A state-of-the-art system should also be able to:

- Calculate crash metrics based on both severity and type.
- Identify locations with potential safety issues using both black spot and systemic analysis.
- Conduct statistical analyses with comparisons between individual locations, networks and subsets of the network.
- Diagnose crash issues, generate collision diagrams and identify the distribution of crash types—such as rear-end, head-on and left-turn—and other crash attributes.
- Conduct an economic analysis estimating the cost-effectiveness of countermeasures, benefit-cost ratios and other metrics.
- Establish a priority ranking of countermeasures based on location crash metrics and economic metrics.

Researchers also drafted a Request for Information document that can be used to solicit additional information from crash analysis software developers and vendors to help Mn/DOT further refine the desired features of a new crash analysis system and prepare a Request for Proposal to procure services for developing this system.

What’s Next?

Using this report and the results of the Request for Information, Mn/DOT will create a proposal for a new crash analysis system that meets as many of its needs as possible. To reduce costs, researchers recommend basing the system’s functionality on a CFPF system and then customizing as needed. CFPF systems offer the advantage of being supported outside of Mn/DOT along with the availability of lessons learned from other states using the same system. Researchers hope to have Mn/DOT’s new system in place in the next three to five years.

This Technical Summary pertains to Report 2011-10, “Minnesota Department of Transportation Traffic Safety Analysis Software State of the Art,” published February 2011. The full report can be accessed at <http://www.lrrb.org/PDF/201110.pdf>.