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RESEARCH
SERVICES SECTION

TECHNICAL SUMMARY

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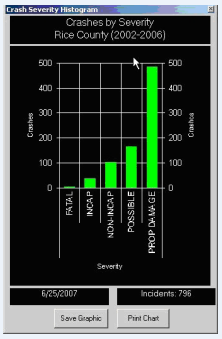
IMPLEMENTATION PROJECT COST:

$19,980



This MnCMAT chart shows crashes by severity type.

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Putting Research into Practice: Updating Minnesota's Crash Mapping Analysis Tool

What Was the Need?

Minnesota's traffic safety professionals analyze crash data to help target initiatives that will reduce the number and severity of crashes, for example, changes to road geometry or traffic regulations, or targeted safety or enforcement campaigns. This crash analysis previously relied on a procedure that involved Mn/DOT traffic engineers, the Transportation Information System database and computer spreadsheets.

State Aid for Local Transportation, a division of Mn/DOT, under the direction of the Minnesota County Engineers Association Safety Committee, commissioned Iowa State University's Center for Transportation Research and Education to improve upon this system, and in April 2006, CTRE released the Minnesota Crash Mapping Analysis Tool, or MnCMAT. This mapping tool, based on a geographic information system, is currently used by Minnesota's city and county engineers and other traffic safety experts to produce maps, charts and reports of selected crash data. This system has been extremely well-received, and its user base continues to grow.

Users from approved and sponsored agencies install the MnCMAT software on their own computers through use of an FTP site that can be accessed through SALT's Web site. Mn/DOT has seen a significant decrease in the number of crash-related inquiries it has received since the release of MnCMAT, but the most recent crash data in the system was from 2005, and the system did not have a good way to present multiple crash events at the same location. To ensure the tool's continued success, investigators needed to update MnCMAT with current crash data and improve the system interface to better fit user needs.

What Was Our Goal?

The objective of this project was to maintain the integrity of the MnCMAT data set by incorporating current and additional historical crash data, and to enhance its user interface to improve its utility in analyzing crash data. This would in turn lead to more reasoned deployment of crash countermeasures, among other benefits, which could save lives and lower costs.

What Did We Implement?

This project leveraged the initial release of MnCMAT by implementing the updates required to keep the data set current and add functionality. Crash data for MnCMAT comes from Mn/DOT's TIS database. While the TIS is updated in near-real time, the TIS data set used for MnCMAT's initial release was essentially a snapshot of TIS data covering 2000 to 2005; CTRE needed to augment the data set with more current TIS data.

How Did We Do It?

CTRE updated the MnCMAT data set to reflect data about the reported crashes on all public roads within the state for the period 1997 to 2006. Updates included a five-year data set (2002 to 2006) and a 10-year data set (1997 to 2006). CTRE also implemented the following software enhancements, which were chosen through an informal user survey designed to analyze MnCMAT usage patterns and needs:

- **Filter Updates.** To better enable user analyses by crash characteristics like light conditions, type of roadway, driver age and crash severity, CTRE added new filters for every available crash attribute. Investigators also removed filters that MnCMAT users said were not needed.
- **Auto-Stack Feature.** The initial version of MnCMAT did not include an easy way to visually

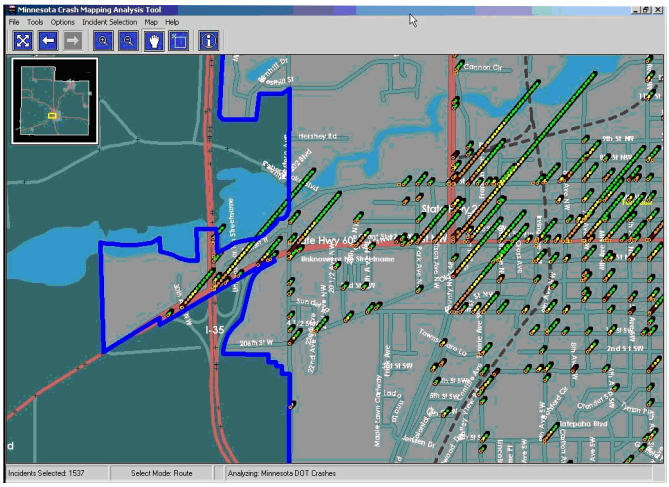
continued

"MnCMAT is very easy to use. Within a few hours, a user can confidently enter queries and generate reports."

–Mark Vizecky,
Traffic Safety Support Engineer, Mn/DOT State Aid Division

"With this update, users can mix and match more filters to drill even deeper into their crash data."

–Dan Gieseman,
Systems Developer, Iowa State University Center for Transportation Research and Education



This screen shot from MnCMAT shows wide-area crash locations using the stacker feature. In Version 3.7.0E, MnCMAT automatically restacks the map when the user selects a different filter.

differentiate single crashes from multiple crashes at the same location. CTRE added an automated three-dimensional projection of multiple crashes, using colors to differentiate crashes by level of severity. (The darker the color, the more severe the crash.) The update also enabled the selective application of crash attributes using MnCMAT's filter tools that are then mapped in the three-dimensional projection. When the user changes a filter, the map automatically restacks.

- **Installer Tool Improvements.** CTRE streamlined and simplified the end-user software installation process, informing users, for instance, of the need to obtain an updated data set.

What Was the Impact?

CTRE successfully updated the initial release of MnCMAT to create MnCMAT Version 3.7.0E. This new version is now available to users through the SALT Web site. Crash data for 2007 is now available from new five- and 10-year data sets (2003 to 2007 and 1998 to 2007, respectively). Current users are being notified by e-mail and can opt to download a new version of the MnCMAT application or download only the updated data sets. The added features and data make the system more accurate and easier to use, encouraging increased use of the system and better value for the funds spent on its development.

What's Next?

MnCMAT is still a client-based application with a static database of crash data; whenever new crash data becomes available or the interface is updated, users must install an updated application or data set. To avoid the need to periodically update, the Minnesota County Engineers Association, in partnership with Mn/DOT, is investigating the transition to a Web-based tool that would access TIS crash data in near-real time while still being as easy to use and feature-rich as the current application.

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This Technical Summary pertains to LRRB's Research Implementation Committee's product 2007RIC09, "Minnesota Crash Mapping Analysis Tool (II)," published in October 2007. The MnCMAT application can be accessed at http://www.dot.state.mn.us/stateaid/sa_crashmap.html.