



RESEARCH SERVICES SECTION

TECHNICAL SUMMARY

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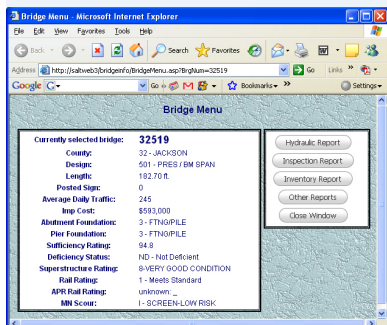
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Principal Investigator:

Hart Gilchrist, Bonestroo

IMPLEMENTATION PROJECT COST:

\$19,389



The Bridge Tool delivers bridge descriptions (left) and report links (right) via a standard Web browser.



Putting Research into Practice: Creating a New Bridge Information Management Tool

What Was the Need?

Bridge management personnel need access to reliable bridge data, such as hydraulic information about drainage area and flow rate, load ratings, inspection histories, and bridge type and materials, to effectively maintain Minnesota's bridges. To address this need, management launched the Bridge Hydraulic Information database in late 2002. This interactive, geographic information systems-based application allows users to display bridge hydraulic information from state Trunk Highway and State Aid structures using a static database of bridge information.

Authorized users log in to the secure, online database to access bridge data by clicking on a map symbol that represents a bridge. The program displays a map showing the general location of the selected bridge; bridges with information in the database are noted with blue markers. When the user clicks the marker, a report displays all of the hydraulic information available for that bridge.

Mn/DOT saw the opportunity to make the state's bridge design and maintenance work more efficiently by capitalizing on the Bridge Hydraulic Information database to provide greater functionality and more detail about bridges in the system.

What Was Our Goal?

The goal of this project was to create an enhanced Internet-based Bridge Tool that allows the end user to view Mn/DOT's bridge information using a map-based interface. This tool could be employed, for instance, to locate deficient bridges or to develop location maps for general reporting purposes or for applications for bridge funding.

What Did We Implement?

The two most important resources leveraged for this project were:

- The 2002 Bridge Hydraulic Information database, which has been consistently updated with new hydraulic information as it became available.
- The Pontis Bridge Management System, developed in the 1990s under a Federal Highway Administration contract. Mn/DOT uses this system to generate recommendations for least-cost, long-term preservation and improvement policies using collected cost data and information on the condition of bridge elements such as beams, piers and railings.

How Did We Do It?

Investigators began their work with the Bridge Hydraulic Information database and incorporated additional bridge details found in Pontis. They then merged multiple data sets into the Pontis master database to allow for expanded reporting and speedier display of updates. This provided the basis for the new Bridge Tool, which upgraded the original database with:

- Ten new mapping layers for deficient bridges, posted bridges, bridge costs, guardrail, average daily traffic, bridge superstructure type, total bridge length, National Bridge Inventory bridge deck rating, scour codes and legislative districts
- Links from the database to enable the use of Pontis' reporting functions

“Users told us they wanted to see more than just bridge hydraulic information, and they wanted to see it all laid out on a map. The new Bridge Tool does just that.”

–Petra DeWall,
Assistant State Hydraulics
Engineer, Mn/DOT Office
of Bridges and Structures

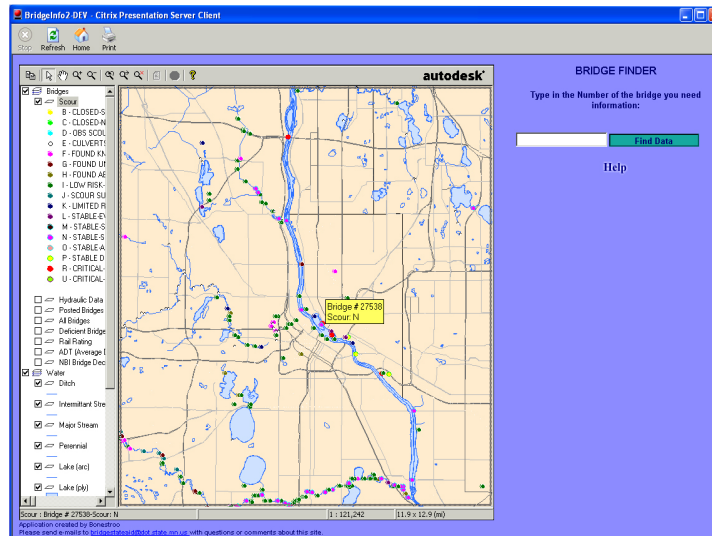
“The Bridge Tool uses a graphical interface to pull complex information out of a database, giving users a map to work with instead of multiple relational tables.”

–Hart Gilchrist,
Geographical
Information Systems
Manager, Bonestroo

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This Bridge Tool screen uses color to show bridge scour codes such as screened as low risk for failure due to scour, screened and determined to be scour-susceptible, and scour-critical.

- Access to hydraulic information for dead or replaced bridges, enabled by the development of a relational table that links the old bridge information with the new bridge number
- A new, user-friendly, Web-based data entry form

What Was the Impact?

The tool's new mapping layers provide much more detail about the state's bridges and greater opportunities for analysis. Users can quickly and easily view details about bridges of interest, and generate Pontis reports about hydraulics, inspections, inventory and other topics. The "Map Tools" function allows users to view all bridges in a particular area of the state. Users can also select a particular bridge element, such as scour code or rail rating, and view all bridges, laid out on a map, coded by color or symbol to denote bridge classifications and ratings.

The new data entry form speeds up the availability of new data. The original Bridge Hydraulic Information database required manipulation of new data before it could be deployed in the application. The Bridge Tool allows Mn/DOT staff to enter data into a form on a Web page and have this information fed directly into the database and broadcasted to the Bridge Tool's Web access point, where it is accessible to users the day after its entry.

What's Next?

The Bridge Tool is now available for use by Minnesota's bridge engineers and engineering technicians and is being presented at the 2008 Minnesota Public Engineers Technology Conference and Tradeshow. Those wanting access to the system should [send an e-mail to the State Aid for Local Transportation Help Desk](#).

The next phase of development for the Bridge Tool is already under discussion. Investigators are looking at ways to provide for interactivity when entering bridge maintenance data and easy data entry while in the field. A change in the application to support incorporation of the Bridge Tool's mapping capabilities into Minnesota's BaseMap is also under consideration.

This Technical Summary pertains to LRRB's Research Implementation Committee's product 2008RIC08, "Development of Scalable Technology to Enhance Transfer of Bridge Information," released in October 2008. For more information on this project, please contact Petra DeWall at petra.dewall@dot.state.mn.us.