



TECHNICAL SUMMARY

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TOTAL PROJECT COST:

\$72,072

LRRB PROJECT COST:

\$22,751



The new data format will report deck condition separately for the wearing surface and the structural deck element.



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SYSTEM MANAGEMENT

Ensuring Compliance with MAP-21's Element-Level Bridge Inspection Requirements

What Was the Need?

The MAP-21 highway funding authorization bill enacted in 2012 changes the requirements for reporting of bridge inspection data in the National Bridge Inventory. The NBI previously collected condition ratings (from 1 to 9) for bridge decks, superstructures and substructures. The new law requires states to also collect element-level data for their bridges: information about the specific components of a bridge such as piers and abutments.

Like many states, Minnesota already collects element-level bridge data on many of its bridges, following AASHTO guidance first published about two decades ago. However, the Federal Highway Administration's new reporting system incorporates new guidance, AASHTO's [Guide Manual for Bridge Element Inspection](#), which was published in 2011 and revised in 2013. As a result, there are many cases in which Minnesota collects data in formats that are not compatible with what FHWA now requires.

What Was Our Goal?

This project sought to evaluate Minnesota's bridge data collection practices and make recommendations about how to bring them into compliance with FHWA's new formats. MnDOT also has a wealth of historical bridge data that it did not want to lose in the transition.

What Did We Do?

Researchers first reviewed MnDOT's current inspection methodology, manuals and tools, including the [Bridge and Structure Information Management System](#) and the Bridge Replacement and Improvement Management prioritization tool. They compared the latest guidance from FHWA and AASHTO to MnDOT's current inspection practices to identify and document the changes necessary to make MnDOT's data compatible with FHWA requirements.

Researchers then developed a plan for incorporating the new inspection methodology into the MnDOT Bridge Office's reporting tools and performance measures, and established guidelines to help bridge owners adopt the new inspection methodology.

Researchers made recommendations to bring SIMS and BRIM into compliance with the new data requirements. They also developed rules for migrating historical bridge condition data into the new formats.

What Did We Learn?

The new FHWA requirements define far more elements than before. While MnDOT already collects much of the information that is necessary, some practices will need to be modified.

Researchers identified changes in bridge inspection and data reporting procedures necessary to comply with new element-level data requirements mandated by the MAP-21 transportation law. They migrated historical data to the new formats and developed guidelines to help bridge owners adapt to the new methodology.

“The new system is scheduled to fully roll out April 1. We’ll be explaining the changes that need to be made from old procedures at a series of seminars in 10 locations around the state.”

—David Hedeem,
Data Management
Principal Engineer,
MnDOT Bridge Office

“BRIM is an important tool for scheduling maintenance and rehabilitation activities in a data-driven and cost-effective approach. One outcome of this project was determining modifications needed to keep it compatible with FHWA’s new data requirements.”

—Basak Aldemir Bektas,
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Element-level bridge inspection collects condition data for individual bridge components rather than the overall condition of the bridge deck, substructure and superstructure, which FHWA expects will improve bridge deterioration forecasting and improve decision-making.

One significant change to procedures is in the rating of the condition of each element. Under MnDOT’s current system, some elements have three possible condition ratings, while other elements have four or five. AASHTO’s new guide specifies four possible condition states for every element. In addition to affecting data reporting procedures, this proved to be a challenge in migrating historical bridge condition data to the new system. Because the possible condition states in the old and new systems do not correlate directly, an absolutely perfect translation from old values to new was not possible.

There are several changes in how specific elements are evaluated. For example, the new system separates paint from the steel elements that it coats, so inspectors will now need to take field measurements to establish paint quantities. The new rules also separate wearing surfaces from deck and slab elements.

Several elements have changes in their element numbers in the new system, which researchers cataloged as an appendix to the report.

Many of the Bridge Performance Indices in BRIM, which are used in allocating bridge maintenance resources, will require updating to be compatible with AASHTO’s new data formats and the four possible condition states for each element. Researchers recommended new BPI scales to incorporate this change.

What’s Next?

The new inspection and reporting procedures will be implemented April 1, 2016. Even though many bridge inspectors in Minnesota are already familiar with element-level inspection generally, there will naturally be a learning curve for bridge inspectors as they implement the specifics of the new methodology. MnDOT has offered and will continue to offer training in the new system, including seminars in 10 locations around Minnesota in February and March of 2016. MnDOT also plans to roll out a new bridge inspection manual.

MnDOT will also be using the first set of data reported under the new inspection procedures as a quality control measure for the migrated historical data. MnDOT expects and will encourage end users to adjust the migrated data as necessary to match a bridge element’s actual condition in cases where the migration process introduced errors. Researchers also recommend reviewing early data submitted under the new system to identify and correct common problems or inconsistencies among different inspectors.

The necessary upgrades to BRIM and SIMS recommended by this project to be compatible with the new data formats are planned for March 2016.

This Technical Summary pertains to Report 2015-47, “Next Generation Bridge Management Tools and Inspection,” published December 2015. The full report can be accessed at mndot.gov/research/TS/2015/201547.pdf.