



The upgraded bridge deck assessment tool makes it easier for bridge engineers to choose from a wide range of maintenance and repair options.

# RESEARCH SOLUTIONS

## Upgrades to bridge deck assessment tool increase accuracy and usability

Once a bridge is constructed, ongoing management begins to keep the structure in good working order. But with limited resources and many high-, moderate-, and low-cost maintenance and repair options available, Iowa's state and county engineers must consider numerous factors when determining which treatment options will ultimately provide the greatest value for the agency and the traveling public. To ease this decision-making process, the Iowa Highway Research Board (IHRB) made an existing engineering tool more accurate and user-friendly.

### THE NEED

With limited resources available, Iowa DOT and other state transportation agencies have historically taken a reactive approach to bridge management, incurring significant costs to replace structures in need. However, a recent push by the federal government strives to

show that routine maintenance can proactively add years to a bridge's service life and cost less in the long run.

To help states make strategic investments in their bridges and systematically improve the nation's aging infrastructure, federal law

requires transportation agencies to regularly inspect and report on the condition of every bridge they manage, including the maintenance and repair activities that have been performed and the potential impacts of not performing them. By encouraging a more long-range view



**“A tool that’s more user-friendly will help engineers across the state more easily choose the right bridge deck treatment option at the right time.”**

**— SCOTT NEUBAUER,**  
Iowa DOT Bridge Maintenance and Inspection Engineer

of each bridge and its role within the state’s transportation system, the federal government aims to help states realize the long-term benefits of cost-effective investments.

In 2020, the IHRB completed the first phase of a research project to help Iowa comply with the federal mandate, developing a software-based decision tool that engineers can use to anticipate the preservation, rehabilitation, and repair needs of any bridge deck in the state. They can also use the tool to compare the costs and benefits of treatment options to achieve customized performance goals or budgetary parameters. In this second phase, the researchers integrated additional data to produce more realistic results and upgraded the tool’s interface to make it easier to use.

## RESEARCH APPROACH

To provide engineers with a more holistic estimate of the costs and benefits of various bridge deck treatment options, the tool was refined to consider the safety and environmental impacts incurred when a bridge is closed or access is restricted during treatment. Researchers also integrated a newly updated federal road user cost calculation model that lets users easily adjust their bridge deck maintenance goals to achieve a higher- or lower-cost solution.

Additionally, changes to the tool’s appearance and structure were made

to modernize and improve the user experience, which may encourage more widespread use among engineers in Iowa.

## WHAT IOWA LEARNED

The upgraded tool is more robust and easier to use than the previous version. It offers users greater flexibility to enter and revise data depending on a number of variables particular to the bridge or agency goals. In addition, it can now factor actual expenses such as staff time and materials needed to perform a maintenance or repair activity, as well as less-tangible expenditures related to travel delays and vehicle operating costs when a project slows the flow of traffic or requires a detour.

Compared with the earlier iteration, the updated tool also allows users to cycle through and pass over input prompts, if desired. Moreover, a new feature allows users to save their progress within the tool so they can continue working and complete calculations at a later time.

Though this tool applies exclusively to bridge decks, similar tools may be developed in the future to evaluate and recommend treatments for the superstructure, substructure, culverts, and other bridge elements.

## PUTTING IT TO WORK

With a tool that is easier to use and produces more accurate estimates of maintenance and repair costs,

state and local bridge engineers now have greater decision-making power. By considering the full scope of the impacts and benefits of each possible treatment option, experts will be better equipped to select a deck treatment that is right for the bridge, the community, and the agency’s budget.

## ABOUT THIS PROJECT

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