

# MOUNTAIN-PLAINS CONSORTIUM

PROJECT BRIEF | August 2015

## Using Expert Opinion to Quantify Accuracy and Reliability of Nondestructive Evaluation on Bridges



### the **ISSUE**

Research is currently being conducted to improve bridge inspection practices. One potential improvement is the use of nondestructive testing equipment to supplement visual inspection. To consider the costs and benefits of this equipment, data about the accuracy of nondestructive testing results are needed.

### the **RESEARCH**

This project sought to quantify the accuracy and reliability of various nondestructive testing (NDT) equipment. Based on past research, the most common NDT techniques for steel and concrete bridges were identified. A literature review was conducted to identify any past research measuring the accuracy of these methods. A delphi survey was then conducted with experts in NDT. This survey was implemented in several rounds and asked experts to assign numbers to the accuracy and reliability of NDT techniques with which they were familiar. Results of the survey were analyzed and compared to past research.



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Colorado State University  
North Dakota State University  
South Dakota State University

University of Colorado Denver  
University of Denver  
University of Utah

Utah State University  
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### Project Title

Using Expert Opinion  
to Quantify Accuracy  
and Reliability of  
Nondestructive  
Evaluation on Bridges

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### Sponsors | Partners

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## the FINDINGS

The literature review made it clear that there has not been much quantifiable research on many of the NDT techniques. The Delphi study was limited by the small number of participants but did produce numerical values for accuracy and reliability of the techniques. Comparing the little data that was available from past studies to expert opinion indicates that while experts seem to have a good sense of the relative repeatability of different NDT techniques compared to each other, they may not have a good sense of the absolute repeatability of a single techniques - believing the techniques to be more repeatable than they are.

## the IMPACT

The information about accuracy and repeatability compiled by this research can be used to develop new schemes for planning bridge inspections that are more cost-effective than the current biennial visual inspections required by the National Bridge Inspection Standards. However, this research also indicates the need to conduct additional studies to quantify the results produced by NDT. NDT costs include the capital cost of the equipment and the time to process the raw data. NDT also requires skilled operators to judge the value NDT can provide to bridge inspection, the costs and benefits must be better understood.

For more information on this project, download the entire report at <http://www.ugpti.org/resources/reports/details.php?id=819>

For more information or additional copies, visit the Web site at [www.mountain-plains.org](http://www.mountain-plains.org), call (701) 231-7938 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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