


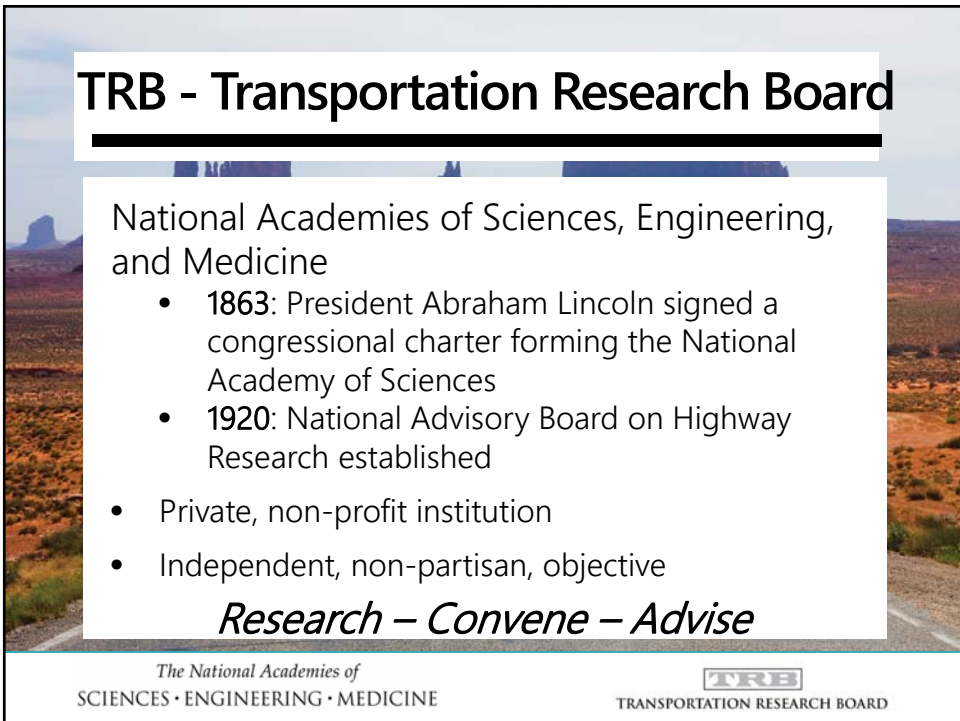
Welcome to Geo³T² Conference & Exposition

Nancy Whiting
Sr. Program Officer - Soils, Geology and Foundations
Transportation Research Board
The National Academies of
Sciences, Engineering, and Medicine

The National Academies of
SCIENCES • ENGINEERING • MEDICINE



TRANSPORTATION RESEARCH BOARD




TRB - Transportation Research Board

National Academies of Sciences, Engineering,
and Medicine

- 1863: President Abraham Lincoln signed a congressional charter forming the National Academy of Sciences
- 1920: National Advisory Board on Highway Research established
- Private, non-profit institution
- Independent, non-partisan, objective

Research – Convene – Advise

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Innovation for Results



"Since 2003, we have implemented 199 innovative ideas related to contracting methods, safety improvements, accelerated bridge construction, traffic management, and other areas discussed at TRB meetings. As a result, we have realized more than \$198 million in savings."

Carlos Braceras, Executive Director, UTAH DOT



"With the pace of innovation increasing daily, the research provided by TRB helps inform investments and guide decisions as we look to stay ahead of the curve."

Shailen P. Bhatt, Executive Director, COLORADO DOT

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Example: Bridge Innovation

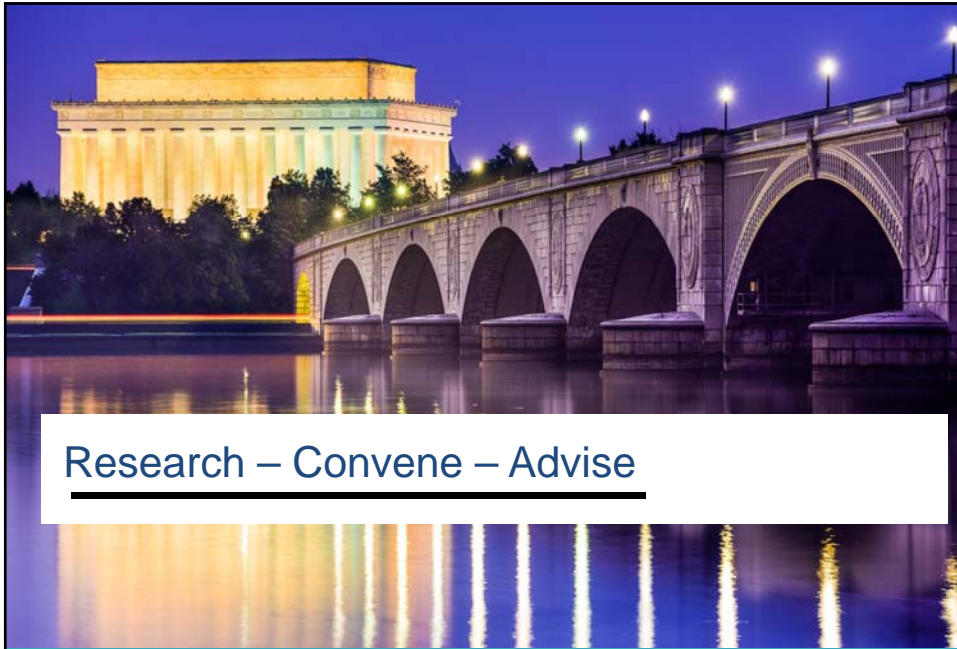
TRB's *Innovative Bridge Designs for Rapid Renewal* project provided a design toolkit for prefabricated bridges which helped to reduce road closures and bridge outages:

- **Arizona** - Road closures reduced from months to 11 days
- **Kentucky** - Road closure limited to less than 3 weeks
- **Maine** - Bridge replacement project completed in 29 days
- **Rhode Island** - Road closure limited to only 21 days
- **Wisconsin** - Construction time reduced by 3 weeks

Real Savings in Time and Money

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Research

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Cooperative Research: NCHRP

TRB's National Cooperative Highway Research Program

- Responds to the practical needs of DOTs
- Ready-to-implement, sustainable solutions
- \$58 million invested annually in the Cooperative Research Programs

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 **TRANSPORTATION RESEARCH BOARD**

By the Numbers

- 200+ publications annually
- 300+ research projects currently managed
- 900+ peer-reviewed papers in the *Transportation Research Record* (TRR) annually
- 6 editions of the *TRNews* annually

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World's Largest Transportation Research Database

- TRID contains 1 million+ records of published and on-going transportation research
- Publicly accessible on TRB's web site trid.trb.org

TRID: Transportation Research International Documentation

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Convene

Transportation Research Board 97th Annual Meeting

January 7–11, 2018 • Washington, D.C.

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Convene

- TRB fosters networking through convening activities
- Join a passionate and devoted worldwide transportation community
- Strengthen your personal and professional connections



By the Numbers

- 200+ standing committees
- 7,000+ active volunteers
- 12,000+ attendees at the TRB Annual Meeting every year
- 750+ sessions and workshops at the TRB Annual Meeting
- 90+ webinars annually
- 70+ TRB meetings and conferences annually

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Advise

Advise experts on transportation policy in an objective and interdisciplinary manner

Key characteristics of study reports:

- Independent
- Objective
- Evidence-based
- Thorough and fair
- Non-partisan

Connect



Connect with Us

- TRB connects with 7,000+ engineers, scientists, and researchers each year.
- TRB is seeking the best and the brightest to join us.

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Volunteer for TRB

Become a member or friend of a TRB committees

- ID research needs
- Inform research priorities
- Review papers
- Promote application of research findings
- Develop conferences and workshops

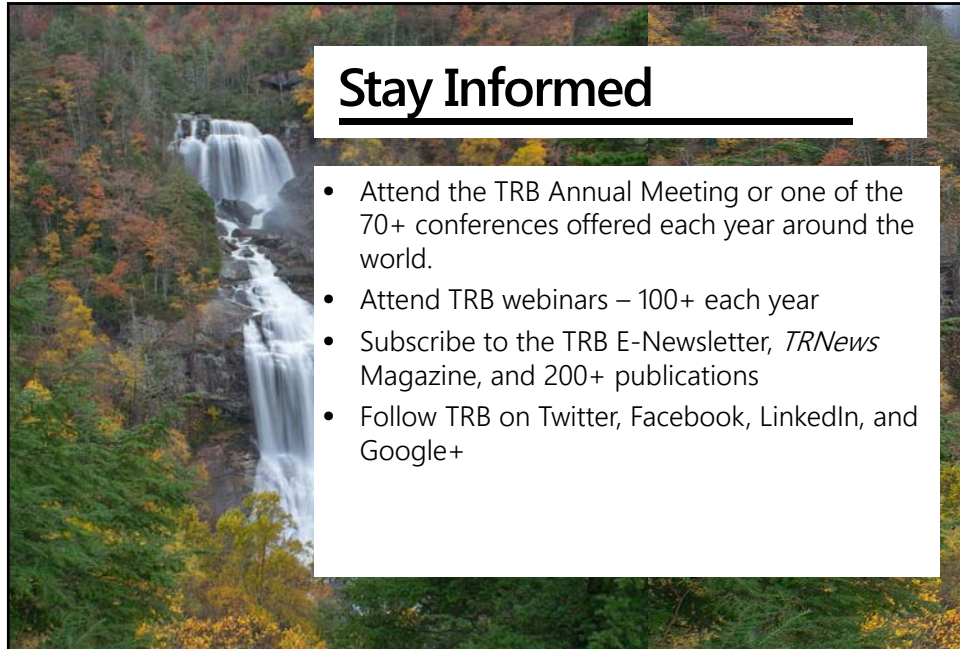
NCDOT: 60 volunteers involved with committees and research panels – Directors, Managers, Engineers & more



NORTH CAROLINA
2015-16 OFFICIAL STATE TRANSPORTATION MAP

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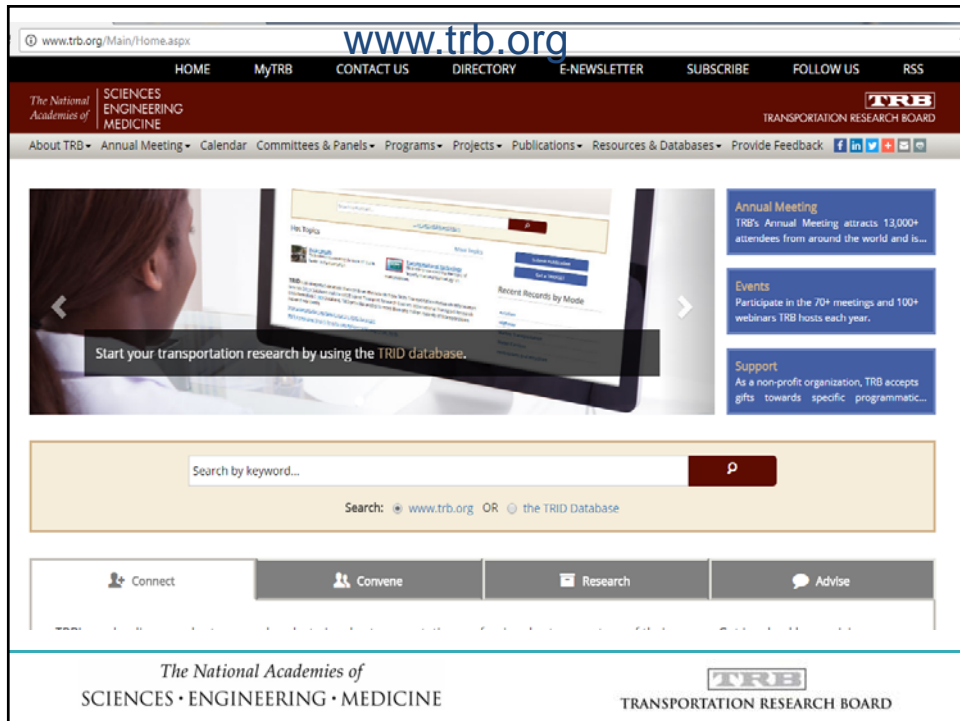


Stay Informed

- Attend the TRB Annual Meeting or one of the 70+ conferences offered each year around the world.
- Attend TRB webinars – 100+ each year
- Subscribe to the TRB E-Newsletter, *TRNews* Magazine, and 200+ publications
- Follow TRB on Twitter, Facebook, LinkedIn, and Google+

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

SCIENCES
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MEDICINE


 TRANSPORTATION RESEARCH BOARD


About TRB • Annual Meeting • Calendar • Committees & Panels • Programs • Projects • Publications • Resources & Databases • Provide Feedback 


Start your transportation research by using the TRID database.


Search by keyword...

Search:  www.trb.org OR  the TRID Database


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The screenshot shows the TRB website's 'Stay Informed' page. At the top, there is a navigation bar with 'HOME MyTRB CONTACT US'. Below that is a header for 'The National Academies of SCIENCES ENGINEERING MEDICINE'. A secondary navigation bar lists 'About TRB Annual Meeting Calendar Committees & Panels Programs Projects Publications Resources & Databases'. The main content area is titled 'Several options for staying informed' and is divided into sections: 'Planned Gifts', 'Volunteer', 'Join / Sponsor', 'Submit a Proposal', 'Stay Informed', 'Live', and 'Electronic'. The 'Stay Informed' section lists various options like attending meetings, conferences, and webinars. The 'Live' section includes 'Attend the Annual Meeting' and 'Attend a Specialty Conference'. The 'Electronic' section includes 'Subscribe to the TRB E-Newsletter' and 'Follow TRB on Facebook and Twitter'. A sidebar on the left contains links for 'Planned Gifts', 'Volunteer', 'Join / Sponsor', 'Submit a Proposal', 'Stay Informed', 'Attend the Annual Meeting', 'Attend a Specialty Conference', 'Subscribe to the TRB E-Newsletter', 'Follow TRB using Social Media', 'Attend a Webinar', 'Receive an RSS Feed', 'Subscribe to the TR News Magazine', and 'Subscribe to TRB Publications'. There is also a 'Make a Gift' link.

This screenshot is similar to the one above but features a large, blue-bordered box on the right side titled 'Stay Informed'. This box contains a list of options, each preceded by a blue arrow icon: 'Attend the Annual Meeting', 'Attend a Specialty Conference', 'Subscribe to the TRB E-Newsletter', 'Follow TRB using Social Media', 'Attend a Webinar', 'Receive an RSS Feed', 'Subscribe to the TR News Magazine', and 'Subscribe to TRB Publications'. The 'Subscribe to the TRB E-Newsletter' option is circled in red. Dotted lines connect the text in this list to the corresponding text in the main content area of the screenshot. The rest of the page layout is identical to the previous screenshot.

Subscribe to the FREE TRB Transportation Research E-Newsletter

Stay Informed

- Attend the Annual Meeting
- Attend a Specialty Conference
- Subscribe to the TRB E-Newsletter
- Follow TRB using Social Media
- Attend a Webinar
- Receive an RSS Feed
- Subscribe to the TR News Magazine
- Subscribe to TRB Publications

www.trb.org/ElectronicSessions/ConferenceRecordings.aspx

The National Academies of SCIENCES ENGINEERING MEDICINE

About TRB Annual Meeting Calendar Committees & Panels Programs

Past Webinars
Straight to Recordings
Suggest A Webinar
Continuing Education and TRB Webinars
Presenters: What You Need to Know

TRB Webinar Program

Please select the webinar that you would like to attend from the list below and register.

Upcoming Webinars

NCHRP
NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

TRB Webinar: Introducing the Guidelines for Im
April 10, 2017
TRB will conduct a webinar on Monday, April 10, 2017, from 1:00 PM to 3:00 PM ET that features research from the National Cooperative Highway Research Program (NCHRP) Report 835: Guidelines for Implementing Managed Lanes. This report provides guidance for transportation agencies...

TRB Webinar: Practical Technology-Based Approaches to High
April 12, 2017

www.trb.org/ElectronicSessions/ConferenceRecordings.aspx

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The National Academies of SCIENCES ENGINEERING MEDICINE

About TRB Annual Meeting Calendar Committees & Panels Programs Projects Publications Resources & Databases

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Presenters: What You Need to Know

TRB Webinar Program

Please select the webinar that you would like to attend from the list below and register. All participants must register at least 24 hours in advance of the webinar.

Upcoming Webinars

NCHRP
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TRB Webinar: Practical Technology-Based Approaches to Highway Infrastructure Maintenance
April 12, 2017
TRB will conduct a webinar on Wednesday, April 12, 2017, from 2:00 PM to 3:30 PM ET that will feature different examples of how technology can be implemented and leveraged to improve highway maintenance decision-making through more feature-rich data. Presenters will focus on L...

TRB Webinar: Fundamentals of Resilient and Sustainable Buried Structures
April 13, 2017
TRB will conduct a webinar on Thursday, April 13, 2017, from 2:00PM to 3:30PM ET about buried structures such as culverts and bridges. Buried structures are an important part of state and regional transportation networks, which can be disrupted by extreme weather events. Repa...

TRB Webinar: Bases/Subbases for Concrete Pavements
April 17, 2017
TRB will conduct a webinar on Monday, April 17, 2017, from 2:00 PM to 3:30 PM ET about bases and subbases for concrete pavements. This webinar will focus on information in Technical Brief FHWA-HIF-16-005. Presenters will discuss rigid pavement layer configurations, design co...

TRB Webinar: Reconstructing Old Traffic Circles into Modern Roundabouts
April 19, 2017
TRB will conduct a webinar on Wednesday, April 19, 2017, from 2:00PM to 3:30PM ET that will explore state efforts to convert old traffic circles into modern roundabouts, which can be safer and more efficient. The first modern roundabouts were introduced into the United States ...

NCHRP
NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

TRB Webinar: Comparing the Volumetric and Mechanical Properties of Laboratory and Field Specimens of Asphalt Concrete
April 20, 2017
TRB will conduct a webinar on Thursday, April 20, 2017 from 2:00 PM to 3:30 PM ET that features research from the National Cooperative Highway Research Program (NCHRP) Report 816: Comparing the Volumetric and Mechanical Properties of Laboratory and Field Specimens of Asphalt...

Sign up for updates

[Sign up for TRB Webinar Updates](#)

Registration Fee Information

TRB's webinars are produced with funding received from TRB Sponsors and TRB Sustaining Affiliates may attend the Highway and Transportation Departments of the 50 states and the District of Columbia.

In addition to employees of TRB Sponsors and TRB Sustaining Affiliates, the following are eligible for free webinar registration:

- TRB and National Academies employees;
- Chairs of TRB standing committees, sections, and CRP panel members who were involved with the project that is the subject of the webinar;
- SHRP 2 technical coordinating committee or expert panel members;
- Employees of tribal governments;
- Members of the media; and
- Members of Congress or their staff.

TRB charges a registration fee to other attendees in order to cover the cost of the webinar. Please view the individual webinar announcement for pricing information.

Professional Development Hours and American Institute of Certified Planners (AICPA) Credit

TRB is authorized to issue CEU's. TRB is a registered provider with the American Institute of Certified Planners (AICPA). TRB will provide a certificate of completion, so please view the certificate of completion. To contact your licensing board, please visit each webinar page.

IRCEP
REGISTERED CONTINUING EDUCATION PROVIDER

CM
CERTIFICATION MAINTENANCE

Webinars

FREE to:

- all State DOTs
- FHWA
- TRB committees Chairs
- Employees of tribal governments
-

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for Professional Engineers**

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TRNews



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TR News

Research Pays Off (RPO)

- Featured in TR News
- Rated by the over 15,000 regular readers of the TR News as their favorite part of the publication.

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RPO

NCDOT

RESEARCH PAYS OFF



Evaluating Bridges with Unknown Foundations for Vulnerability to Scour

North Carolina Applies Risk-Based Guidelines

MOHAMMED A. MULLA

The author is Assistant State Geotechnical Engineer and Geotechnical Contracts and Statewide Manager, North Carolina Department of Transportation, Raleigh.

For approximately 10 percent of the estimated 600,000 bridges that span waterways in the United States, the “as built” information—that is, the details of the final structure—is not available or is missing. The National Bridge Inventory (NBI) of the Federal Highway Administration (FHWA) classifies these as bridges with unknown foundations.



Problem
 Scour is the removal of material such as sand and rock around a bridge foundation—the abutment and piers—by flowing water. Scour affects the stability of the foundations of bridges over water and contributes to an estimated 60 percent of all U.S. bridge failures. Bridge failures cause loss of property—sometimes loss of lives—and disrupt traffic. Determining the vulnerability of a bridge's foundation to scour, therefore, is important.

Ideally, a bridge should have a construction plan and an as-built plan containing information on the

type, depth, geometry, and materials incorporated in the foundation. This information is necessary to determine a bridge's vulnerability to scour. Bridges with unknown foundations, however, lack this information. Approximately 6,000 bridges in North Carolina have unknown foundations.

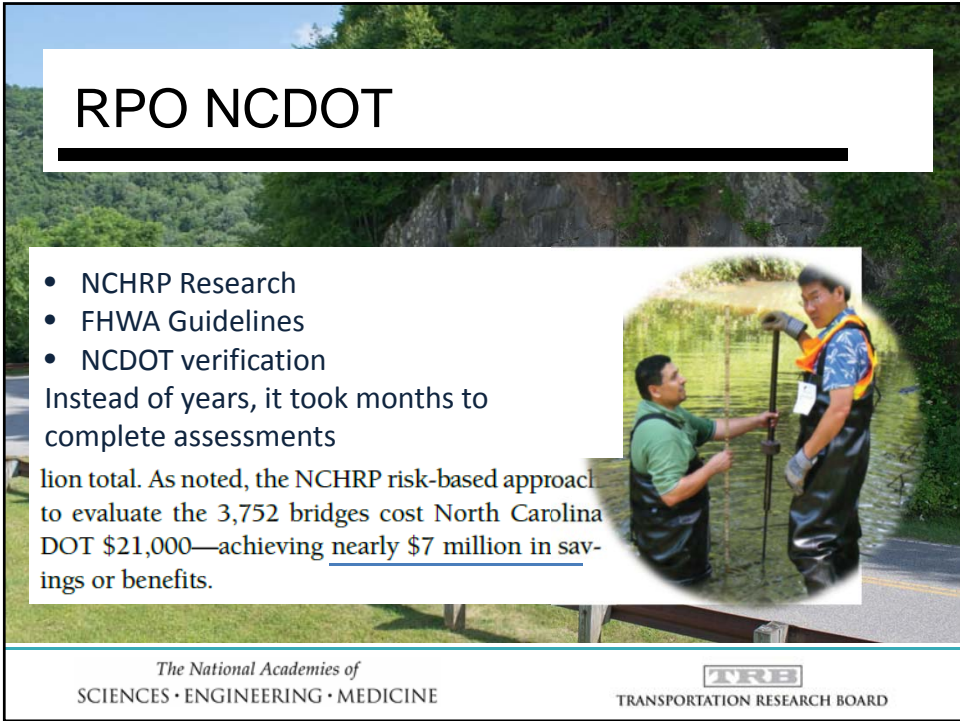
In 2001, FHWA encouraged each state and all bridge owners to develop a plan of action to evaluate bridges with unknown foundations for vulnerability to scour, to ensure the safety of the traveling public and to prevent traffic disruptions.

Solution
 In 2004, the North Carolina Department of Transportation (DOT) established a plan of action for bridges with unknown foundations. The Scour Committee, which consists of the Geotechnical Engineering, Hydraulic, Structure, and Bridge Management Units and the local FHWA bridge engineer, would oversee the evaluations of the bridges. \$1 million was allocated every two years for evaluations by

Pile integrity testing on (a) HP12x53 steel and (b) 12-in. timber.

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RPO NCDOT

- NCHRP Research
- FHWA Guidelines
- NCDOT verification

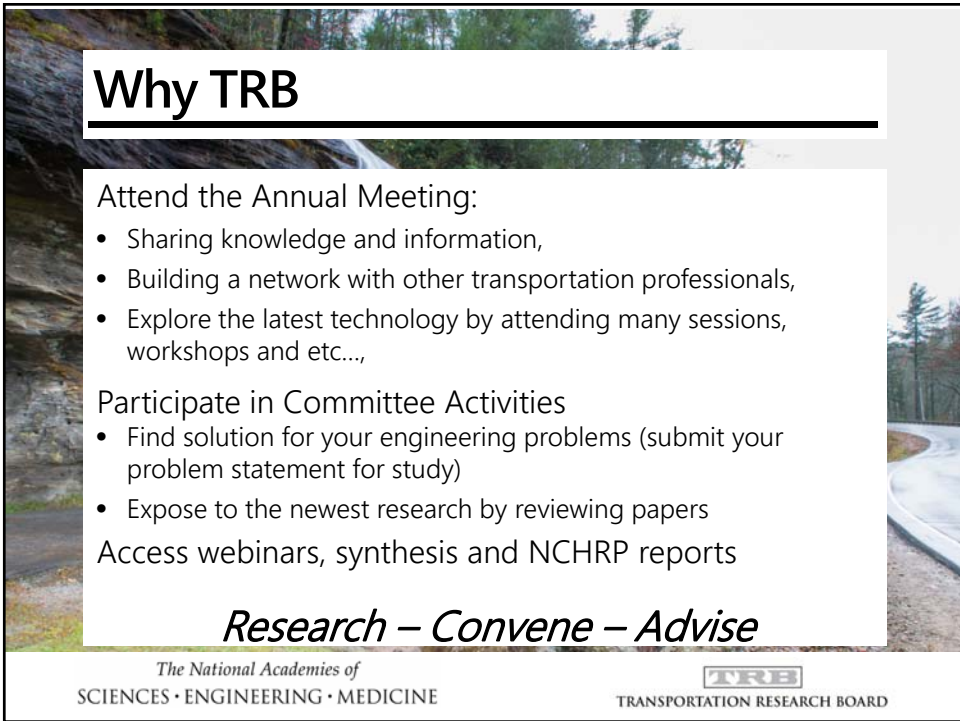
Instead of years, it took months to complete assessments

lion total. As noted, the NCHRP risk-based approach to evaluate the 3,752 bridges cost North Carolina DOT \$21,000—achieving nearly \$7 million in savings or benefits.



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Why TRB

Attend the Annual Meeting:


- Sharing knowledge and information,
- Building a network with other transportation professionals,
- Explore the latest technology by attending many sessions, workshops and etc...,

Participate in Committee Activities

- Find solution for your engineering problems (submit your problem statement for study)
- Expose to the newest research by reviewing papers

Access webinars, synthesis and NCHRP reports

Research – Convene – Advise



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Questions ?

Thank You

For More Information

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