



# Trustworthy Resources for Bridge Maintenance

2025 Highway Maintenance Conference

April 21, 2025

Jason DeRuyver, P.E.

HDR - Senior Bridge Engineer, East Lansing, MI



# AASHTO Preservation Management (TSP2)

## Transportation System Preservation Technical Services Program

- initiated as an *efficient* means
- *disseminate information* to AASHTO member agencies (and other bridge owners)
- *preserve* their *highway infrastructure* - pavements and **bridges**

Focus on **Outreach, Education, & Research** to promote Bridge Preservation

*“actions or strategies that prevent, delay or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition and extend their life.”*

Source: AASHTO Board of Directors, Policy Resolution PR-3-11, October 17, 2011



MICHIGAN STATE  
UNIVERSITY

# Partnerships

## Collaboration & Cooperation



State Departments of Transportation



Local Agencies



FHWA



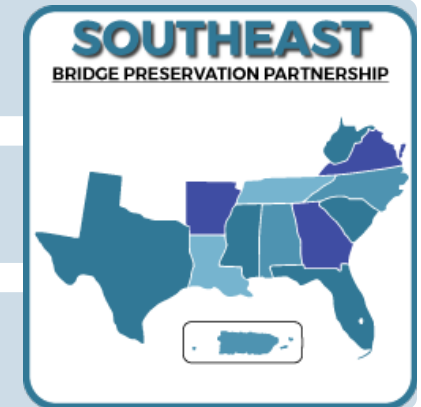
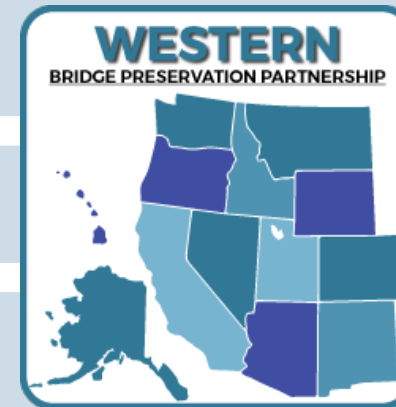
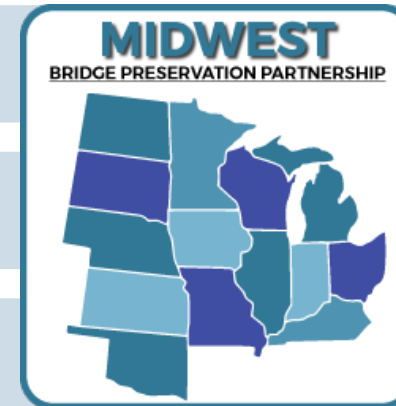
Academia



Industry



Consultants



# Overview



## Officers

Name	Organization	Office
John Culberson	Kansas DOT	Chair (State Rep)
Philip Meinel	WisDOT	Vice-Chair (State Rep)
Drew Storey	Clark Dietz	Vice-Chair (Industry)
Joe Stanisz	Iowa DOT	Secretary/Treasurer

## Directors

Name	Organization	Representation
Philip Meinel	Wisconsin DOT	State Agency Director
John Culberson	Kansas DOT	State Agency Director
Matt Kurl	North Dakota DOT	State Agency Director
Katrina Davidson	South Dakota DOT	State Agency Director
Joe Stanisz	Iowa DOT	State Agency Director
Patrick Conner	Indiana LTAP (Purdue)	Local Agency Director
Drew Storey	Clark Dietz	Industry Organization Director
Jason DeRuyver	HDR Engineering	Industry Organization Director
Başak Bektaş	Minnesota State Univ.	Academic Director
Matt Keilson	TuffTex Materials	At-large Director





# Overview

## 4 Regional Partnerships

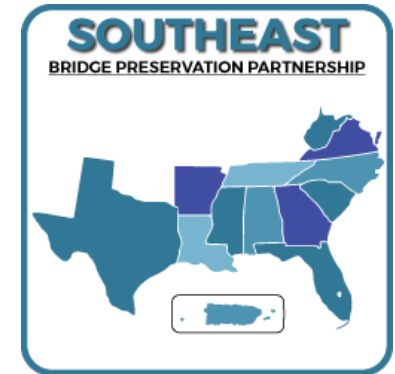
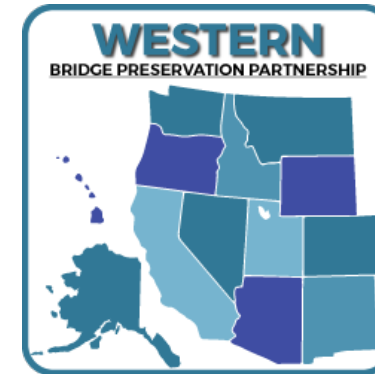
### *Monthly Teleconference Meetings*

- *Technical Presentations/Discussion*
  - Innovative Products/Practices
  - Preservation Challenges
  - Current Topics
  - Best Practices

## Get Involved

### *Monthly Teleconference Meetings*

- **MWBPP – 2PM ET – 1<sup>st</sup> Tuesday of the Month**
- **WBPP – 2PM ET – 1<sup>st</sup> Wednesday of the Month**
- **NEBPP – 10AM ET – 1<sup>st</sup> Tuesday of the Month**
- **SEBPP – 10AM ET – 1<sup>st</sup> Wednesday of the Month**
- Email Stewart Linz – [linzchar@msu.edu](mailto:linzchar@msu.edu) to get invited



# Working Groups

**Working Groups** formed to address identified need associated with bridge preservation

*Leadership*

Chair; Co-Chair; Secretary

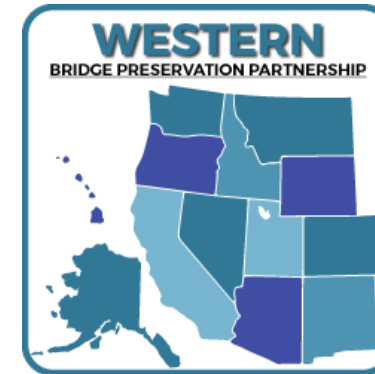
*Work Scope*

Focus of work

*Deliverable Products*

*Completion*

Ongoing



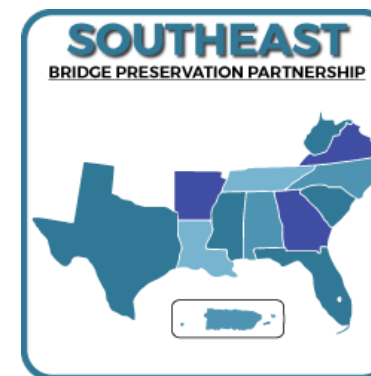
# Current Working Groups

## Regional Working Groups

- Bridge Inspection Program Managers – Private Group

## National Working Groups

- Bridge Deck Preservation NWG – 3<sup>rd</sup> Thursday of the Month – 11AM ET – Sarah Sondag MNDOT - Chair
- Bridge Preservation BMS NWG
- Bridge Preservation Outreach & Communication – Lorella Angelini, Angelini Consulting – Chair
- Construction Quality of Bridge Preservation NWG
- Innovative Technology Demonstration (ITD) NWG – 2<sup>nd</sup> Friday of the Month – Noon ET – Brian Mintz – Phoscrete - Chair
- **Local Agency Outreach NWG** – Every Other Month – Noon ET – Travis Kinney, DEA & Jason DeRuyver, HDR – Co-Chairs



# Bridge Deck Preservation NWG

*Promote development and adoption of best practices for bridge decks that extend the service life and demonstrate the value of preservation.*

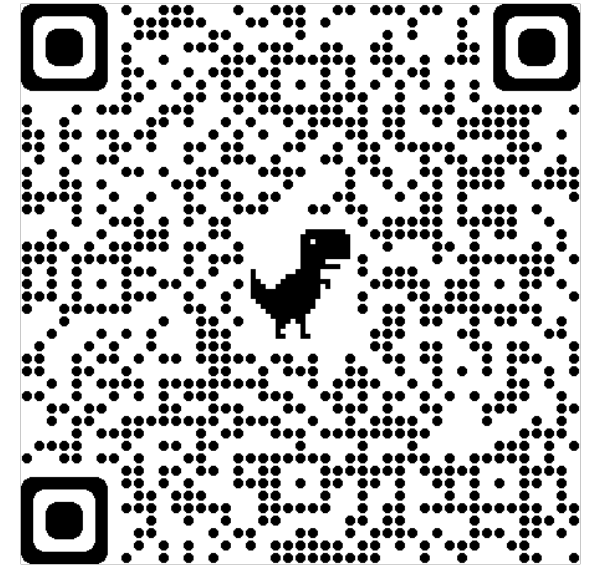
- Developed [Concrete Bridge Deck Preservation Resource Guide](#)
  - *Basic Deck Preservation Actions*
  - *Links to Preservation Documents*
- Initiated **Current Practices for Penetrating Type Sealers and Crack Sealers for Concrete Bridge Decks** Research
  - *Survey of State Practices & Compilation of Reports & Guidance Documents*
  - *Prepare White Paper Describing Current Practices*
  - *Draft Problem Statement for NCHRP Synthesis Study*



# Bridge Preservation Outreach & Communication NWG

## *Improve Awareness and Understanding of Bridge Preservation*

- Developed LinkedIn Page [TSP2 Bridge Preservation](#)
  - *Post Articles, Upcoming Events, Items of Interest*
- Produce & Publish **TSP2 Bridge Preservation Blog**
  - *Interviews with Bridge Preservation Practitioners*
- Continue to work with NCPP on TSP2 Website improvements
  - *Improved Page Layout*
  - *Current Information, Links*



# Construction Quality of Bridge Preservation NWG

## *Review Constructed Quality and Future Performance of Preservation and Maintenance Treatments*

- Collaborate with Bridge Owners to Identify:
  - *Treatments Difficult to Construct with Quality*
  - *Treatments Routinely Constructed with Quality*
  - *Methods to Ensure Quality Construction*
- Share Information through TSP2, AASHTO, and TRB Presentations and Webinars

# Innovative Technology Demonstration (ITD) NWG

*Share Innovative Technology through Field Demonstrations involving Industry, Independent Consultants, Owners, Academia, & TSP2*

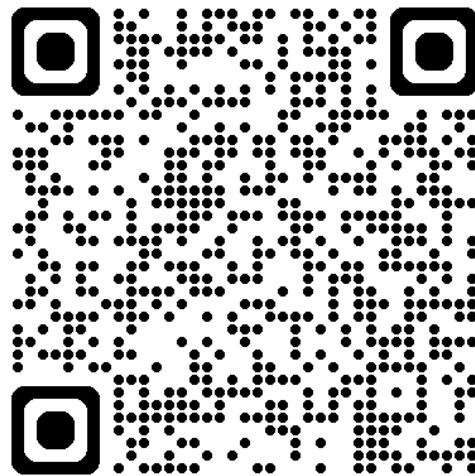
- Provides:
  - *Owners opportunity for Hands-On Experience with Innovative Technology*
  - *Industry the Opportunity to Learn from Field Experience*
  - *Independent Consultant/Academia/TSP2 the Opportunity to Review*
- Consultant Documents Performance for a Period of Time
- Follow-up Report Posted on TSP2 Website



# Local Agency Outreach NWG

*Provide Opportunities to Local Agencies for Training and Collaboration on Methods and Importance of Bridge Preservation*

- Develop and Deliver Training for Local Agencies – Once Every 2 Months
- Email [Jason.DeRuyver@hdrinc.com](mailto:Jason.DeRuyver@hdrinc.com) to receive webinar invites.



## Concrete Repair Methods and Materials

March 28<sup>th</sup>, 2025

The Bridge Preservation Partnership Local Agency program is pleased to announce a **Training Opportunity on Bridge Concrete Patching**. The 60-minute training is specifically designed to teach the basics of bridge maintenance and repair and is geared towards meeting the needs of local agencies.

The training will explain the basics of bridge deck maintenance activities. Bridge concrete deteriorates over time, and determining the best repair option can be a daunting task. Whether it is substructure concrete, superstructure concrete or deck concrete, simple maintenance patching can defer future rehabilitation and replacement costs. This training will explain the basics of concrete repair using easy and cost-effective methods using various materials. The training will focus on deck repairs as well as vertical and overhead repairs.

This virtual training is being offered **free of charge**. Participants will gain a general understanding of the procedures and materials required for concrete repair. Participants will also gain an idea of degree of difficulty, crew size and required equipment to perform the work.



Figure 18. Steps for establishing a bridge preservation program.

Establishing a Preservation and Maintenance Program

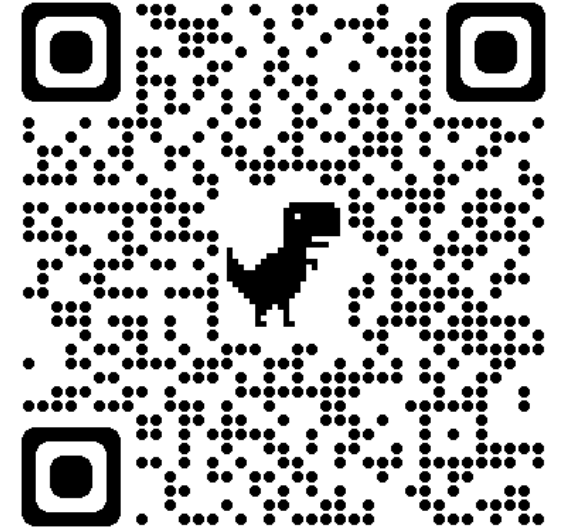
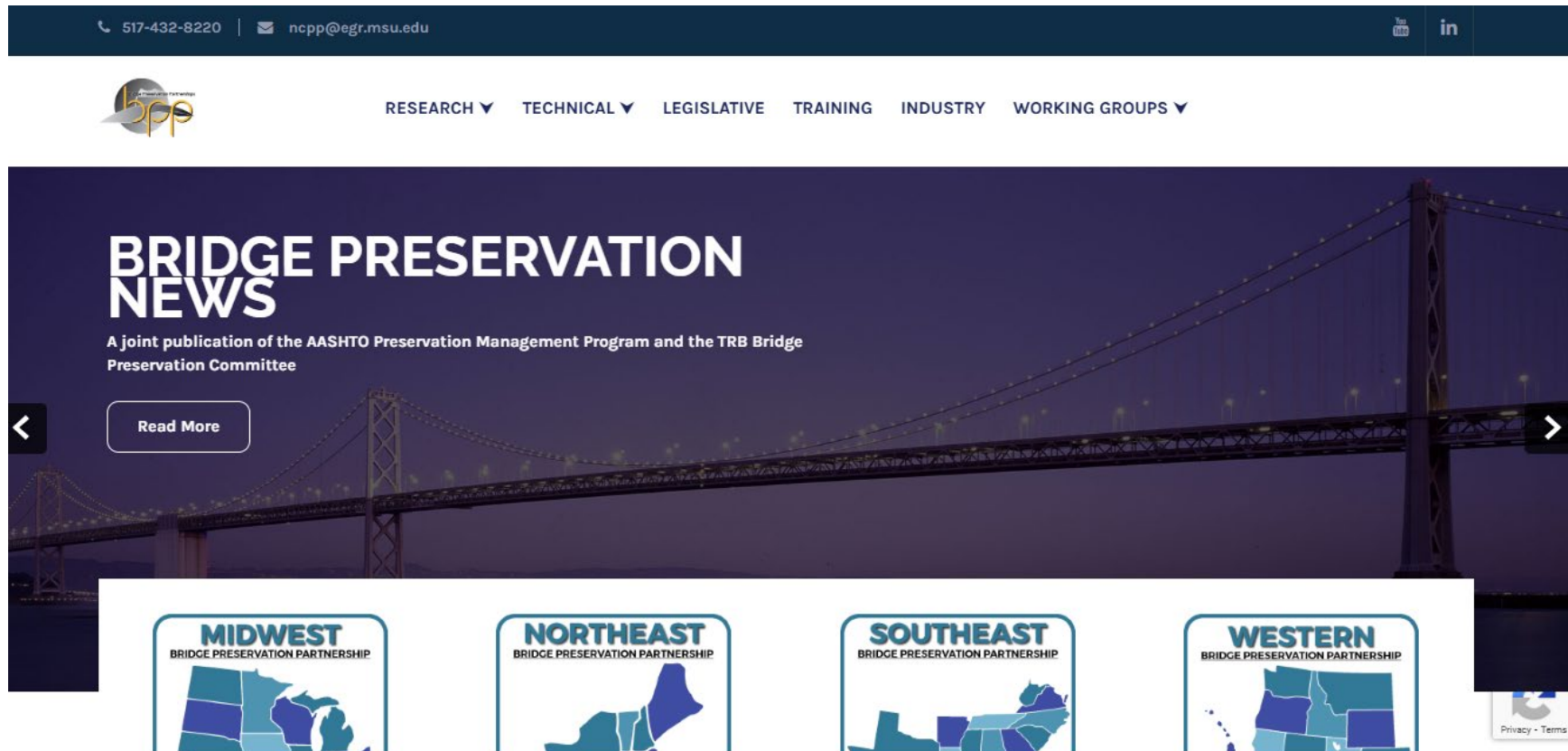


**When:** 12:00-1:00 PM (EDT) May 28<sup>th</sup>, 2025



# TSP2 Website

<https://tsp2bridge.pavementpreservation.org/>



MICHIGAN STATE  
UNIVERSITY

# TSP2 Bridge Preservation News

Joint Publication of the TSP2 and the TRB Bridge Preservation Program

## BRIDGE NEWS

---

2024-11 Bridge Preservation News (Vol 10 ) "AASHTO Bridge Preservation Management Survey"

---

2024-07 Bridge Preservation News (Vol 9 ) "Using Fibers to Reduce Cracking in Bridge Decks"

---

2023-11 Bridge Preservation News (Vol 8 ) "Utilizing Cathodic Protection"

---

2023-06 Bridge Preservation News (Vol 7) "Where Did NACE and SSPC Go?"

---

2022-10 Bridge Preservation News (Vol 6) "An Overview of Bridge Health Index"

---

# TSP2 Bridge Preservation News

Joint Publication of the TSP2 and the  
RB Bridge Preservation Program

## BRIDGE PRESERVATION NEWS

VOLUME 8

NOVEMBER 2023

A JOINT PUBLICATION OF THE AASHTO TSP2 PROGRAM AND THE TRB BRIDGE  
PRESERVATION COMMITTEE

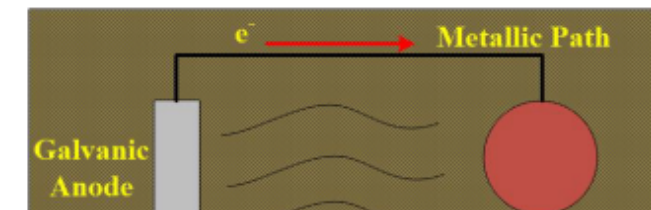
### BRIDGE PRESERVATION UTILIZING CATHODIC PROTECTION

***We've all heard of cathodic protection, but how does it really work? For this issue, we asked the industry's subject matter experts to provide us with some insight into the mechanism and applications of cathodic protection for bridge preservation.***

A wide variety of Cathodic Protection (CP) systems have been used on bridges worldwide to mitigate corrosion and extend the service life of existing structures. This paper provides an overview on how CP works and presents some examples of how it can be used to preserve bridge structures.

Corrosion results from electrochemical reactions driven by a potential difference between two locations on the surface of a metal, where one location becomes an anode, and the other location becomes a cathode. The anode and cathode are connected by an electronic path and are immersed in the same electrolyte. An electrolyte for a bridge element is either water, soil, or concrete, as shown in Figure 1.

There are two primary types of CP, galvanic (sometimes called "passive" or "sacrificial") and impressed current (sometimes called "active"). Galvanic cathodic protection protects an element from corrosion by connecting a metal that is more electronegative (i.e., less noble) than steel to the element to be protected. A galvanic anode will corrode and generate a current that will protect the steel from corrosion, as shown in Figure 2.























# TSP2 Website

Archived presentations from annual meetings



# TSP2 Website

## Archived presentations from annual meetings

 Sealing Panel Discussion	Sondag, Sarah; Peters, Walt	2019-10-17	
 Installation of very early strength LMC overlays	Martens, Pat	2019-10-16	
 MidWest Bridge Deck Deterioration TPF 5(432)	Oliva, Bill	2019-10-16	
 Chloride Testing & Hydro Demolition	Pilarski, Paul	2019-10-16	
 Protocols for Concrete Bridge Deck Protections & Treatments	Bektas, Basak	2019-10-15	
 Installation of very early strength LMC overlays	Martens, Pat	2019-10-15	
 Sealing Panel Discussion Sarah Sondag (Minnesota DOT)	Peters, Walt	2019-10-15	
 Bridge Deck Preservation Working Group	Welch, Ed	2019-09-11	
 Bridge Deck Chloride Testing	Blower, Andrew	2019-09-10	
 Installation of Very Early LMC Overlays	Martens, Pat	2019-09-10	
 UHPC Overlay Solutions	Nault, Gregory	2019-09-10	
 NDE & Materials Testing for Bridge Deck Condition & Service Life Assessment for Asset Planning	Boone, Shane	2019-05-15	
 Panel Discussion: Deck Preservation Treatments	Henning, Brandon; McDowell, Herbert; Hardan, Chris	2019-05-15	
 National Working Group: Bridge Deck Chloride Testing	Kinney, Travis	2019-05-15	

# TSP2 Website

## FHWA Bridge Preservation Expert Task Group (BPETG)

### Goals & Strategic Objectives

1. Provide information on cost-effective bridge preservation strategies
2. Communicate the benefits of including bridge preservation as a component of asset and performance management
3. Advise and assist in developing educational materials on bridge preservation
4. Foster a collaborative environment that encourages research and innovation

[BP-ETG under FHWA | TSP2 Bridge Preservation \(pavementpreservation.org\)/](#)



<https://tsp2bridge.pavementpreservation.org/>

# Bridge Preservation Pocket Guides

## POCKET GUIDES

---

[POCKET GUIDE A User's Guide to Polyester Polymer Concrete Bridge Deck Overlays](#)  
[POCKET GUIDE A User's Guide to Latex Modified Concrete Bridge Deck Overlays](#)  
[POCKET GUIDE A User's Guide to Low Slump Concrete Bridge Deck Overlays](#)  
[POCKET GUIDE A User's Guide to Supplemental Cementitious Material Concrete Bridge Deck Overlays](#)  
[POCKET GUIDE A User's Guide to Ultra-High Performance Concrete Bridge Deck Overlays](#)  
[POCKET GUIDE A User's Guide to Maintenance and Repair of Bridge Bearings](#)  
[POCKET GUIDE A User's Guide to Removal and Replacement of Bridge Coatings](#)  
[POCKET GUIDE A User's Guide to Bridge Cleaning](#)  
[POCKET GUIDE A User's Guide to Thin-Polymer Bridge Deck Overlay System](#)  
[POCKET GUIDE A User's Guide to Concrete Bridge Deck Patching](#)  
[POCKET GUIDE A User's Guide to Spot, Zone, and Overcoating Existing Bridge Coatings](#)  
[POCKET GUIDE A User's Guide to Repair of Bridge Concrete Substructure Elements](#)

WORKING GROUPS ▼

REGIONAL / NATIONAL  
WORKING GROUPS

WORKING GROUP  
PRODUCTS

LOCAL AGENCY –  
OUTREACH & TRAINING

POCKET GUIDES

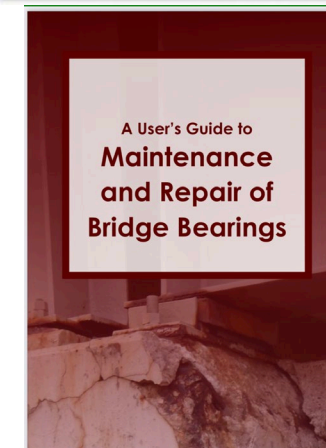
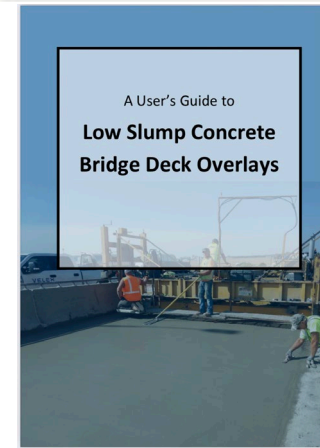
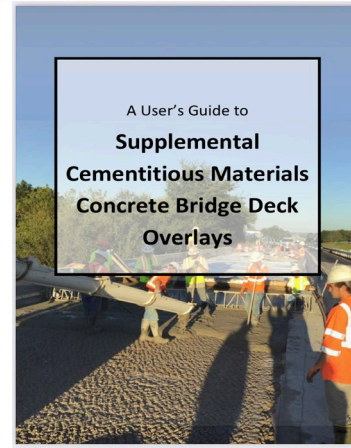
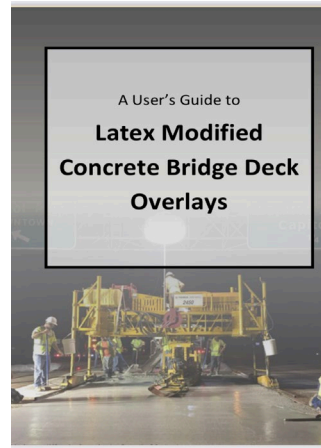
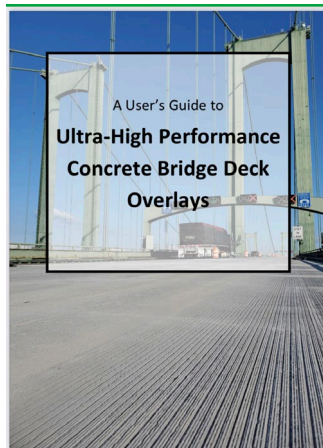
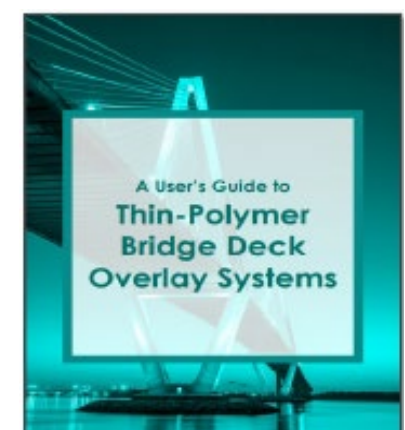
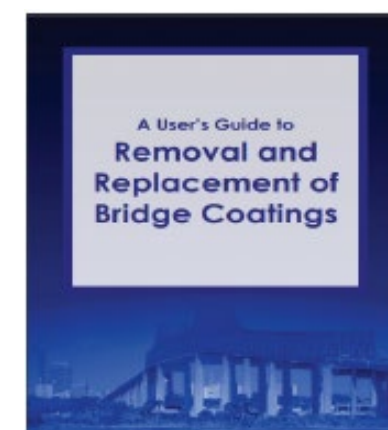
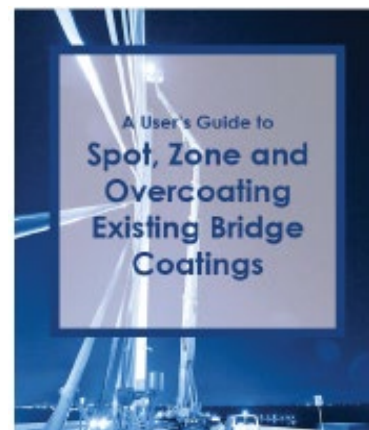
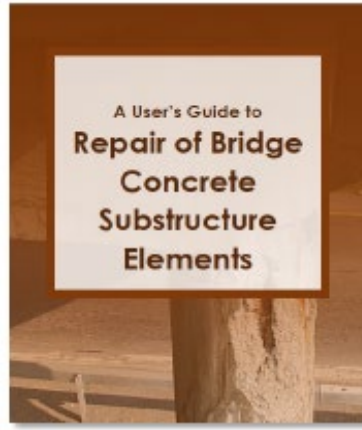
BRIDGE BLOG

BRIDGE PRODUCT  
DATABASE



MICHIGAN STATE  
UNIVERSITY

# Bridge Preservation Pocket Guides





# Bridge Preservation Pocket Guides

Installation guidelines

Equipment and tools

Limitations & restrictions

Avoiding potential failure mechanisms

Recommended training

Required technical support

Recommended QA/QC



# Bridge Preservation Pocket Guides

## POCKET GUIDE A User's Guide to Concrete Bridge Deck Patching

This guide has been developed to provide a better understanding of the process to patch concrete bridge decks. The guide describes how to plan and execute a concrete deck patching operation with an emphasis on identifying repair areas, surface preparation, and placing, finishing and curing deck patch material. The best practices presented in this guide will help minimize potential premature failure of bridge deck patches and contribute to a successful deck patching operation.

[Download A User's Guide to Concrete Bridge Deck Patching \(.pdf\)](#)

▼ [Google Play Store \(Android App\)](#)

▲ [Apple App Store \(iOS App\)](#)

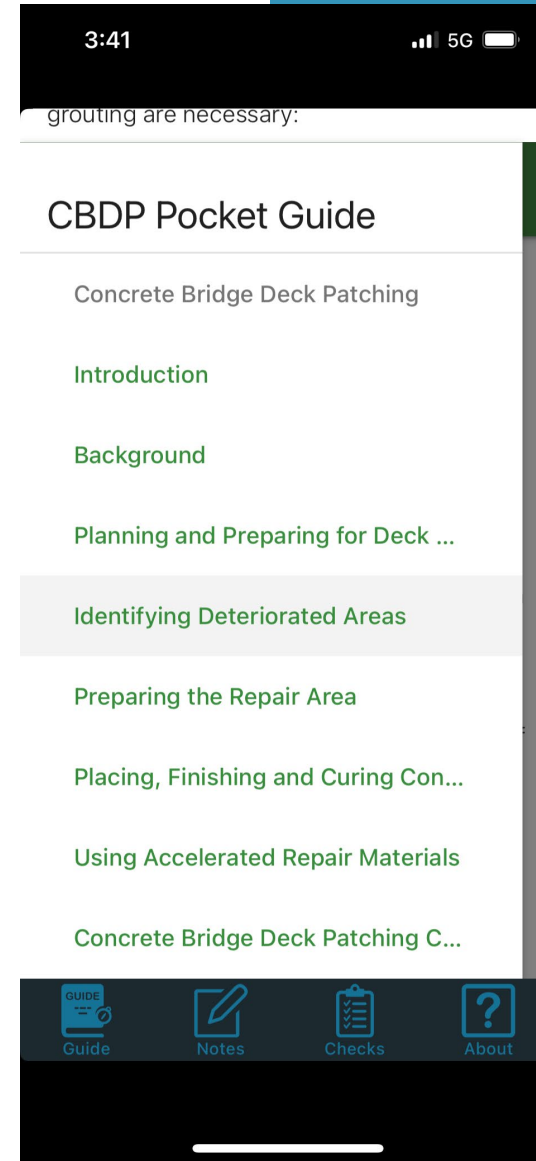


# Concrete Bridge Deck Patching APP



A User's Guide to  
**Concrete Bridge  
Deck Patching**

# Concrete Bridge Deck Patching APP



# Concrete Bridge Deck Patching APP

	Requires Specialized Skills	Requires Specialized Equipment	Accuracy of Results	Ease of Use	Speed of Data Collection	Economical
Hammer Sounding			✓			✓
Chain Drag Sounding			✓	✓	✓	✓
Impact-Echo Sounding		✓	✓	✓	✓	✓
Infrared Thermography	✓	✓	✓	✓	✓	✓
Ground Penetrating Radar	✓	✓		✓	✓	✓

# Concrete Bridge Deck Patching APP

## **Saw Cutting**

A best practice is to saw cut the perimeter of the repair area prior to the removal of the deteriorated concrete. The saw cut provides containment for the patch material and avoids very thin or feather-edge repairs that are prone to failure. Keys to successful saw cutting include, but are not limited to the following:

- Check the depth of the rebar prior to saw cutting the delaminated area to ensure the saw cutting will not damage the rebar.
  - Saw cut the perimeter of the patch approximately 3/4-inch to 1-inch deep.
- 
- Make square cuts to avoid feather-edging the patch material.
  - Keep edges clean and sharp.
  - Key-in the repair by tilting the saw blade to make the patch wider at the bottom than at the deck surface.
  - Extend saw cut 1 inch beyond intersection lines and seal these extended saw cuts during the placement of the patch material.

# Concrete Bridge Deck Patching APP



*Abrasive blast cleaning of reinforcement*

If corrosion has reduced the cross-sectional area of the reinforcement by more than 20%, extra reinforcement is usually added. The typical method of adding reinforcement is to pair the weakened bars with additional bars to restore the cross-sectional area to its original value.

If the section loss results in the existing bars being completely removed, then new bars must be spliced in. Whether sistering or splicing, the new bars must have a minimum development length, commonly referred to as a lap length, to provide continuity of the reinforcing steel. Additionally, the lap lengths of the added bar should be the same as those required for new construction (typically



# Concrete Bridge Deck Patching APP





# Concrete Bridge Deck Patching APP

A general procedure to achieve a saturated surface dry condition is:

1. Clean concrete surface.
2. Saturate repair area with water spray for 24 hours. If a 24-hour saturation is not practical, the concrete should receive a water spray for as long as possible. A quick "blessing" of sprinkled water just before the pour will not sufficiently pre-soak the existing concrete.
3. Remove any standing water. Any water remaining in the repair area will need to be removed by waiting until it dries out or by air blasting.

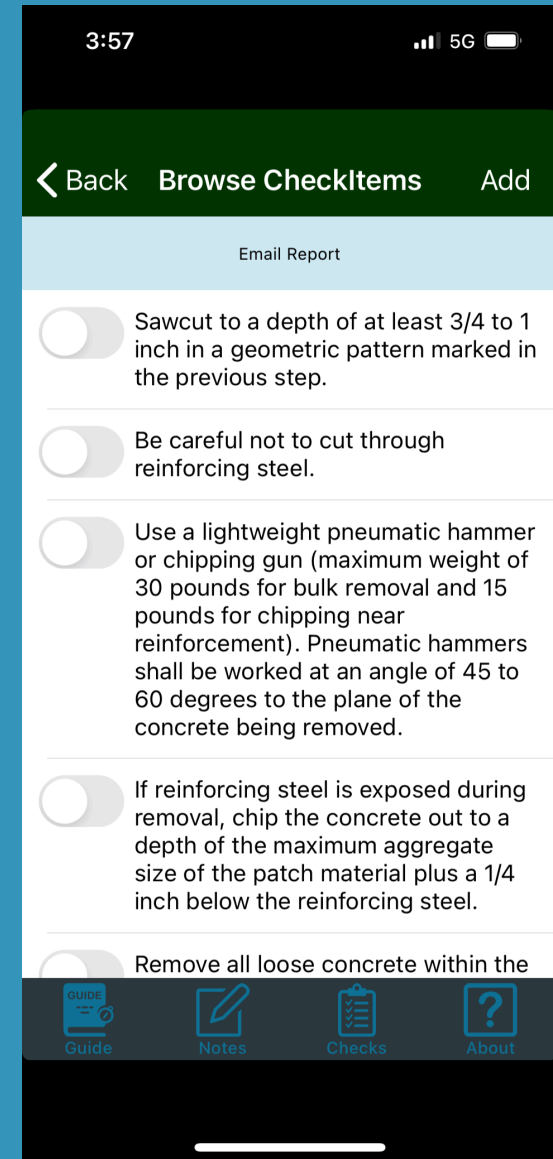
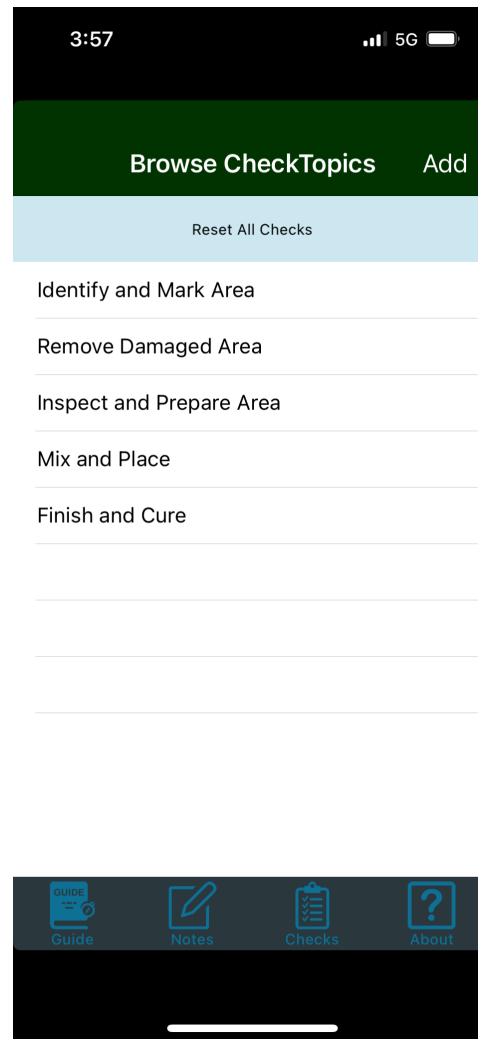
OR

1. If required, apply a bonding agent (usually a cement grout or epoxy) to the concrete surface in accordance with the manufacturer's recommendations. It is very important that the bonding agent is applied correctly, or it can become a bond breaker.



*Application of bonding agent*

# Concrete Bridge Deck Patching APP



# Bridge Preservation Pocket Guides

## Technical Training

**Find Training**

**PDHs**

☐ Offers PDHs 103

☐ Does not offer PDHs 11

**Category** [see all](#)

Maintenance 114

**Subcategory** [see all](#)

☒ Bridge & Culvert Maintenance

**Price Range**


\$0 \$350


0 175 350

## Maintenance

Sort By: Alphabetical (A-Z)

There are 39 of 114 training(s) currently selected. Total 1 filter(s) selected.

Bridge & Culvert Maintenance  [Clear All](#)



**BRIDGE COATING**


### Removal and Replacement of Bridge Coatings (1 PDH)

This course encourages a better understanding of the process to completely remove and replace bridge coatings for the structural steel elements of bridges in service. This training emphasizes containment, surface preparation, and painting. The structural steel for a bridge is painted primarily to...

Non-Member Price: \$50.00

Member Price: \$25.00

Subscription Price: \$0.00



**REPAIR OF BRIDGE CONCRETE SUBSTRUCTURE ELEMENTS**


### Repair of Bridge Concrete Substructure Elements (1 PDHs)

This course was developed to provide a better understanding of the process to repair bridge concrete substructures. This course covers the most common repairs for concrete bridge elements and provides checklists for various elements that comprise the substructure of a bridge. The...

Non-Member Price: \$50.00

Member Price: \$25.00

Subscription Price: \$0.00



**RIGID DECK OVERLAYS**

### Rigid Deck Overlays (3.5 PDHs)

This course covers the placement, equipment needs, personnel needs, and long-term benefits of several rigid deck overlays, including latex modified concrete, low slump concrete, supplemental cementitious material concrete, and ultra-high performance concrete.

There are four modules in...

Non-Member Price: \$175.00

Member Price: \$88.00

Subscription Price: \$0.00

# Additional Resources (NHI)

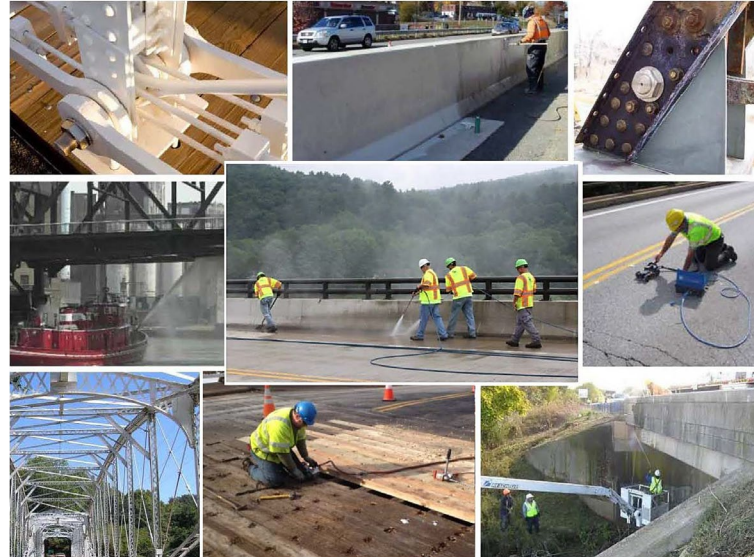


U.S. Department  
of Transportation  
Federal Highway  
Administration

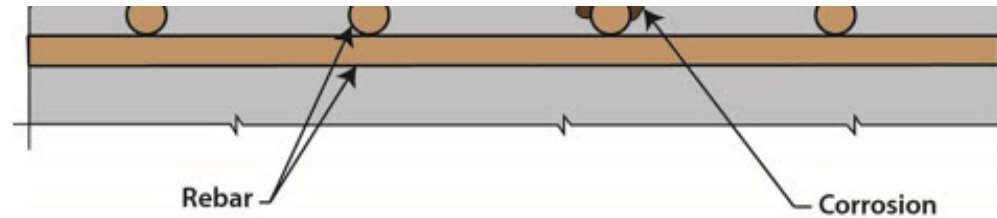
**FHWA-NHI Course No. 130108**

Publication No. FHWA-NHI-14-050  
May 2015

## **Bridge Maintenance Reference Manual**



## Additional Resources (NHI cont)



**Figure 7.1 Typical Reinforced Concrete Deck and Slab Deterioration**

Sealing the bridge deck cracks and overlaying the surface with dense materials will slow the rate of deterioration by limiting the water and salts that reach the reinforcing steel. If a significant amount of chlorides have already reached the reinforcing steel, cathodic protection may be used to stop corrosion from progressing. This section presents various aspects of concrete bridge decks and slabs and the related bridge maintenance activities.



### *What To Look For*


- Cracks
- Spalls
- Leaks on underside of deck
- Efflorescence in edges or underside of deck
- Accumulated debris on deck
- Evidence of ponding on deck

### **7.2.2 Deck Protection Methods**

Proactive deck protection is the best way to preserve the life of any concrete bridge deck or



## Additional Resources (NHI cont)



### *Suggested Procedure*

#### Concrete Spall Repair

1. Identify the deck or slab location to be repaired.
2. Hammer sound or chain the area around the spall to identify and mark adjacent unsound concrete. Mark off square areas outside the limits of the unsound concrete.
3. Combine patches closer than 1 foot into larger patches.
4. Sawcut to a depth of at least 3/4 to 1 inch in a geometric pattern marked in the previous step. Be careful not to cut through reinforcing steel (see Figure 7.16 and Figure 7.17).
5. If the patch is full depth, protect the area under the work area from falling debris. This can be done by placing wooden or metal forms attached to the girders or soffit of the bridge (see Figure 7.18). Forms may be suspended from reinforcing steel by wire ties for areas of less than 3 square feet. In the case of larger openings, forms shall be supported from below by blocking to ensure the form can support the wet concrete weight.
6. Use a lightweight chipping gun (maximum weight of 30 pounds) to chip the concrete out between the edge of the spall and the sawcut lines. Pneumatic hammers shall be worked at an angle of 45 to 60 degrees to the plane of the concrete being removed. Chip the concrete out max aggregate plus 1/4 inch below the top mat of reinforcing steel or any

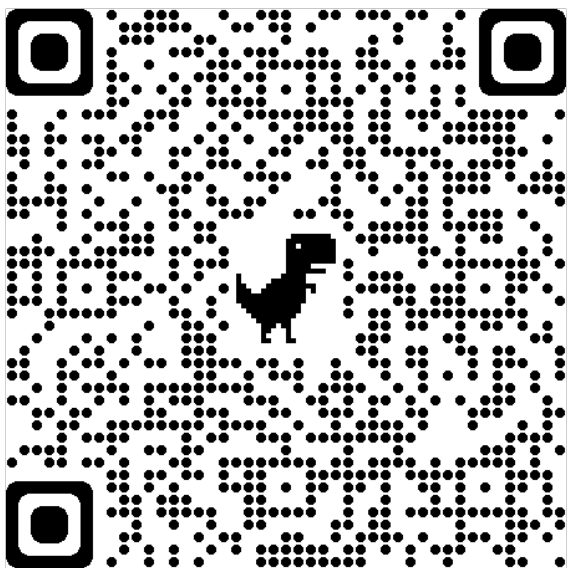


[Bridge Deck Preservation](#)

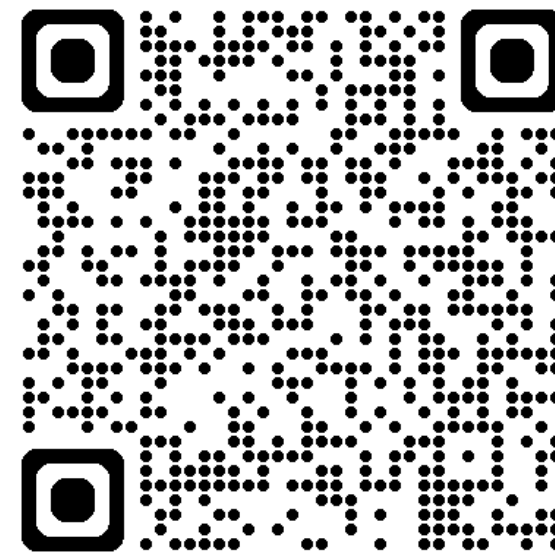
[Questions?](#)



[TSP2 Website](#)



[Bridge Preservation LinkedIn](#)



[Local Agency Webinar](#)