

Introduction to Bridge Maintenance Training



Bridge Preservation Partnership
Local Agency Outreach Working Group



House Keeping

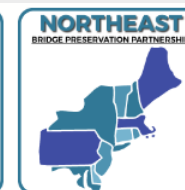
- Let us know what topic you'd like to see next.
- Add your contact info in the chat for future invites.
- Trainings every other month.
- Platform Change



TYPE QUESTIONS INTO
THE CHAT.



THE PRESENTATION
WILL BE RECORDED
AND MADE AVAILABLE.



Partnerships

Collaboration & Cooperation



DOTs



Local Agencies



FHWA



Academia

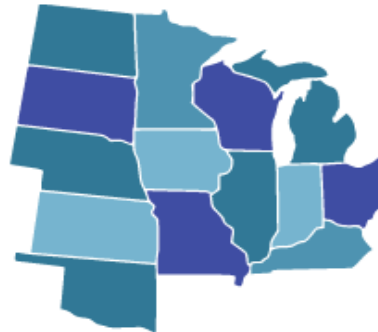


Industry



Consultants

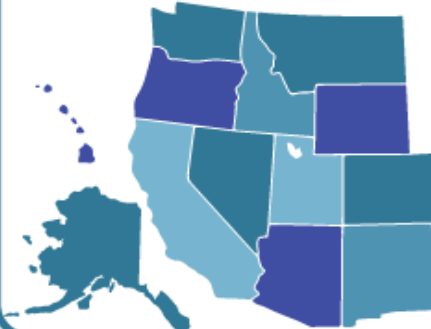
MIDWEST BRIDGE PRESERVATION PARTNERSHIP



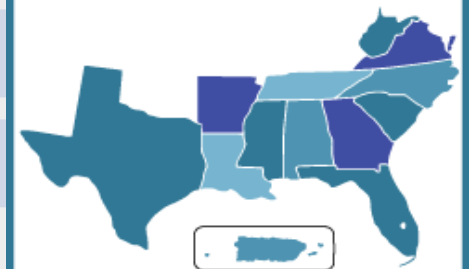
NORTHEAST BRIDGE PRESERVATION PARTNERSHIP



WESTERN BRIDGE PRESERVATION PARTNERSHIP

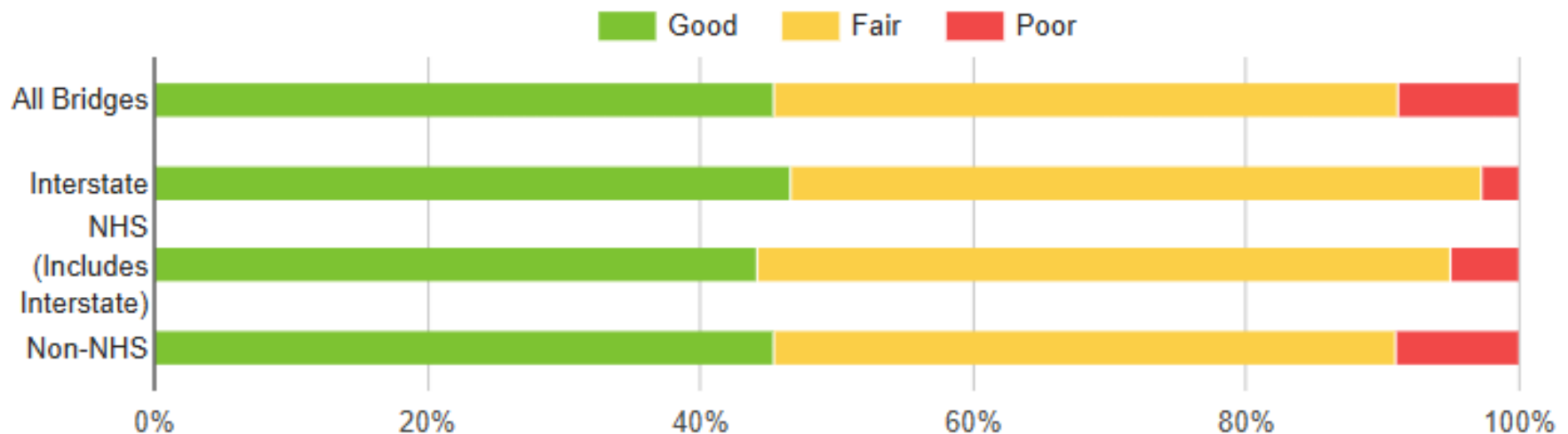


SOUTHEAST BRIDGE PRESERVATION PARTNERSHIP

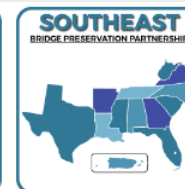


Local Agency's Maintain ~1/2 of all Bridges

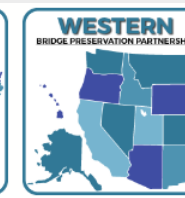
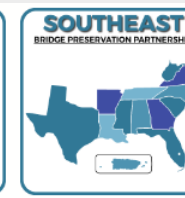
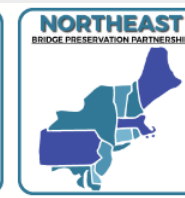
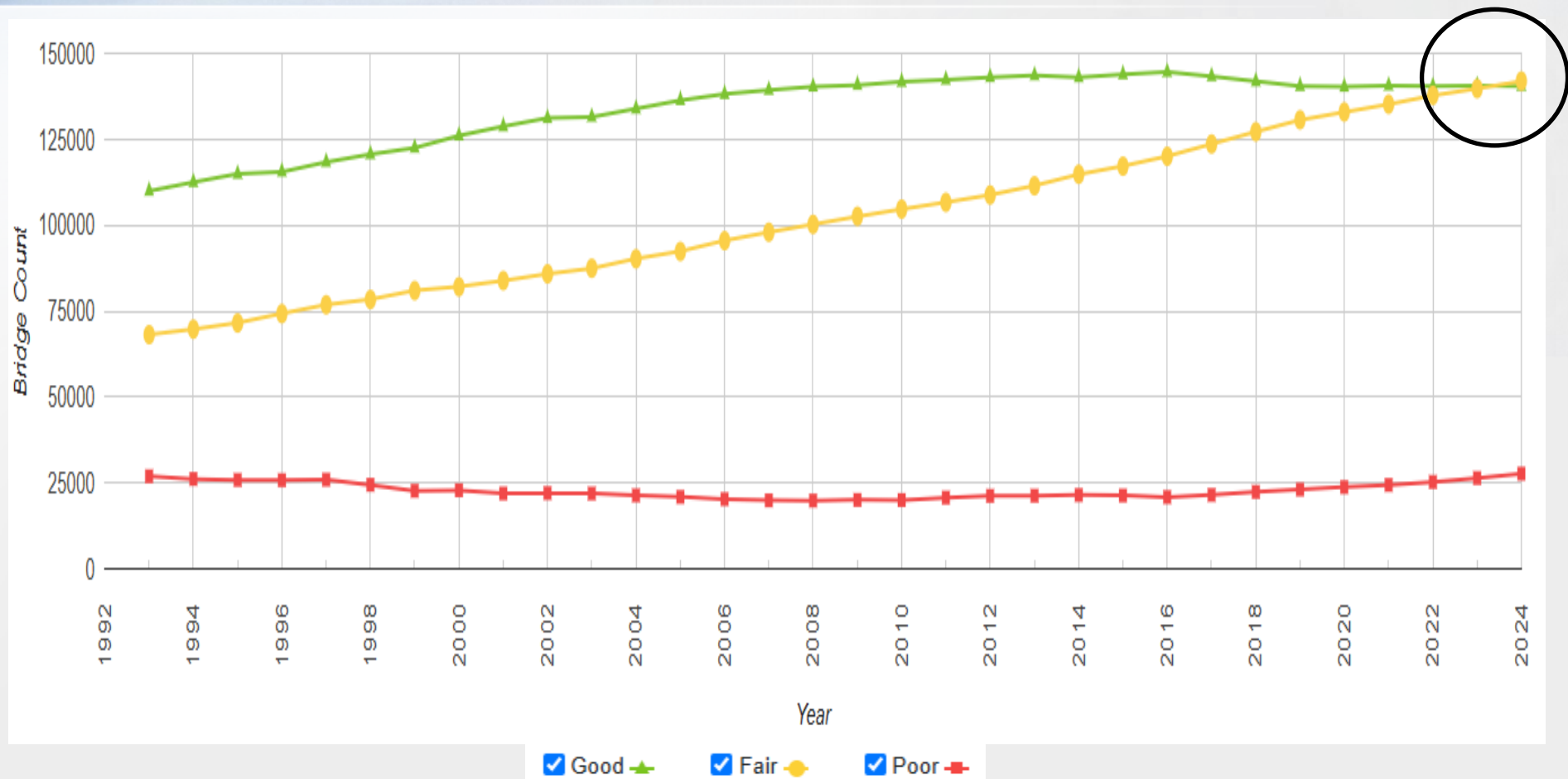
Percentages by Bridge Count



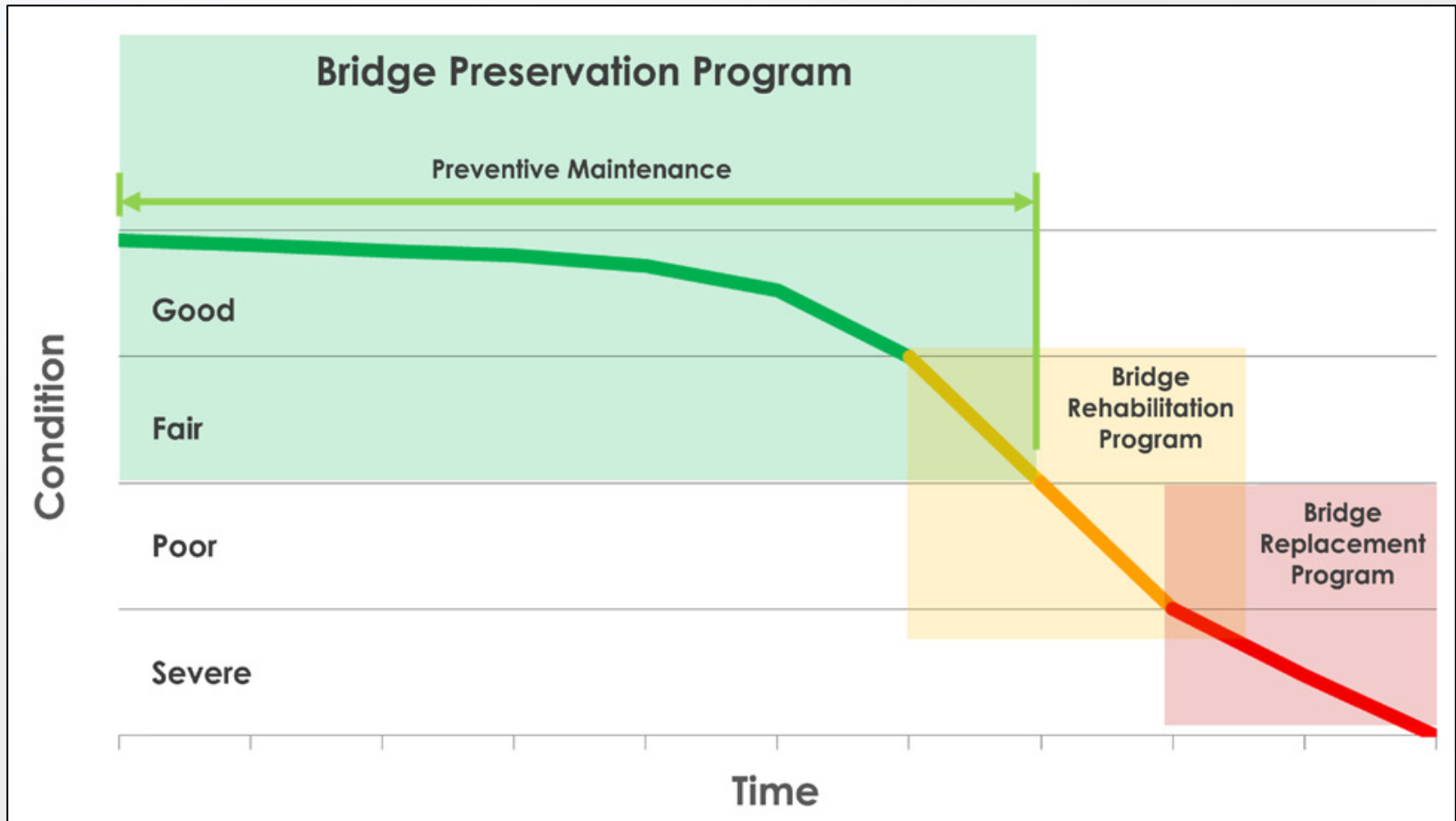
	Good	Fair	Poor
All Bridges	140,515 (45.31%)	141,930 (45.76%)	27,684 (8.93%)
Total: 310,129			



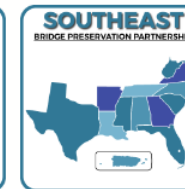
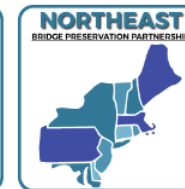
Local Bridge Condition Trends



Candidates for Maintenance



Source: GPI, Ref 3



What's the Purpose of Maintenance?

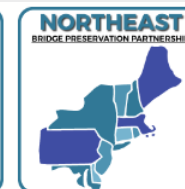


Maintenance

- Oil Changes
- Washing
- Tire Rotation
- Transmission Service

Rehabilitation

- Engine Rebuild
- Body work and Painting
- Tire Replacement
- Transmission Replacement

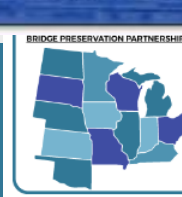
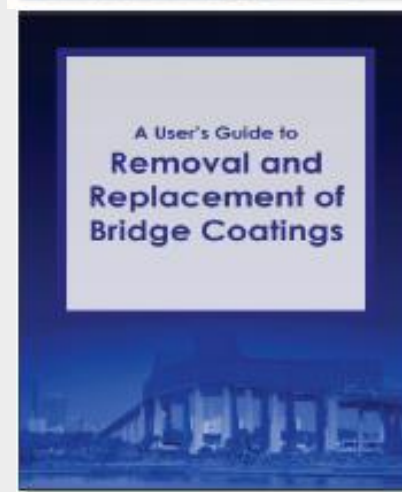
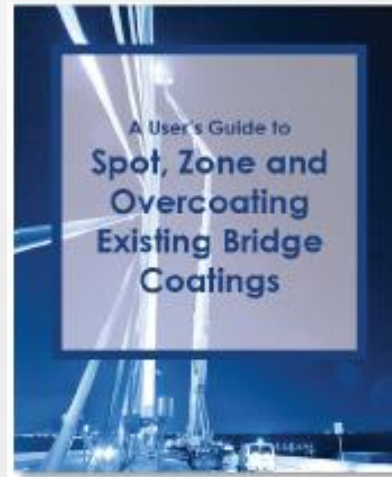
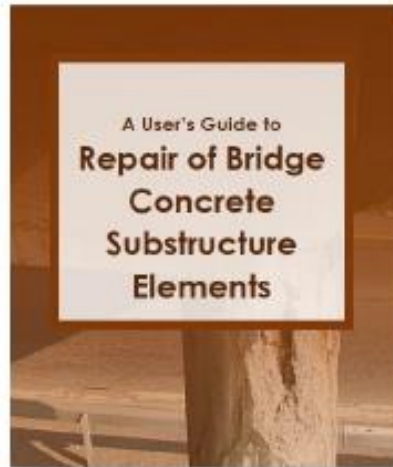


Bridge Maintenance



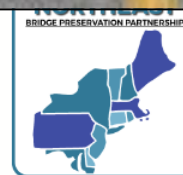
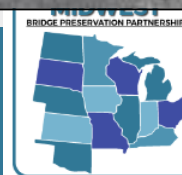
- Bridge Washing
- Bearing Repairs
- Deck Treatments (Sealers and overlays)
- Bridge Joint Sealing
- Asphalt/ Membranes
- Painting Steel
- Concrete Patching
- And much more...

Preservation Pocket Guides

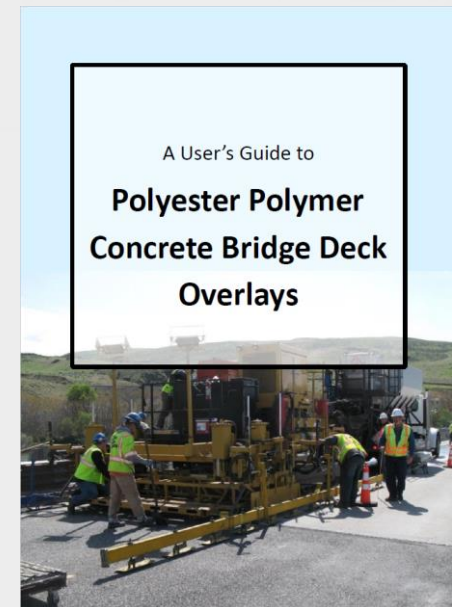
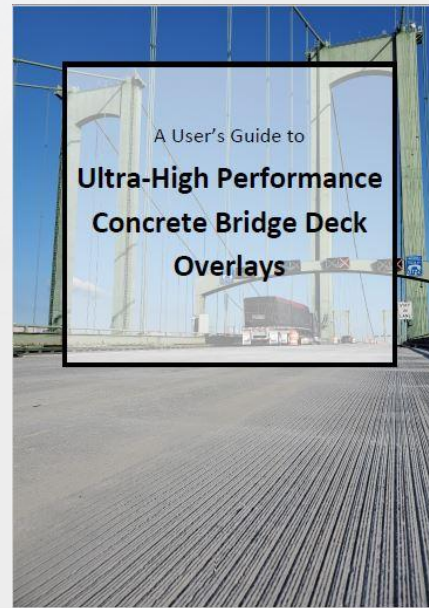
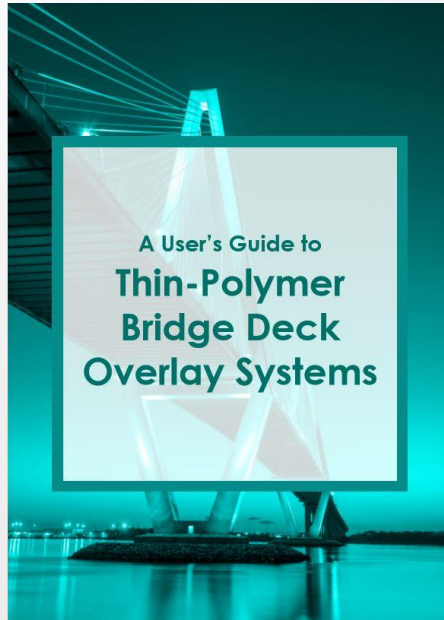
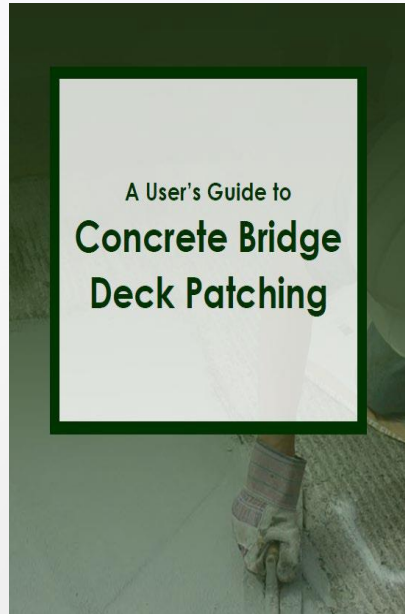
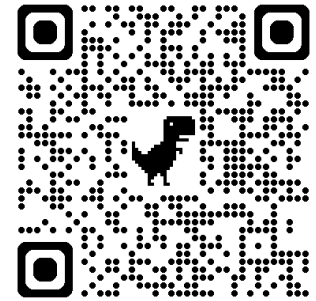


Intent of the Pocket Guides

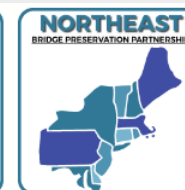
- Installation guidelines
- Equipment and tools
- Limitations & restrictions
- Avoiding potential failure mechanisms
- Recommended training
- Required technical support
- Quality Control



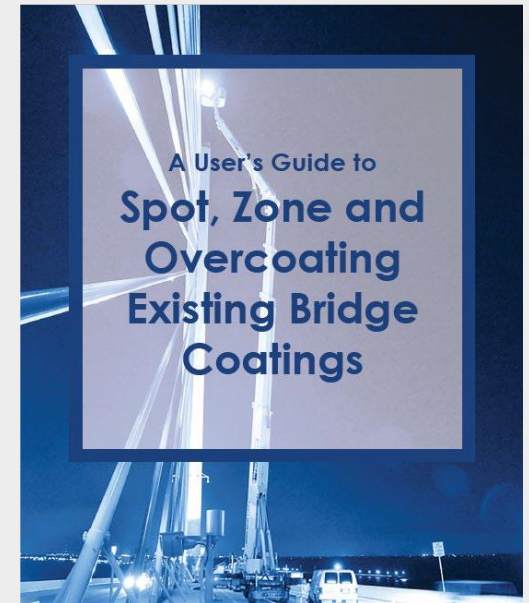
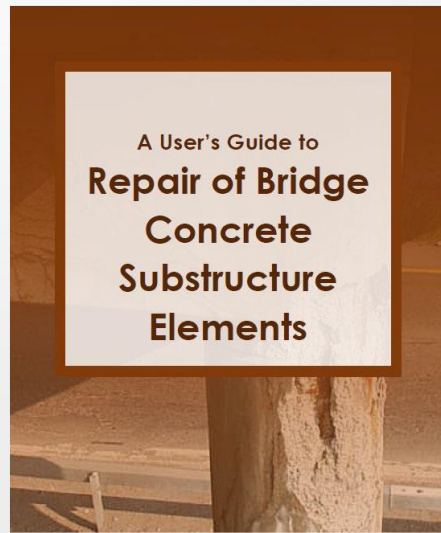
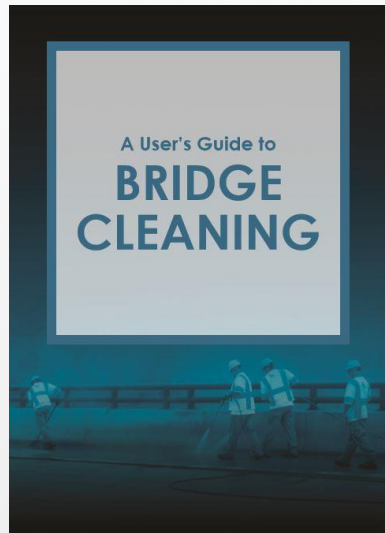
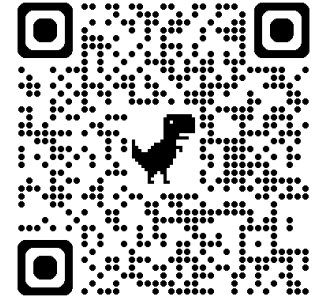
Bridge Preservation Pocket Guides



Source: NCPP Bridge Preservation Website



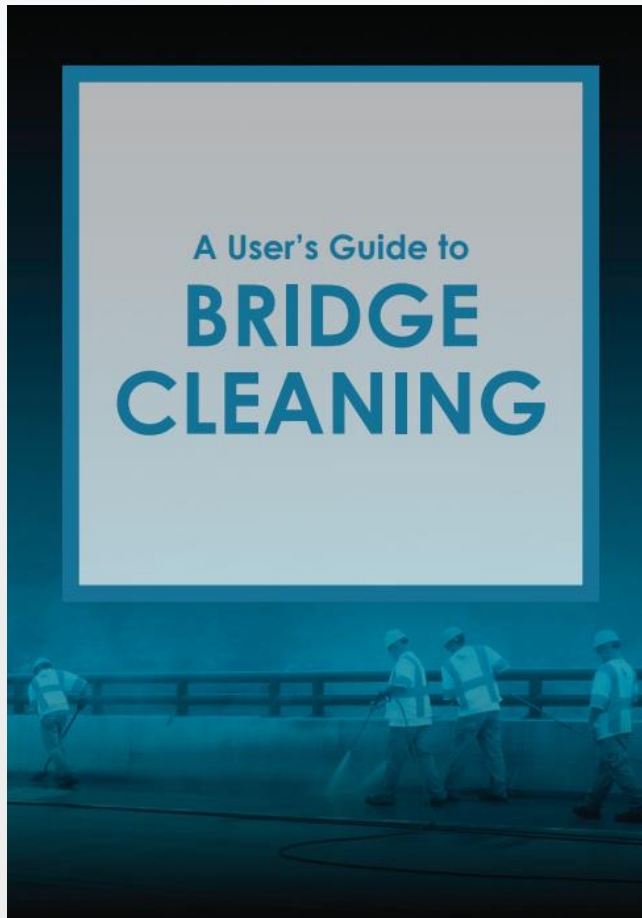
Bridge Preservation Pocket Guides



Source: NCPP Bridge Preservation Website

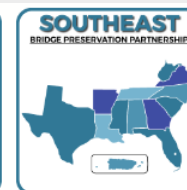


Bridge Washing



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Bridge Cleaning & Washing

Benefits:

- Flushing and washing reduces the potential of chloride intrusion in deck.
- Essential for proper joint and bearing movement.
- Extend the life of steel coating systems.



Bridge Cleaning & Washing



- **Elements to Wash:**
- Decks, joints, curbs and rails
- Abutments, beam seats and bearings
- Beam ends, trusses and end diaphragms
- Drains

Bridge Cleaning & Washing

Things to Consider:

- Follow state and federal regulations. (Some debris may be hazardous)
- Sweep and collect large debris for disposal.
- Flush during high water flow to minimize environmental impact.
- Clean on regular cycle of avoid large build-up with hand removal



Bridge Bearings

A User's Guide to Maintenance and Repair of Bridge Bearings

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Types of Bearings:

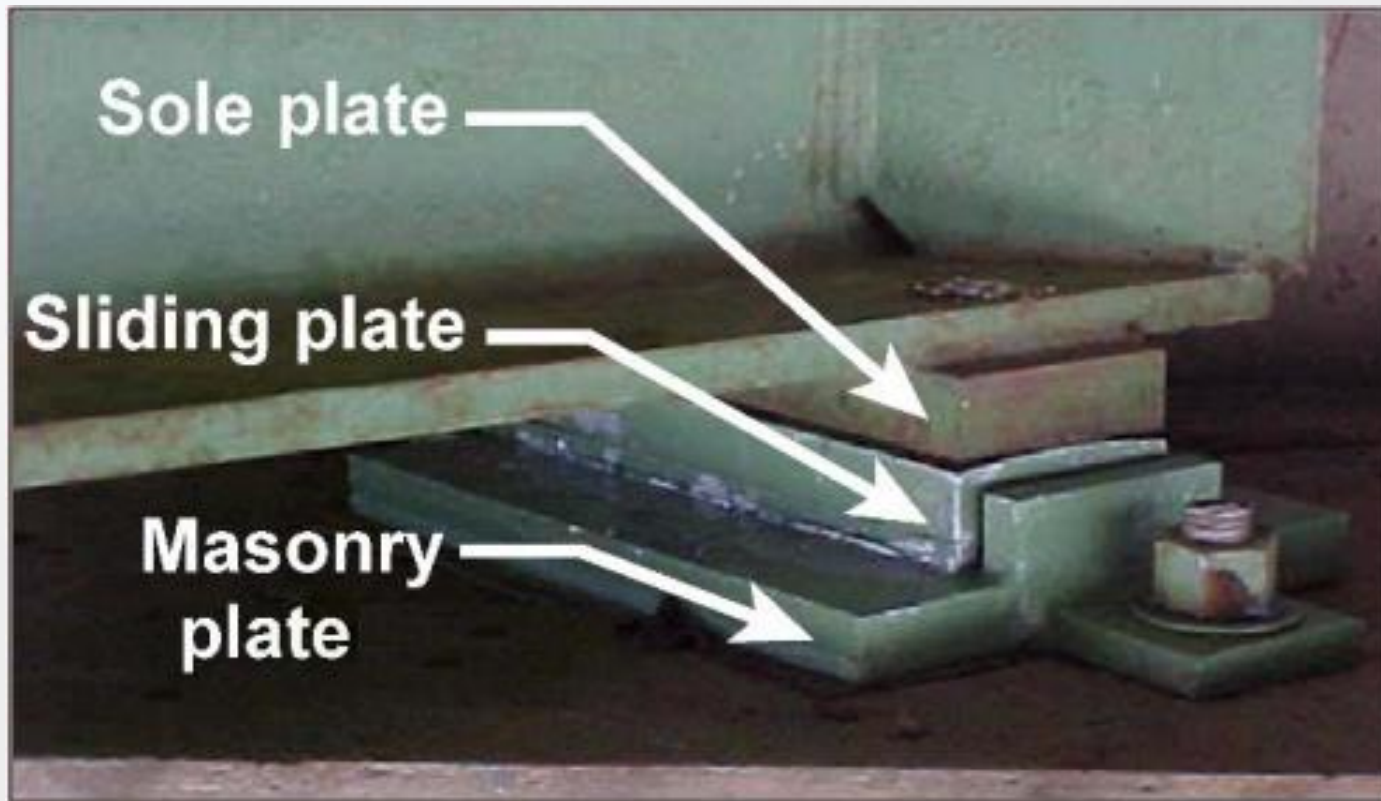


Figure 1 - Sliding Bearing. Source MnDOT.

Types of Bearings:

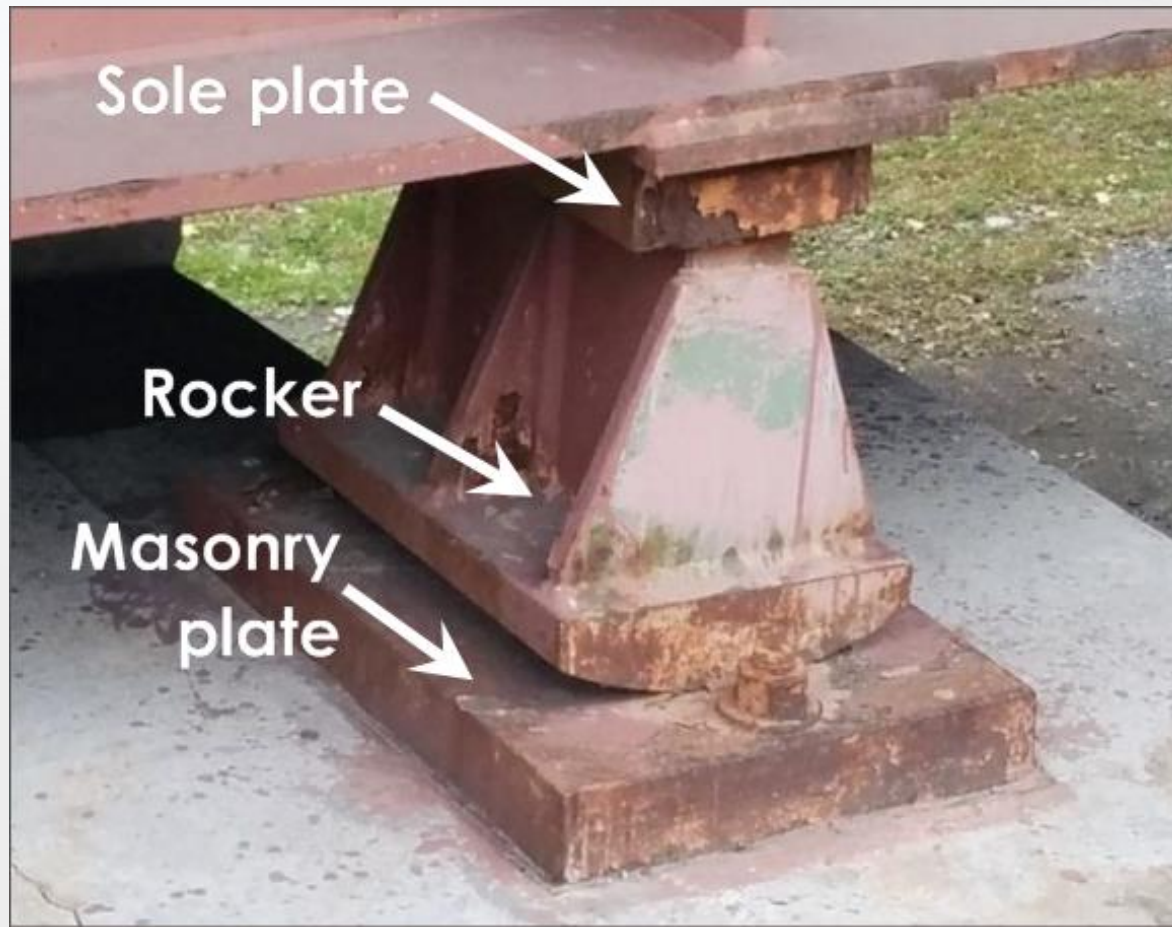


Figure 2 - Rocker Bearing. Source GPI.

Types of Bearings:

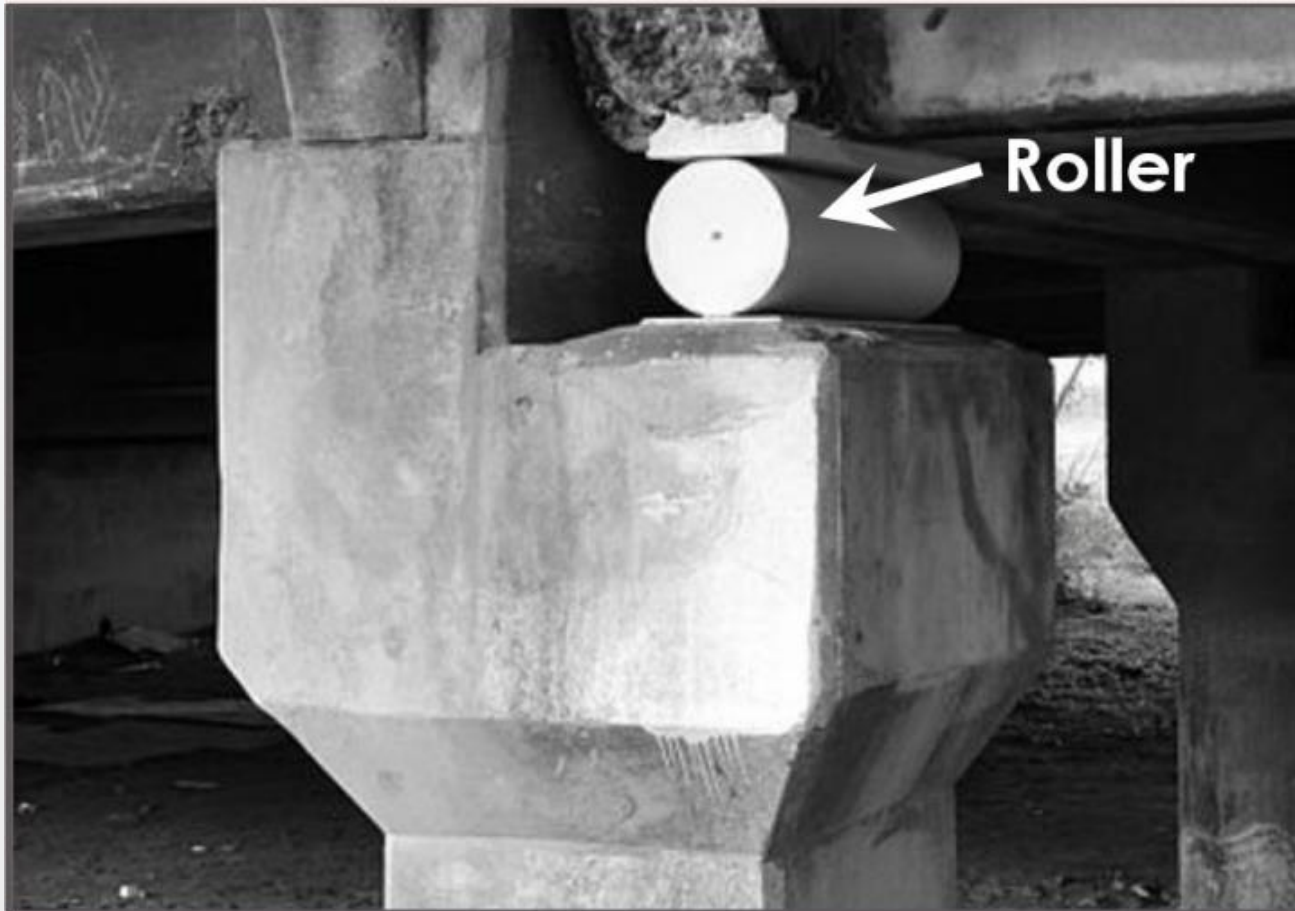


Figure 4 - Roller Bearing. Source P. Feller.

Bearings: Common Maintenance

- Cleaning:
 - Maintains proper function
 - Reduces the chances of the bearing “freezing”
 - If the bearing is frozen, the bridge may need to be jacked to facilitate the removal, cleaning and repainting before reinstallation.
- Anchor Bolt Tightening:
 - Loose anchor bolts may cause damage to other components of the bridge in addition to the bearing
 - Retighten anchor bolts as directed



Bearing Painting: Before



Bearing Painting: After



Bearing Lubrication:



Figure 8 - Bearing Lubrication. Source GPI.

- Jack to provide clearance.
- Clean first by flushing, power washing or compressed air.
- Lubricant can utilize grease, oil, graphite, or as directed.
- Some bearings have grease fittings.

Bearings: Jacking bridge

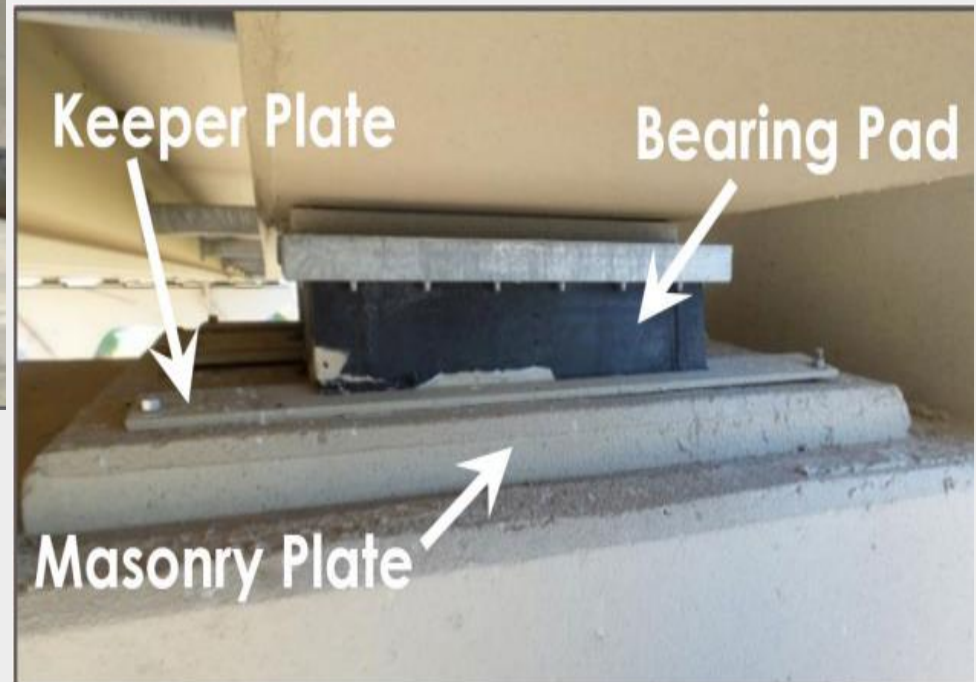


- Consult an Engineer
- Lift all beams at once to avoid damage
- Most old bridges weren't design to facilitate jacking.

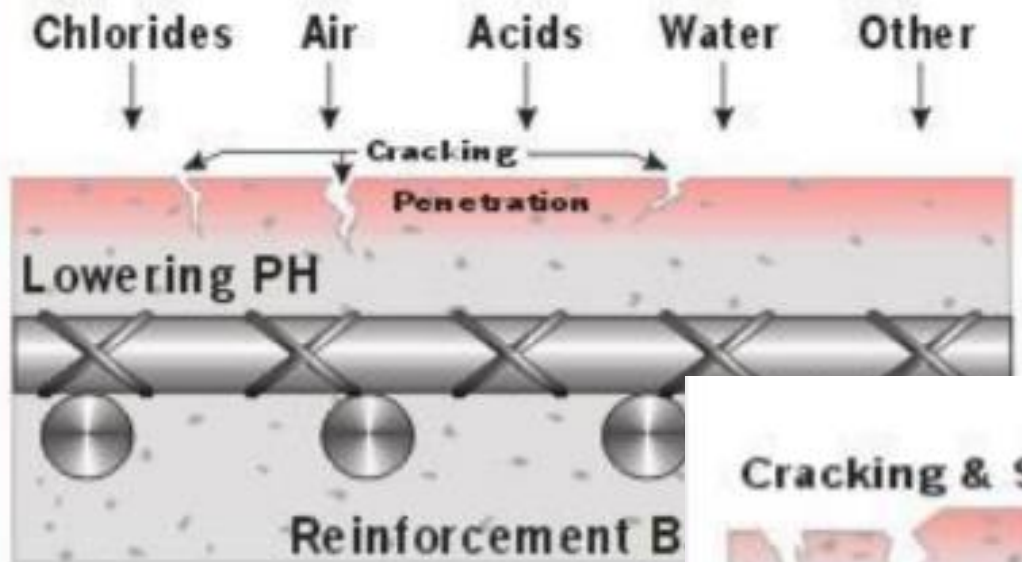
Jacked Superstructure. Source MnDOT



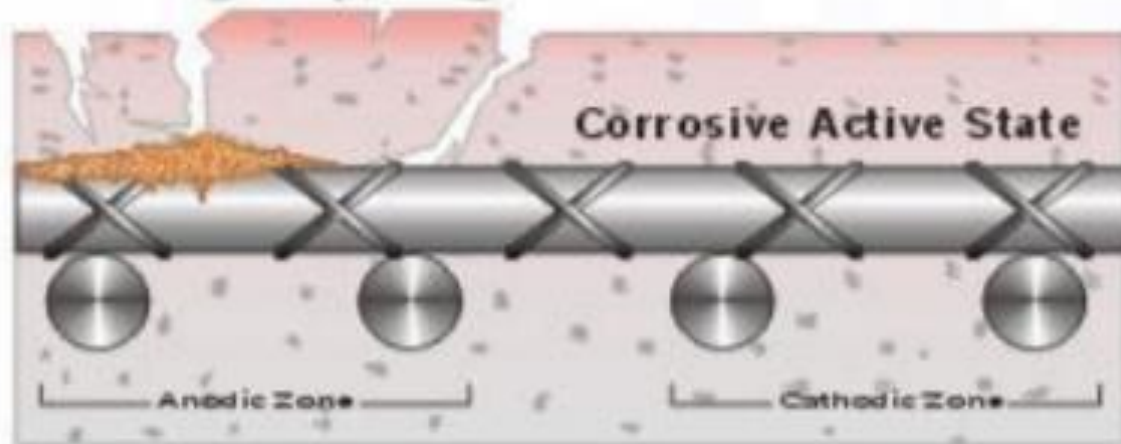
Bearings: Install Keeper Plate



Concrete Sealing

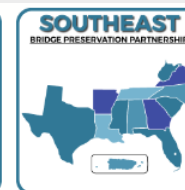
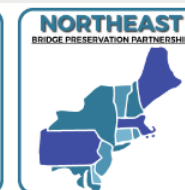


Cracking & Spalling

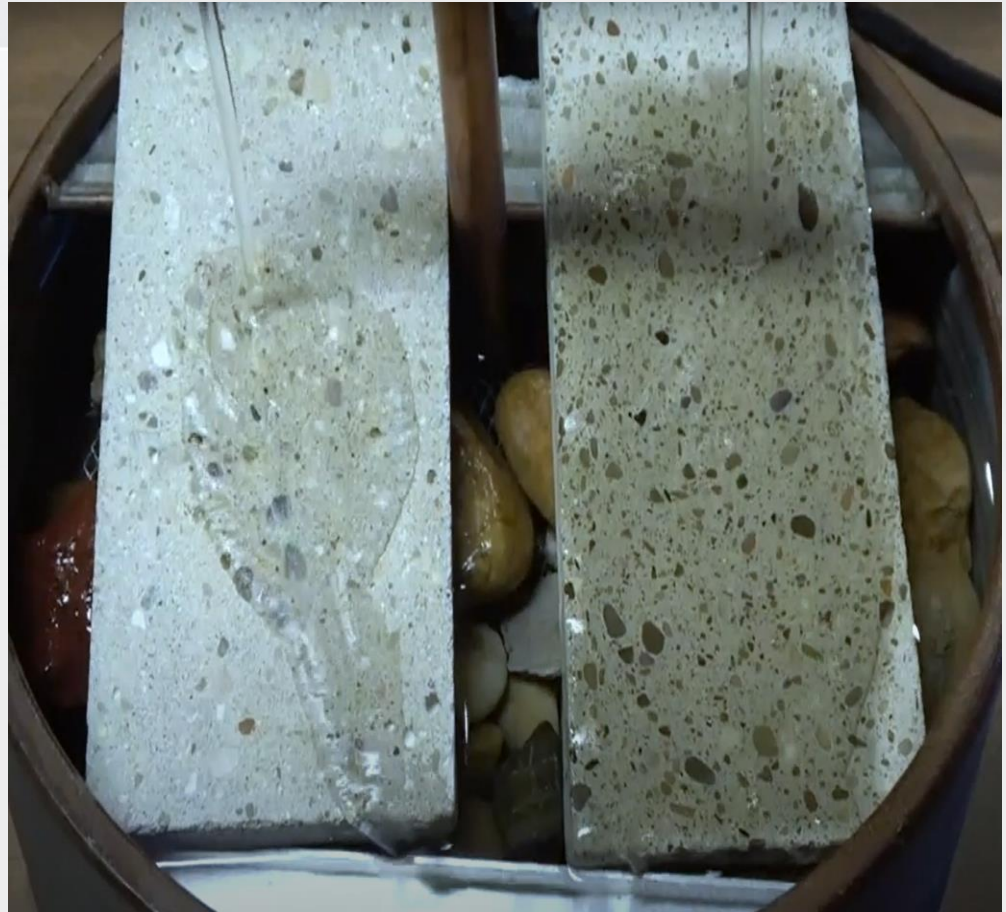


Penetrating Sealers (Silanes, Siloxanes and Siliconates)

- Penetrating water repellents protect from moisture and chloride penetration into the concrete
- Achieves a depth of penetration into the concrete that seals and protects without impacting slip/skid resistance
- Does not fill visible cracks in concrete
- Reapplied on a 5 to 10 year cycle.



Penetrating Sealers (Silanes)



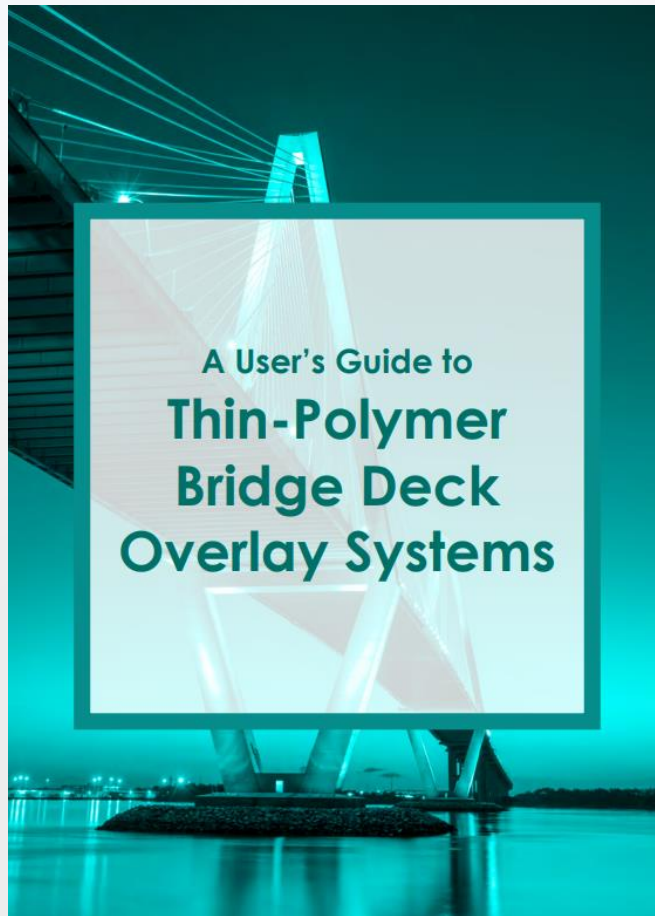
Bridge Deck Crack Fillers

Flood Coat Application

- Seals cracks in the bridge deck concrete to prevent the intrusion of moisture, de-icing chemicals and other damaging environmental affects
- Most effective when placed early, after initial shrinkage cracking and prior to exposure to de-icing chemicals

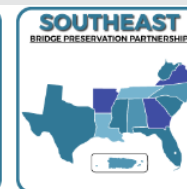


Thin-Polymer Overlays



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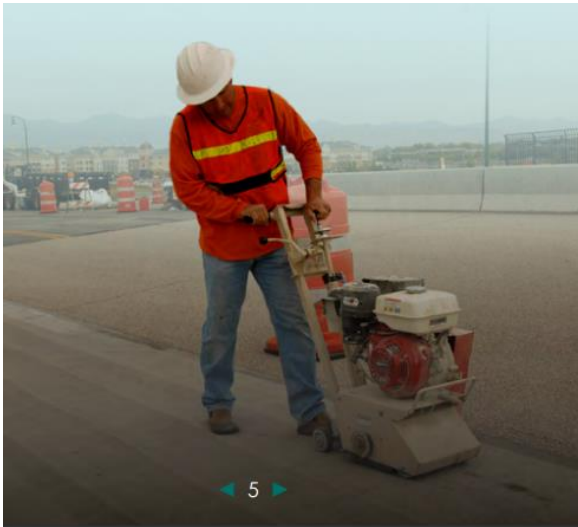
Thin Polymer Overlay System

- Ultra low permeability to protect the deck concrete from the intrusion of moisture, de-icing chemicals and degradation
- Provide a protective, durable, skid-resistant wearing course for a concrete bridge deck
- Costs are low compared to other protective deck overlay systems
- Can easily be installed with maintenance crews



Thin Polymer Overlay - Preparation

- Shot-blast the entire deck.
- Remove all dust and debris
- Protect and cover drains and joints



Thin Polymer Overlay - Application

- Mixing per the manufacturer directions. This isn't technical... but very important!
- Use squeegee to push and pull the material onto the deck.
- Broadcast aggregate.
- Repeat for second coat

- YouTube Instruction ->



Asphalt Systems

- Spray Applied Membranes (Polyurea)
- Polymer Membrane (Epoxy)
- Rolled Membrane (Fabric)



Rolled on Membrane Installation

- Overlap and offset seams per manufacturer recommendations.
- Have laps splices going downhill.



Rolled on Membrane: Pave Top Course



Bridge Maintenance Painting

- Painting systems are used to protect the steel.
- Spot painting is an important tool to extend the service life of the existing bridge coating.
- Pay close attention to worker safety and environmental regulations.



Corrosion of Beam End, Cross Frame and Bearing

Source: NCHRP Project 14-30

Candidates for Bridge Maintenance Painting



Coating Failure Exposing Rusted Mill Scale



Inter-Coat Failure

Source: NCHRP Project 14-30

Bridge Maintenance Painting: Surface Prep



Figure 24. Shrouded grinder with back pack vacuum (pneumatic powered)



Figure 25. Feathering of existing coating

Source: NCHRP Project 14-30

Bridge Maintenance Painting

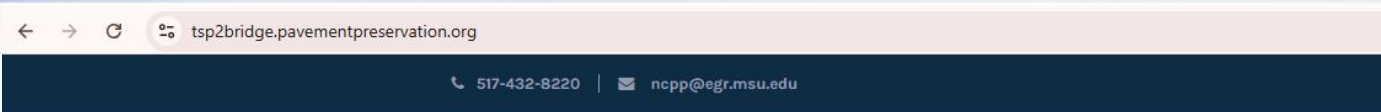
- Performed when the existing coating on a bridge has deteriorated
- Surface preparation and coating application are critical to longevity
- Can be installed with agency maintenance personnel when properly trained
- A good specification and training of inspectors is vital

Source: NCHRP Project 14-30

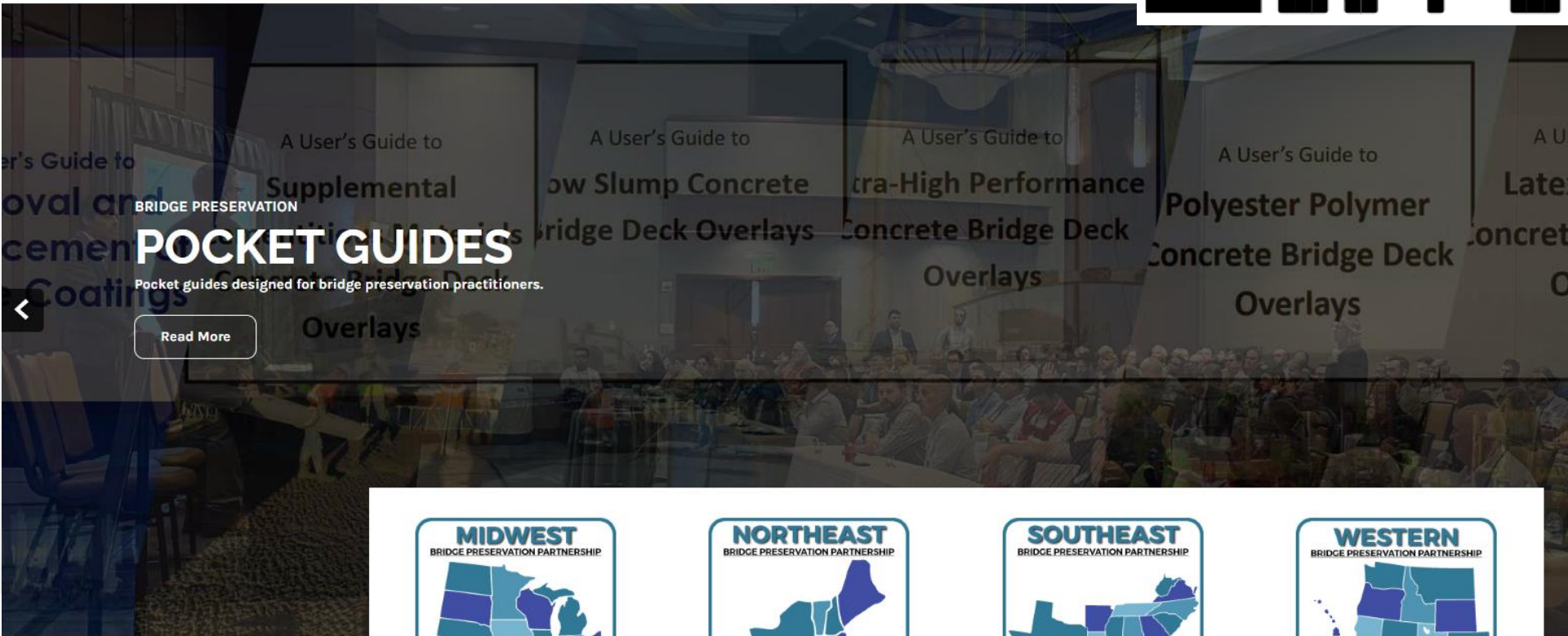


Figure 30. Coating application on riveted steel using a mitt

Website - TSP2.ORG



RESEARCH ▼ TECHNICAL ▼ LEGISLATIVE TRAINING INDUSTRY



MIDWEST (MW/BPP)



NORTHEAST (NEBPP)

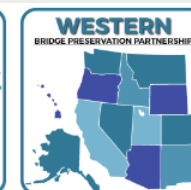
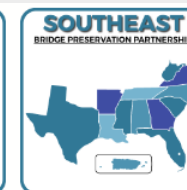
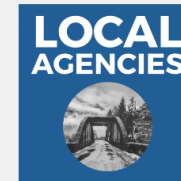
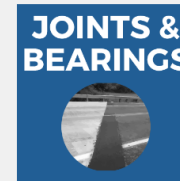
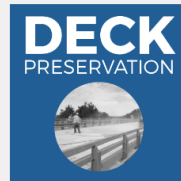


SOUTHEAST (SEBPP)



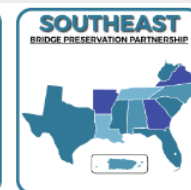
WESTERN (WBPP)

Training Video Library



Regional Partnership Meetings

Meeting	Date	Location
SEBPP	April 28-30, 2025	Charleston, West Virginia
WBPP	May 20-22, 2025	Missoula, Montana
NEBPP	September 8-10, 2025	Worcester, Massachusetts
MWBPP	October 20-22, 2025	Columbus, Ohio



Questions?

Travis Kinney

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Jason DeRuyver

Jason.DeRuyver@HDRinc.com



Question	Answer	Answerer
Thank you for the presentation from the Shoshone-Bannock Tribes in Fort Hall Idaho		
Greetings from Wind River Agency	Welcome!	Nancy Huether
As a supplier in the industry, I can testify we love nothing more than to demo and educate our customers. It's a great way to learn.	Message me you info	Jason DeRuyver
dave.kasprzyk@crafco.com Dave Kasprzyk 314-348-6497	She is also at CRAFCO	Jason DeRuyver
dave.kasprzyk@crafco.com Dave Kasprzyk 314-348-6497	I emailed Lisa Zentner - I am trying to get a presentation on Apshalt Plugs given to HDR Staff	Jason DeRuyver
I'm on the board of directors of the MPPP, fyi.		
I can help you with Lisa. Send me a note.		
We're trying to mirror your local agency outreach efforts on the pavement preservation side. Your attendance is awesome. Thanks!!! DK		
Would you cover more on the safety in the next meetig		
thank you		
Would you be able to send a link to your PowerPoint presentation so that I can share this with coworkers?	The PowerPoint slides, as well as the full recording will be available on the website after ther conclusion of the webinar. All attendees should all receive a link.	Nancy Huether
1) Will local agencies be responsible for inspecting railroad underpasses?Is there state funding available for inspection and maintenance of local bridges?	Another example - Michigan Specific Law requires inspecting bridges as small as 10 feet in length, as well as any pedestrian or RR bridge over public roadway.	Jason DeRuyver
1) Will local agencies be responsible for inspecting railroad underpasses?Is there state funding available for inspection and maintenance of local bridges?	Message me your state, and I can send you your local DOT contact	Jason DeRuyver

Question	Answer	Answerer
1) Will local agencies be responsible for inspecting railroad underpasses? Is there state funding available for inspection and maintenance of local bridges?	That probably depends on each state's legislation. In Michigan, RR bridges are owned by the RR. The federal law only covers inspecting bridges carrying vehicular traffic.	Jason DeRuyver
How about California?	You could contact Chris Long. He works for FHWA but is active in this Working Group. I think he should be able to help. His email is christopher.long@dot.gov	Nancy Huether
How about California?	I am asking for contact info.	Jason DeRuyver
do you have info on wood bridges?		
where can it found the training for timber bridges?	Drop your email in the chat	Jason DeRuyver
Thank you!		
Has there been any effort to add sacrificial zinc anodes to steel members to prevent rusting?		
missed my zinc question		
Do you grind the existing rust and then paint?	There are maintenance overcoat systems that allow for a water blast to remove the loose rust and loose paint. The system is HRCSA paint. It has it's drawbacks, such as it stays tacky for a few years and collects dirt. Standard systems, yes - blasting the surface to remove all rust is required. Wasser also has some zinc overcoats.	Jason DeRuyver
Is there some sort of sign in sheet for those of us that are watching in a group?		
Timber bridge repair		
how long until you can drive on a sealed deck?	Depends on the sealer. As soon as it is cured. Silane - 2 hours - Epoxy 4-8 hours depending on temperature.	Jason DeRuyver
how long until you can drive on a sealed deck?	Agreed, Jason. Check with the product on expected curing time.	Nancy Huether

Question	Answer	Answerer
Is there a possibility of you recording this training and sending to us to share with staff?	This webinar will be recorded and the link will be shared with the attendees	Nancy Huether
thank you!		
the nut on that anchor bolt is super loose!		
I have a couple of vehicle rated pedestrian cable stay bridges in Missoula, MT and am having trouble finding someone to perform qualified maintenance on them - checking torque on turnbuckles, greasing end connections, replacing expansion joints, etc. Can you provide any guidance on qualified contractors?	I work for a national engineering firm that has a ton of experience in the inspection and design of cable stayed bridges. If you message me your contact info, I can ask around.	Jason DeRuyver
Lincoln Lake - Missoula Parks Dept. - LakeL@ci.missoula.mt.us		
thank you!		
would a sealant like that repel graffiti or assist in the removal of?	Not really, there are a few products that deter graffiti or make it easier to clean off, but I have not had success with it.	Jason DeRuyver
cable stayed bridge maintenance		
Thank you!		
I couldn't unmute - but also heartbroken by Bills	That was a good game but tough for the Bills fans.	Nancy Huether
Using methacrylate		
Thank you so much!		
How do you folks feel about aluminum mastic or "rust converter" as a limited measure to treat rusty beam areas? Granted environmental concerns don't go away with these products.	If you would like information on the Coatings Working Group, please email me and we can get you included in the meeting. Email me or ncpp@egr.msu.edu	Nancy Huether
How would y'all go about cleaning a large amount of bird feces off of a truss over a river?	It is very important to clean it, though! Just be cautious about how to do it.	Nancy Huether
Great training/webinar! Thank you		
screw the chiefs		
rural road bridge deck mx		
wood bridge deck mx		

Question	Answer	Answerer
Does the wood bridge training include information on filling minor timber crack repairs?		
Thank you very Much!		
Very informative, we appreciate all your great work. Thank you!		
For asphalt overlaying of the concrete deck, have there been any issues with increased dead load of the bridge?	Yes - Each bridge is different. Responsible bridge engineers design bridges for future 2" overlay. Best to have a bridge engineer check the capacity.	Jason DeRuyver
Any suggestions on available grants for bridge maintenance?		
In MN, if we call it bridge washing we have to recover our water. If we call it flushing, we don't. Point is to be careful on what term you use when letting.	In Michigan we use vac trucks and sweepers to get some of the bulk debris, then use potable water.	Jason DeRuyver
In MN, if we call it bridge washing we have to recover our water. If we call it flushing, we don't. Point is to be careful on what term you use when letting.	Great point - flushing is often used to indicate that only water is used - no detergents, etc.	Nancy Huether
Afternoon from TAT Roads Department on MHA Tribe.		
Thanks again, this is great to know about these resources!		
do you close the whole deck or can you do one lane at a time ?	One lane at a time is standard operating procedure.	Jason DeRuyver
Would you recommend adding a sealer to a new concrete bridge, or would it be best to wait for those micro cracks to form after some time?	I agree. You do need to wait till the concrete has cured for best results - typically 28 days is best	Nancy Huether
Would you recommend adding a sealer to a new concrete bridge, or would it be best to wait for those micro cracks to form after some time?	I recommend silane right away - sealers after 1 to 2 years. Let the bridge go through a few freeze thaw cycles.	Jason DeRuyver
How many people showed up to this? Curious	337 was the highest	Jason DeRuyver
Painting		

Question	Answer	Answerer
is there training for methacrylate?	What kind? Sealer? It is similar to placing epoxy, just more chemicals. I have got tremendous results with Transpo T-17 in Michigan. That is a methacrylate patching material that cures in an hour. Meant for very small patches	Jason DeRuyver
is there training for methacrylate?	I believe that there are pockets guides for sealers in process. Please email me or Stewart after the webinar and I will verify.	Nancy Huether
Thank you.		
Do you have any recommendations for maintaining precast concrete culvert structures		
Where is everyone sourcing their concrete crack filler epoxy?	I found most of my epoxy from the industry partners that attend the partnership meetings. I use BASF Masterseal, EBond 526, Echem EP50, Euclid Flexolith, Polycarb Flexogrid and Sika Sikadur for epoxy overlay. I also use healer sealers that each of those companies sell	Jason DeRuyver