Bridge Preservation Resources for Local Agencies

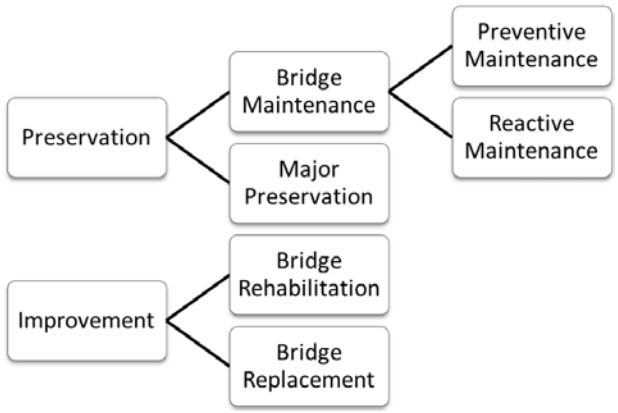

Figure 1 – Bridge Action Categories

Preservation is a program of cyclical and condition-based maintenance activities that slow bridge deterioration, restore a bridge's function, keep bridges in sound condition and extend their life. Bridge Maintenance is generally identified through the inspection and assessment process and can be divided into two categories: Preventive and Reactive.

- **Preventive Maintenance** includes routine maintenance activities performed according to an assigned frequency, as well as periodic minor repairs with the intent of preserving the bridge. These routine maintenance activities increase the lifespan of the bridge by slowing the deterioration caused by traffic and the environment. Typical Preventive Maintenance Activities are included in Table 1.
- **Reactive Maintenance** is scheduled in response to an identified condition that may compromise public safety or bridge structural function.

Major Preservation refers to those activities, beyond ordinary maintenance, that are intended to slow or stop the deterioration of bridge elements. These activities prolong service life, and generally maintain the existing design features of the bridge. Slight improvements in bridge condition, geometrics or load-carrying capacity may be realized. Examples of major preservation include painting, deck overlays, minor superstructure and substructure repair, partial deck replacement, barrier replacement and expansion joint replacement. Major Preservation is identified through BRIM and inspection information.

Improvement includes major rehabilitation and replacement. When a bridge deteriorates to a condition in which preservation is not viable or cost-effective, a major capital improvement or complete bridge replacement must be performed.

Effective management of the bridge network requires that resources are allocated to the correct asset management component at the correct time. This ensures that service life is maximized, lifecycle costs are minimized and our bridges safely fulfill their transportation function.

Preventive Maintenance Activity	Recommended Frequency
Flushing	Annually
Crack Sealing (Crack Chase or Flood Seal Methods)	Every 3-5 years
Deck Sealing (Silane or Penetrating Sealer)	Every 5-10 years
Poured Joint Sealing	Every 5-8 years
Cleaning and Lubricating Bearings	Every 4 years
Rail Sealing	Every 7 years
Maintenance Painting	Every 5 years
Gland Repair and Replacement	As Needed
Joint Repair and Re-establishment	As Needed

Table 1 – Typical Preventive Maintenance Activities and Recommended Frequencies

FHWA Resources

https://www.fhwa.dot.gov/bridge/preservation/

Bridge Preservation Guide

"A successful bridge program seeks a balanced approach to preservation and rehabilitation/replacement. Bridge owners are striving to be more strategic by adopting and implementing systematic processes for bridge preservation as an integral component of their overall asset management."

https://www.fhwa.dot.gov/bridge/preservation/guide/guide.pdf

Bridge Preservation Video

https://www.youtube.com/watch?v=E8xHWtTkVOI&feature=youtu.be (Published: May 7, 2019)

Description: Bridge Preservation – Bridge owners across the United States face significant challenges in addressing the needs of their aging infrastructure. This video explains bridge preservation activities and which ones qualify for Federal funding. Also, learn how transportation agencies in four states established their bridge preservation programs and what advice they have for other agencies.

National Highway Institute (NHI) Training

https://www.nhi.fhwa.dot.gov/home.aspx (Enter a keyword in the search box to generate a course list)

- NHI 130107A Fundamentals of Bridge Maintenance (web-based)
- NHI 130108 Bridge Maintenance (instructor-led)
- NHI 130107B Bridge Maintenance Painting (web-based)
- NHI 130106A Bridge Preservation Fundamentals (web-based)
- NHI 130109A Bridge Management Fundamentals (web-based)
- NHI 130106B Establishing a Bridge Preservation Program (web-based)
- NHI 130112C NDE for Timer and Other Material Bridge Elements (web-based)

Bridge Preservation Expert Task Group (BPETG) Pocket Guides

Pocket guides were developed by the Bridge Preservation Expert Task Group to provide information on cost-effective bridge preservation strategies. The pocket guides are in a checklist format consisting of installation guidelines, equipment and tools, limitations and restrictions, avoiding potential failure mechanisms and recommendations for training, technical support and QC/QA for designers, specification writers, inspectors, contractors and maintenance crews. Pocket guide apps are also available for both iPhone and Android phones.

- A User's Guide to Removal and Replacement of Bridge Coatings
    - Phone App: *RBC Pocket Guide*
- A User's Guide to Bridge Cleaning
    - Phone App: *BC Pocket Guide*
- Thin-Polymer Bridge Deck Overlay System
    - Phone App: *TPO Pocket Guide*

Additional pocket guides in progress include deck patching, spot painting and concrete overlay systems.

https://tsp2bridge.pavementpreservation.org/technical/fhwa/documents/

MnDOT Resources

Bridge Maintenance Guidance Documents and Resources

Bridge Maintenance Manual: http://www.dot.state.mn.us/bridge/maintenance-manual.html

Cost-Effective Timber Bridge Repairs: http://www.dot.state.mn.us/research/TS/2015/201545B.pdf

Bridge Design, Construction, Inspection and Maintenance Resources: http://www.dot.state.mn.us/bridge/

Bridge Maintenance Training

http://www.dot.state.mn.us/bridge/training.html

Bridge Preventive Maintenance eLearning Modules

Bridge preventive maintenance eLearning modules that focus on planning, equipment, materials and best practices were developed by MnDOT and are available to local agency participants at no cost.

- Bridge Flushing
- Crack Sealing
- Poured Joint Sealing
- Strip Seal Neoprene Gland Repair

Bridge Maintenance Academy

The Bridge Maintenance Academy Training Series is also available to local agencies at a reduced cost.

- Bridge Maintenance Academy I
    - MnDOT is in the process of converting Bridge Maintenance Academy I into eLearning modules.
- Bridge Maintenance Academy II
    - In Bridge Maintenance Academy II, participants will receive an introduction to the fundamentals required to perform bridge maintenance effectively including strategies for structural steel, timber bridge maintenance and formwork. Participants will also be given the opportunity to observe experts and perform hands-on bridge maintenance tasks, such as concrete formwork, rebar placement, concrete placement, finishing and curing, chain dragging, concrete removal, concrete patching and structural steel repair.
- Bridge Maintenance Academy III
    - In Bridge Maintenance Academy III, participants will be given the opportunity to construct a small single span bridge in order to facilitate bridge jacking training. As part of this exercise, participants will be able to observe experts and perform hands-on bridge maintenance tasks, such as setting elastomeric bearings, setting steel beams, fastening steel diaphragms, constructing bridge deck formwork, placing rebar, placing, finishing and curing bridge deck concrete, installing a strip seal joint and performing full depth deck patching. Following construction of the bridge, participants will receive an introduction to basic bridge jacking and bearing and joint maintenance fundamentals as well as perform a bridge jacking exercise.

Bridge Maintenance Support

MnDOT's Bridge Operations Support Unit is available to answer questions, provide guidance for your agency's bridge maintenance program or demonstrate the SIMS Maintenance Module. Please contact Sarah Sondag at 651-366-4529 or sarah.sondag@state.mn.us or Greg Mensen at 651-366-4520 or greg.mensen@state.mn.us.

AASHTO Resources

Midwest Bridge Preservation Partnership

The Midwest Bridge Preservation Partnership (MWBPP) is comprised of representatives from regional state and local highway agencies, provincial transportation agencies, industry, suppliers, consultants, and academia. Any interested agency, organization, company, or group may join and participate in the activities of the Partnership by contributing funds to the American Association of State Highway and Transportation Officials (AASHTO), or by paying fees to attend the annual workshop and conference.

https://tsp2bridge.pavementpreservation.org/midwest-mwbpp/

Local Agency Participation

One of the goals of the MWBPP is to promote outreach to local agencies. The partnership has monthly teleconference calls, working groups and regional meetings in order to conduct partnership business and exchange bridge preservation knowledge.

At the 2019 Regional Meeting, the partnership adopted the following language regarding Local Agency Participation into the bylaws:

- Local Agencies may join a regional partnership upon payment of a membership fee of $2250.00 each year. The local agency member would then be allowed full participation in the Regional Partnership for either bridge or pavement preservation and would have travel expense reimbursement for one person per local agency membership.

T3 Transportation Curriculum Coordination Council

Training is also available through the T3 Transportation Curriculum Coordination Council at https://store.transportation.org/. Some examples of the technical training course topics available are listed below:

- FHWA Bridge Preservation Guide
  - Bridge Preservation Overview
  - How to start a Bridge Preservation Program
- Bridge Preservation Pocket Guides
  - Bridge Cleaning
  - Thin-Polymer Bridge Deck Overlay System
  - Removal and Replacement of Bridge Coatings
- Other Bridge Related Topics
  - Bridge Plan Reading
  - Bridge Construction
  - Materials
  - Corrosion of Structures
  - Bolted Connections