

# Session 1 Report Out:

## Bridge Preservation Activities

MWBPP Conference  
Council Bluffs, Iowa  
October 16-18 2012

**Group number: 1**

**Discussion topic: Reviewing Deck Activities**

- **Difference between cleaning and sealing and sealing joints?**
- **Slope pavement should be under another item other than deck?**
- **Drainage system cleaning/repair should be broken down to cleaning scupper and repairing pipe.**
- **Floodcoat is easier than chasing cracks.**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- **Micro silica reputation of cracking. Latex is performing better. Latex is sensitive with slope and moisture. Contractors have knowledge of process**
- **Silica fume overlays will also include approach slabs.**
- **Asphalt overlay w/o membrane only if you are going to do a deck replacement in the next 5 years.**

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- **Add details to see how much longevity each agency expects from repair.**
- **Funded pooled research to share costs.**
- **Regional bridge life cycle of bridge decks.**

**Discussion Highlights (note main discussion items)**

- Leading Questions No. 1 - The activities cover most of the general activities and are in the appropriate category.
- Leading Question No. 2 – Units are generally setup in units of each for structural components and unit per dimension for elements. The unit measurement requires the contractor to be responsible for including all of the necessary cost into the unit rate. Some of the difficulty for not doing a smaller unit such as hourly rate is the inability to collect reasonable and necessary information to adequately determine an hourly rate or other unit based compensation. For example tracking labor rates, mobilization, material quantities and effort required per square foot of each bridge. The information collected and used to establish cost estimates is typically reflective of how the agency approaches preventative maintenance. For example deck flushing may only be contracted as an entire structure rather than spot flushing or zone flushing where unit based compensation per hour or area would be more appropriate. The items listed with multiple units were discussed and summarized below.
  - Clean/Flush Deck is bridge, Clean/Seal Expansion Joints is linear foot, Coat Concrete Barrier/Deck Fascia is linear foot or square yard, Drainage System Cleaning / Repair is location, Seal Bridge Deck Cracking is linear foot, Seal Joints is linear foot, Approach slab overlay is square foot or pending the type of approach slab overlay is may be ton, deck fascia/overhang repair is square foot, deck joint repair is linear foot, deck joint replacement is linear foot and each, Deck Repair – Full depth is square yard, Deck Repair – Half Sole is square yard, Leveling/Lifting/Stabilization is cubic yard and each (effort and materials are separated), Patching with concrete is square foot, Patching with HMA Overlay (No & with water HMA Overlay) is tons, Railing Replacement is linear foot, Shallow Rigid Concrete Overlay is square yard,
- Leading Question No. 3 – No specific examples were provided but in general two methods were discussed. The direct method (field testing of performance) or an indirect method (measurement of the change in bridge condition overtime to project where to budget program cost). Agencies are using a best guess or comfort level with their understanding of their agencies bridge program. Indirect methods need to be established to monitor the change in bridge and/or elemental condition overtime.
- Leading Question No. 4 – Yes additional information should be collected and inventoried to help make it an apples to apples comparison.
- Leading Question No. 5 – The following changes or modifications were mentioned during the discussion of Leading Question No. 2:
  - Approach slab overlay needs to be broken down into smaller activity types for epoxy, latex modified, etc... or just included into the general overlay categories because separate pay items are not established which would aid in tracking the differences between approach slabs and decks.
  - Hybrid treatments that combine two or more activities such as silane treatments with epoxy top layer
  - Corrosion prevention systems such as cathodic systems, electrochemical chloride extraction, etc... These items would be measured by the square foot.

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- Decks will be sealed with an alcohol based sealer then topped with an overlay or chip seal. Brand new bridges are just sealed within a certain number months and existing bridges must be blown off with air compressor and then cleaned with a power washer.

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- The determination of the appropriate pay item unit for each preservation activity must be compared to the agency's approach for the implementation of each activity because this will account for the type of forces used and the limits of the application for the activity which correlate to the agency's approach to preventative maintenance. The matrix needs to consider how agency's approach similar preservation maintenance activities because whether painting is applied as spot painting, zone painting, or over coating will drive how the units are established for payment which is the only information the agency will have to track how the units are tracked and managed in a BMS.
- Develop field test to verify field performance of preventative activities to help calibrate models used to project bridge conditions overtime. Field test will help to reduce the error in project life cycles or changes in conditions.

**Group number: 3**

**Discussion topic:**

**Discussion Highlights (note main discussion items)**

- **Move these items from Cyclical to Condition:**
  1. **Approach Pvmnt Relief Joints**
  2. **Split item "Clean/Seal Exp Joints" to move "Seal" to Condition**
  3. **Split "Drainage System Cleaning/Repair" to move "Repair" to Condition**
  4. **Seal Bridge Deck Cracking (e.g. crack chaser)**
  5. **Seal Joints**
  6. **Slope Protection Repair**
  
- **Consolidate these items from Condition Based Activities:**
  1. **Patching with Concrete**
  2. **Deck Repair – Half Sole (depth)**
  
- **Add the following item to Condition:**
  1. **Bridge Rail Repair**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- **Clean and Flush Deck Every Year (IN)**
- **Clean Deck Joints (MN)**

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- **Implement Matrix Agency Wide**

**Group number: 5**

**Discussion topic: Reviewing Deck Activities**

**Discussion Highlights (note main discussion items)**

**Cyclical**

- **Flushing of deck with water truck, done with state forces. (note wanding)**
- **Use a street sweeper to clean curb lines.**
- **Jet vac truck to clean suppers at deck level.**
- **Sealing decks**

**Some discussion epoxy coating sealers on concrete barriers.**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- **Need to remove salts with use chemical additives (chloride)**
- Sealing Decks with sealers**  
**Epoxy individual cracks**

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

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**Discussion Highlights (note main discussion items)**

- Iowa measures pressure relief joints at each Routine inspection.
- Missouri does flush decks annually.
- Some concerns with collecting material and disposing of it.
- North Dakota does flush decks every spring.
- Units to measure this activity is important to have a meaningful cost estimating process. Time and deck area may be more valuable.
- Sealing barrier rail is a common practice at time of original construction, but is not done as part of continuing maintenance.
- Sealing decks (silane sealer) is done by some states and not by others. The states that do sealing will do reapplications on a routine basis.
- Oklahoma seals the deck at construction only.
- North Dakota does a water repellent at construction and sealers based on condition.
- Iowa does dense concrete overlays and will epoxy inject delaminations in the overlay to rebond the overlay and fill the void.
- Epoxy overlays have to be used only on decks with minimal deterioration
- Several states have steel pile deterioration that they are developing ways to protect the top few feet of pile against corrosion. Galvanizing, metalizing, painting, and encasing the top few feet in concrete are solutions that have been discussed or tried.

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- Iowa recommends re-cutting or replacing pressure relief joints when they measure less than 2 inches. Oklahoma cuts joints as needed.
- Annual flushing.
- Deck sealing must be done on a scheduled basis.
- Dense concrete overlays have worked well for Iowa's deck protection system.
- Oklahoma does hydro-demolition only, Iowa does milling, and Missouri does both for deck overlaying.
- Oklahoma encases the top ten feet of pile in concrete to prevent corrosion.
- Oklahoma believes that deck replacement is a good maintenance activity for protecting the superstructure.
- Oklahoma loves galvanizing.

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- Cleaning and sealing joints should not necessarily be included together. Cleaning is a cyclical maintenance item and sealing joints is condition based.
- Epoxy overlays should be estimated on a square foot basis.
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**Group number: 7**

**Discussion topic: Deck Activities**

**Discussion Highlights (note main discussion items)**

- **Cost is often estimated per equipment/man hours**
- **Preferred units are linear feet for joints and rail sealing**
- **Square feet for deck applications including patching**
- **Crack sealing in per linear foot of crack**
- **No good performance measures**
- **Only performance measure is number of complaints you receive**
- **Existing matrix items are satisfactory**
- **Matrix could address rail condition**
- **What is approach shoulder shaving**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- **Clean debris out of drains**
- **Missouri/North Dakota-wash deck bearings every year**
- **Iowa-dense concrete overlays early on in life(especially slab bridges)**
- **Iowa-dense concrete overlays at construction for special bridges (\$)**
- **Everyone is big on replacing deck joints and EOF joints**
- **Limited stainless steel reinforcement in high corrosion areas of the deck**
- **Maintenance concerns either sent to District or discussed with them after each bridge inspection**

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- **Research type of overlays appropriate given the age and condition of the deck**

**Group number: 9**

**Discussion topic: Superstructure Preservation Options**

**Discussion Highlights (note main discussion items)**

- **Cyclical maintenance activities are generally not happening at this point.**
- **Disconnect between design, construction, and maintenance functions.**
- **Maintenance functions are currently largely reactive, vs. preventative.**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- **Feasible Action Review Committee (FARC) – meeting of minds with inspection team, maintenance, owner, other stakeholders, etc.**
- **KDOT – performance measures for deck repair/maintenance activities**

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- **Research needed for long term impacts of joint removal (closing joints) at existing expansion joints, converting existing bridges to an integral abutment configuration.**
- **Consider maintenance manual for every bridge (cyclical items).**
- **We need to develop ROI data for preventative maintenance activities.**
- **Need to develop regional performance measures for appropriate corrective actions for elements**
- **Matrix Recommendations: Move Sealing expansion joints and Minor Concrete Patching and Repair to Condition Based.**



**Group number: 10**

**Discussion topic: Superstructure Maint.**

**Discussion Highlights (note main discussion items)**

- What is the Matrix? There was limited previous knowledge of the matrix at our table. The discussion referncing the matrix lacked focal point, a copy of the existing matrix would have been beneficial.
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- **Units: Use entire bridge, LF, SF. No time units or cubic units.**
- **Matrix holds interest to view others experiences and best practices.**
- **How do we utilize this information to propose changes in practices to upper management?**
- **Expand the matrix to local system bridge types (timber, corrugated pipe, etc.) This would assist in the lack of existing performance measures at their level.**
- **Existing performance measures are largely based on experience and personal judgment. In some cases nothing written down or programmed.**
- **Addition of specs to the matrix would put best practices in perspective. (An overlay can encompass many different approaches, what is included in the cost? What are the ex pectations?**

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

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**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

**Discussion Highlights (note main discussion items)**

- All are done by all states. None to add to lists but...
- Slope protection, approach pavement relief joints; not cyclical but rather are condition based activities
- Clean and Flush Decks Only done routinely by one state (SD and is done by maintenance forces, so no unit price applies)
- Seal Expansion joints by LF for all of KY, SD, NE (cleaning done to some extent, by maintenance forces)
- Suggest separating cleaning joints from sealing joints
- Drains only by Maintenance forces usually condition based
- Minor concrete patches are not cyclical
- ND floods decks cyclically with Silanes
- Weren't most of these topics in the questionnaire?
- Coat concrete barrier: area
- Discussion of place of concrete sealers Rep from Surtreat Tony suggests sealing deteriorated concreted can damage it... see his booth
- App slab ovly: SF
- Overhang repair: SF
- Patching with HMA overlay: should say Apply HMA overlay

**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- Didn't get to this
- General agreement about the need for proactive early preservation measures

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- Would like to have a clearing house for concrete sealant information and testing data with independent DOT administered testing to determine best sealer for bridges in various conditions.
- Similarly would like guidance on joint seal performance for various situations

**Discussion Highlights (note main discussion items)**

- How this relates to the Local Roads System. The Local Units may have different priorities and capabilities.
- Vegetation removal needs to be considered in the actions. vegetation around substructure.
- Flushing and cleaning are two separate activities. Sweeping could also be an additional action deck
- At the local level limited staff limits what activities you can get involved with.
- What do need to do with sub-standard rails when we are doing other PM activities.
- Slope paving repair not really a deck related item. Need clarification.
- Rehabilitation not a separate item
- Units.....
- Clean and flush should be reported as an area to have value for future planning of cost.
- The units of measurement appear to reflect the contracting mechanism (Let or negotiated) contract. Again, units of area would be helpful for future planning and estimating cost.
- Tracking of cost done by internal forces is difficult on a unit basis (foot of crack filing).
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**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- Vegetation removal will be both mechanical and chemical.
- Performance measure for deck activities

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

- Need to get a unit cost for items that are done by internal forces. Need to translate from hourly or lump sum cost to a unit cost (LF/SF/Ton/Other)
- Standardize Units of measure
- Performance measure of doing the activity and how well that activity results in good performance over time. (if you patch a deck, how long should it last)
- Standard terms for similar actions between states. (Crack Chaser and other)
- Development of a preservation policy that states could draw on for some level of consistency and allows some level of modification to allow for regional unique aspects
- Research – more coordinated pooled fund research. This could include testing of new products or practices.
- Identify most cost effective best practices and enough detail to illustrative why it is the most cost effective.

**Group number: 13**

**Discussion topic:**

**Discussion Highlights (note main items)**

- Ease of use of matrix. Visual/map based interface of preservation activity
- Who's doing what and why and theory behind
- Matrix will be expanded if deemed on right track
- Expand matrix to substructure – timber piling (local bridge owners)
- Costs – include materials only or materials and traffic control, etc.
- Environmental restrictions on deck washing
- Performances measures – need to show improvement in the systems with documented preservation activities – accurate maintenance costs
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**Notable Practices (Note practices, strategies, policies, products, etc that are working well)**

- Epoxy injection of bridge deck pcc overlays
- Expansion joint – systematic replacement of glands

**Action Items (Note recommendations for research, leadership, communication, facilitation, technical assistance, etc)**

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