

Peer Exchange Report Out: Deck Preservation



**Southeast Bridge
Preservation Conference
Norfolk, Virginia
2013**

Deck Preservation Issues - Group 1

- Many southern states do not wash bridges – ones without salting issues
- Issues with drainage of decks
- Bridge deck problems resulting from concrete mixes
- Many of the southern states use bare concrete decks
- Thin epoxy overlay used when needed
- GPR, chain drag, and cores used to evaluate the level of deterioration
- Appears that deck thickness is one of the biggest contributor to deck durability
- Pourable silicon joints used for many of the smaller joints
- High performance concrete (low permeability) used to help ensure durable bridge decks
- Jointless bridges seem to work on the shorter bridges
- Important for maintenance personnel to provide feedback to design side
- Use of in-house forces can allow for experimentation of maintenance products
- Important for field experience to find its way into the specifications and product use
- Useful to have a resource that gathers experience of others on products and actions that are successful

Discussion Highlights (note main discussion items)

- Overlays – VDOT: some ahead of time, others because of deterioration of deck
- Jointless Bridge
- Has brining affected the chloride levels in decks – pretreatment is increasing chloride levels.
- Bridge washing – environmental issues associated with practice
- Environmental Issues Limiting Work – Peregrine falcons, bats, mussels, eagles
- Pretreating of Bridge Decks – Brining increases chloride levels

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

- Thin epoxy overlay
- Crack Sealing – while deck is a 7 or so (WVDOH)
- LDOTD does not salt roads as much – not same issue
- Aggressive practice in NY to wash decks; very restrictive in southern states
- WVDOH – innovative; use firefighters to help wash bridges...paid by DOT...
- Need to verify chloride content in water being used to wash
- VDOT Staunton washing concrete decks annually
- NHCRP guideline saying bridges are washed every year
- VDOT Staunton – 2,000 LF jointless bridge, 11 spans
- Virginia Abutment – Double backwall system; finger joint pushed between two backwalls and protects ends of beams.

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

- Non-corrosive deicing chemicals
- Lessen restrictions of environmental permitting process and recurring maintenance activities

Discussion Highlights (note main discussion items)

- Deck Joints
- Deck Washing/Cleaning
- Deck Seals and overlays
- Crack Sealing
- Specifications for overlays

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

- FL tries to stay with smaller joints. Problems with larger/modular joints typically construction practices.
- Larger joints in NY seem to last longer potentially due to specs?
- Cost vs. longevity of those joints is a concern.
- Design life is a consideration.
- GA notices installation problems initially and overall seems to be a construction problem in many places.
- Cleaning practices vary between owners and even local areas within states. Total structure cleaning has benefits beyond deck washing only. Generally 1-4yrs depending upon superstructure type and cleanliness. RI has done a Cost Benefit analysis for bridge cleaning activity.
- CEI inspectors particularly with consultants, their skill sets can be limited.
- UT all decks get sealants initially approximately 1yr after completion. Also uses prefab elements making it more important.
- NC, FL, GA does little deck sealants. NC is starting to come around to similar thoughts as UT.
- VA does mostly epoxy overlays but does not start as soon as UT.
- FL EFLHD has specifications for cracking of decks.
- PR experiences similar problems but seems to have an issue about lack of maintenance.
- UT and VA has generic specs for overlays.
- Northeast BPP has good tools for decision matrixes for overlays.

Environmental considerations can vary between jurisdictions. WA did a study justifying benefits vs. environmental impacts.

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

- Better Installation-CEI training
- More Aggressive deck sealing depending upon environment
- Better construction specs and practices
- Joint replacement program, considering expected service life, being a part of maintenance program.

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

- Don't use many deicing salts
- Use polymer overlay that does a good job; expect 13-15 yrs worth of life
- Possibly use deck sealers to extend the life
- Add silica fume, it impacts load factor resistance design (LRFD)
- Fix everything on the bridge at one time (less disruption to traveling public)
- Use pre-stressed concrete, less steel these days
- Moving towards zone painting instead of painting an entire bridge. Element level data collection (under the new NBE's) will be helpful in making decisions moving forward.

Tennessee

- Use asphalt overlays with membranes
- PC overlays and thin overlays
- They do not use any penetrating sealer
- Jointless bridges as much as possible
- General thoughts:
- A number of states are evaluating whether to use crack sealings.
- Some use sealer initially, then apply overlay later. Typical life expectancy of sealer is 5-8 yrs.
- Avoid putting on overlay when concrete is already contaminated.

Answer to #4

- Lorella – Ideal situation is to seal the bridge right away. At 28 days, shrinkage can occur already. Keeps the chemical-carrying water out. But if you wait, the last thing you want to do is apply a barrier and lock everything inside. In that case you want to apply a sealer that is non-film forming.
- Lorella – siline is being used up north in Alberta, Canada with great success. 5 years is a conservative/realistic number... at the end of a 5 yr cycle, they clean and prep the bridge deck and do it again.
- Georgia – originally would seal decks after 2 yrs but re-evaluating that.

Answer to #5

- Georgia is cleaning their decks annually (in general)
- Georgia inspects every bridge in the state
- Working on statewide contract for each district, where a company can do this for each district
- Sweeping decks, cleaning joints is a practice that is favored
- Tennessee doesn't wash their decks

Answer to #6

- Georgia – state route conditions, keep them 7 or above; secondary state route, 6 or above; everything else, 5 or above. They are required to spread the money around extensively throughout the state.

Group number: 7

Discussion topic: Deck Preservation

Discussion Highlights (note main discussion items)

- PR, VA – Compression seals
- Surface Prep.
- Maintenance of joints is important
- Problem with jointless with temp changes
- Need to do maintenance in order to work properly
- Overlays – all used
- Good installation leads to better performance (polyester has design life of 30 years)
- Like bonding agents
- Flex matl over joints
- Deck patching - problems with difference in modulus
- Seal cracks only during major repairs
- 6 and above do PM
- Specs work well --overlay on PR
- State of the Practice of what is

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

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

Discussion Highlights (note main discussion items)

- Low bid method of delivery affects choice of short service life expansion joints.
- Bridge washing is effective. Is it more effective if a solvent or acid is used to attach chlorides on the decks.
- Scoping bridge maintenance is a variable practice.

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

- North Carolina does chloride profiles to screen candidates for deck overlays. Low chlorides at level of reinforcing are candidates for overlays
- VDOT is doing joint closures on every other joint on every deck overlay.

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

- Create a database of joint systems and repair materials that includes a history of performance and expected service life.
- Identify high value bridge assets for enhanced preventive maintenance.
- Bridge deck preservation scan of international practices.

Session One: Table 13: "Deck Preservation"

99% are concrete – no maintenance on joints
Single or double box culvert – scour issues
20 and 60 feet (max 120 ft

Worst first issue – from callers
Political Factor is more in county environment

Emerging tech – gunite - trend - pay attention
Check for Chlorides - Hydro Demolishing – VDOT – LADOTD – Porto Rico

No Joints – Remove Sliding Plates – Rehab

Deck Overlay

Little Deck Sealing

Structural Polymer Concrete

Issue - Cars - Burn on Shoulders – nowhere to exit

Water proof membranes

Cracks in the decks – Categorize?

Table 14			
Alabama	No program in southern districts. Northern districts do perform periodically	Uses 2-part epoxy seal and applies asphalt overlay. Meanwhile, tries to stay away from asphalt overlays.	
Tennessee	No routine program	Delamination repairs done by hydro-demolition, patching, and then apply asphalt as well as epoxy and LMC overlays	Department wants to be the one that writes and controls specifications
VDOT	Program exists, used periodically depending on priority of need.		
All Others	A lot of states do wash scuppers, vacuuming joints.		Specs aren't clear, well defined. Need this to be able to entertain
			Technical specifications and
			Education needs to be available/shared with sister states. E.g. FL experienced significant corrosion problem with substructure
			In N.C., uses deck evaluation to determine type of work. Uses hydro-demolition
			TSP2 should also include something like web-based FAQ where other states can search and apply similar solutions. Challenges include each state wanting to do their own testing/research/etc. Need to identify "experts" or "Go to Guys/Gals" to help standardize solutions and share experiences and best practices.
			Need to incorporate models that project life cycle cost for repair strategies to help establish
			Implement situations where normal (NBI) inspections could also include inspectors performing a number of minimal repair actions like tightening bolts, cleaning