SESSION 5.3

Thin Polymer Overlay on the Dunn Memorial Bridge Pedestrian Ramp

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Synopsis:

This fall, Region 1 Bridge Maintenance repaired the wearing surface and waterproofed the deck of the pedestrian ramp of the Dunn Memorial Bridge in downtown Albany. The 528’ structure serves pedestrians that walk between Rensselaer and Albany. The ramp is maintained all year and is salted heavily in the winter. This had accelerated general deterioration of the deck to such a point that the wearing surface was rated a ‘3’ in the 2003 Biennial inspection and the Department had received numerous complaints about the condition of the ramp.

Bridge Maintenance patched the deck with a fast cure Portland Cement patch material. The deck was then “shot-blasted”, swept clean and covered with a thin (¼”) epoxy overlay. This overlay waterproofed the deck and provided a uniform, high friction wearing surface. Placement of the overlay took approximately 5 hours.

This presentation will cover the processes involved in deck preparation and the actual placement of the epoxy overlay.

About the Presenter:

Doug Rose has a Bachelor's degree in Civil Engineering from Worcester Polytechnic Institute and has been with NYSDOT since 1985. He currently is the Regional Bridge Maintenance Engineer for Region 1 in Schenectady. He is responsible for the Bridge Maintenance Program for the 835 NYSDOT-maintained bridges in Region 1. NYSDOT bridge maintenance work is performed by 6 crews located in 5 facilities across the Region. Prior to coming to Bridge Maintenance, Doug was the Structures Engineer and Bridge Management Engineer in two NYSDOT Regions.
Taking the Edge Off with Chip Seal

Douglas F. Rose, P.E.
Regional Bridge Maintenance Engineer
NYSDOT Region One
Not your father’s seal!
Chip Seal Treatment of Dunn Memorial Bridge Pedestrian Ramp

- City of Albany
- 6 Spans, 537’ total length
- 8’-0” Curb to curb
- 10% Grade
- Surprisingly high volume of commuter traffic
- Heavily salted in winter
Dunn Memorial Bridge
Existing Condition of the Ramp Wearing Surface

- Deck of lower 4 spans in bad condition
- Wearing Surface rated 5-5-3-3-3-4, 2003 Inspection
- Numerous complaints from customers
Numerous potholes throughout
Wearing Surface 2001
Deterioration to top steel in many locations
Issues at hand

• Wearing surface in unacceptable condition
• Sounding of deck and cores reveal most of cover is delaminated
• Can’t afford to completely replace deck
• Need to maintain pedestrian access across the river
Game Plan

- Apply ¼” polysulfide epoxy “Chip Seal” to deck

- **Benefits**
  - Cheap (Approx. $1.00 s.f.)
  - No special equipment required
  - Restores wearing surface
  - Fast cure
  - Slow down deterioration by keeping water and additional chlorides off of deck
  - Gave crew practice off of the road
Repair Procedure

1) Patch potholes
   1) Saw cut around holes and remove excessively deteriorated concrete
   2) Sand blast bars where possible
   3) Clean out hole
   4) Fill with fast curing concrete mortar

2) Clean remainder of deck
   1) Ride-on Shotblaster
   3) Apply “Chip Seal”
M&PT Requirements

• Ramp had to stay open for “Commuters”
  - Closed ramp between 9:00 and 3:00 daily

• Could close for longer duration on weekend
  - Closed ramp for the day on a Saturday to apply the “Chip Seal”

• Notified customers of work one week in advance, using VMS’s on each end of the bridge
Patching Holes

• Saw cut and remove bad stuff
• Cleaned up and ready to fill
Quick set mortar

• Used ThoRoc 10-60 Rapid Mortar
• One-component shrinkage-compensated rapid-setting cement-based mortar
• Portland cement based patch important as “Chip Seal” doesn’t bond to Magnesium Phosphate based products
Quick set mortar (cont’d)

- Open to traffic in 1 hour
- Easy to handle 50 lb. bags
- 60 bags/pallet
- www.DegussaBuildingSystems.com
- Local supplier: A.H. Harris & Sons
Getting there is half the fun!
- Good as in 1972!
- 330 bags
- $15.00 per bag
Deck cleaning

• Shot blast deck
  - Nelson Construction, Inc.
  - (405)495-9797

• Blow clean
  - Compressors must have an oil trap
  - Gas powered leaf blowers need to be checked for air intake proximity to exhaust
  - Electric leaf blowers work well

• “Clean as a Texas Longhorn?”
ONLY IN TEXAS!
“Chip Seal”

- T-48 Chip Seal
  - Transpo Industries, Inc.
  - www.transpo.com

- Two-component polysulfide epoxy based blended sealer and broadcast aggregate system

- Impervious system

- ¼” thick

- Less than 2.0 lbs/sf dead load
Surface preparation

- Clean and free of all dirt, grease, rust and other contaminants
- Ambient and deck temperature between 50 and 100 °F
- **DRY** - “Epoxy don’t do water”
  - Can’t have rained within 24 hours
• Drive off dew
Mix Resin

- Two components (A and B)
- Mix A and B in 2:1 ratio by volume
- 2-3 minutes using low speed drill
- “A” in 55 gallon drum
- “B” in 5 gallon pails
- For large applications, buy several new pails and calibrate them with permanent marker
• Note the guy with the "yellow" hat
Spreading the epoxy

- Best spread with squeegee
  - Reduces introduction of air bubbles
- Notched squeegee used for level surfaces
  - We used flat squeegee to work the epoxy up the grade
- Time is of the essence
  - 15 minute pot life
Broadcast Aggregate

• Applied within 15 minutes
• Basalt or other similar material
• Applied without damaging the overlay
  - Raised platform
  - “Super spikes”
Production rate

- 85 gallons of epoxy
- 3300 square feet took 4 hours
- Ramp opened after 4 hour cure
- Material Cost - $3200.00
Final product
Price for Total Project

- Patching: 5150.00
- Cleaning: 1500.00
- Overlay: 3200.00
- Total: $9850.00