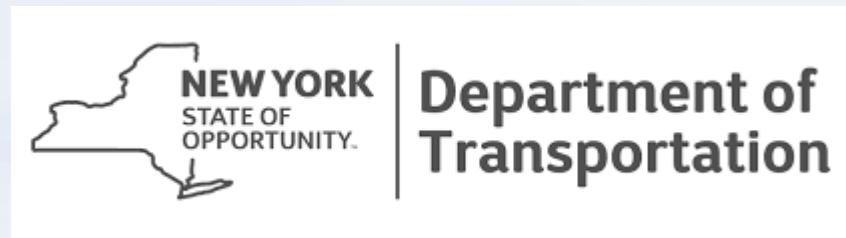


Bridge Overlay Use at NYSDOT for Bridge Deck Life Extension

Harry L. White 2nd

Director - Structure Policy and Innovation Bureau



Hierarchy of Actions in Golf

- Don't drive if you can use an iron
- Don't use an iron if you can use a wedge
- Don't use a wedge if you can use a putter
- Don't use a putter if you can pick it up.

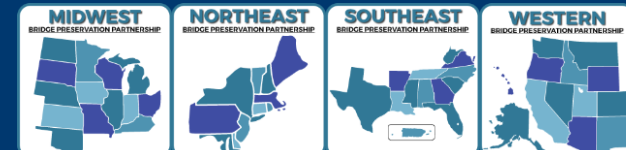


Hierarchy of Actions in Bridges

- Don't replace if you can rehabilitate
- Don't rehabilitate if you can repair
- Don't repair if you can paint
- Don't paint if its too late - wait



Concrete Overlays



Latex Modified Concrete



Latex Modified Concrete

- Increased durability
- Resistance to permeation
- Lower maintenance
- Lower total costs compared to repair alternatives

Micro-Silica Concrete

- Contributes to strength and durability two ways:
 - As a pozzolan, microsilica provides a more uniform distribution and a greater volume of hydration products.
 - As a filler, microsilica decreases the average size of pores in the cement paste.

DP Concrete

- Homogeneous Mixture:
 - Cement
 - Fly Ash
 - Microsilica Admixture
 - Fine/Coarse Aggregate
 - Air Entraining Agent
 - Set retarding water reducing admixture
 - Water

Concrete Overlays

- Minimum 1.5 in. thickness
- Maximum 5 in. thickness
- Lifespan Approx. 18 years
 - Good Installation – 35+
 - Poor Installation – 10+
- Cure = 5-7 days
- Quantity Removed = Quantity Replaced

Thin Polymer Overlay

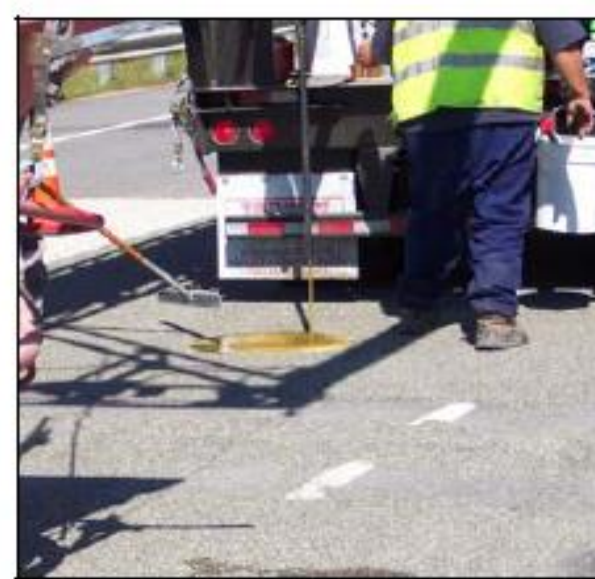
- Minimum $\frac{3}{8}$ in. thickness
- Lifespan Approx. 15 years
- Cure <1 day
- Quantity Removed = Quantity Replaced



Onboard computerized blending system on Polycarb's truck.



Side view of Polycarb's truck (note resin and catalyst storage tank).



Beginning the epoxy "pour."



Crew uses squeegee and roller to distribute product across deck.



Aggregate is carried from hopper by conveyor and distributed over the epoxy.



Material is disbursed by hand to areas where epoxy comes through.





Polyester Polymer Concrete (PPC)



Polyester Polymer Concrete (PPC)

- Polyester Resin
- Natural Aggregate
- Bond Exceeds Concrete Pull-Off
- Milling of Existing Deck (No Hydro-Demo Req.)
- 5,000 PSI Compressive Strength
- Can be Used for Repairs

Polyester Polymer Concrete (PPC)

- Minimum $\frac{3}{4}$ in. thickness
- Lifespan Approx. 30 years
- Cure = <4 hours
- Quantity Removed = Quantity Replaced or Additional Thickness

Hybrid Composite Synthetic Concrete (HCSC)



Hybrid Composite Synthetic Concrete (HCSC)

- Polyester Resin
- Natural Aggregate
- Fibers
- Bond Exceeds Concrete Pull-Off
- Milling of Existing Deck (No Hydro-Demo Required)
- 10,000 PSI Compressive Strength
- Can be Used for Repairs

Hybrid Composite Synthetic Concrete (HCSC)

- Minimum $\frac{3}{4}$ in. thickness
- Lifespan Approx. 30+ years
- Cure <4 hours
- Quantity Removed = Quantity Replaced or Additional Thickness

Asphalt and Membrane

- Minimum 2¹/₂ in. rolled thickness
- Lifespan Approx. 8-12 years
- Additional Thickness



Roll-On Membranes



Roll-On Membranes

Torch Applied



Spray Applied



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Spray Applied



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Waterproofing Membranes

- Minimum Thickness Required
 - Internal Strength
 - Shoving Resistance
 - Pop-Off Resistance
- Must Span Over Working Cracks
- Vulnerable to Sharp Corners/Edges
- Must Not 'Pool' Water Below the Asphalt
- May Not be Placed over New Concrete
 - Hot Asphalt Causes 'Steam' and Debonds the Membrane







WBDO Asphalt Overlay

Waterproof Asphalt (WBDO)

- Minimum 1¹/₂ in. rolled thickness
- Lifespan Approx. 15-20 years*
- Additional Thickness
- \$5/SF (Approximate)

* Estimated

Ultra-High Performance Concrete (UHPC)



Ultra-High Performance Concrete (UHPC)

- “Particle Packing” Very Dense Concrete Mix
- High Strength Steel Fibers
- Bond to Existing Concrete is Excellent
- Hydro-Demo Req.
- 18,000 PSI Final Compressive Strength
 - 12,000 PSI to open to traffic
- Can be Used for Repairs – But Expensive!

Ultra-High Performance Concrete (UHPC)

- Minimum 1¹/₂ in. thickness
- Lifespan Approx. 35+ years
- Cure = 3 days
- Quantity Removed = Quantity Replaced or Additional Thickness











04/07/2020

What to do here?

It Depends!



Remember!!!!

- Quality Overlays REQUIRE:
 - Solid Substrate
 - Proper Surface Prep
 - Proper Construction Techniques
- Every Element is CRITICAL:
 - Shortened Lifespan
 - Wasted Money
 - Wasted Time
 - Increased Traffic

Thank You for Your Attention!

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NYSDOT

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Department of
Transportation