

BRIDGE DECK PRESERVATION PRODUCT MATRIX

Michael B. Johnson P.E.

Western Bridge Preservation Partnership Meeting

Portland Oregon

May 2015

Project Contributors

- Mike Gehring - ODOT
- Josh Sletten – UDOT
- Mike Johnson – Caltrans
- Todd Fraker – Dayton
- Sheila Cherry – Kwikbond
- Dick Dunne – Michael Baker
- Quinn McGuire – Euclid
- Steve Frank – E-Bond
- James High – E-Chem
- Doug Gray – BASF
- Atiq Alvi – TY Lin
- Gregg Freeman - Kwikbond
- Eric Hill – Amer. Concrete Cutting
- Debbie Steiger – BASF
- Mike Stenko – Transpo
- Mike Geist – Polycarb
- Ed Nagle – Nagel and Assoc.
- Brad Kamin – Sika
- David Minor – Dayton
- Scott Issac – Sika
- Drew Storey - Indiana

Project Objectives

- Identify the common field conditions that may require deck preservation treatments.
- Poll the WBPP States to see what products were being used.
- Identify key attributes for each treatment
- Develop product matrices that could be used by the States to select appropriate products.

Deck Seal Product Manufactures used by WBPP States

- Liquid Concrete
- Euclid
- Sika
- Transpo
- E-Bond
- Dayton Superior
- Kwikbond Polymers
- E-Chem
- Polycarb
- Unitex

Seal Selection Considerations

- How wide are my cracks?
- How much crack penetration is expected?
- How quickly do I need to restore traffic?
- What deck preparation is required?
- Is the product sensitive to moisture?
- Do I need strength or stiffness gains?
- How long will the treatment last?
- How much will it cost?

Deck Seal Attributes Collected

- Cost
- Expected Life
- Viscosity
- Time to Traffic
- Cold Weather Application
- Moisture Insensitivity
- Modulus
- Bond Strength

Deck Seal Key Attributes

- Viscosity - Lower viscosity products may be able to penetrate finer cracks.
- Gel Time – How long will the product have to penetrate into the crack before it sets.
- Bond Strength – capacity across the product concrete interface.
- Modulus of Elasticity

Deck Seal Product Matrix

Available at
www.tsp2.org

Western Bridge Preservation Partnership



Bridge Deck Seal Product Matrix

March 2014

Deck Seal Matrix Components

- Recommended deck preparation
- Recommended mixing and application methods.
- Recommended application rates
- Listing of attributes for 20 deck seal products
- Detailed description of attribute criteria
- Links to product web pages
- Manufacturer contact name and contact info

Deck Prep Best Practices

Recommended Deck Preparation and Sealer Application Procedure

Deck preparation is a critically important step in the proper application of bridge deck sealers. The following recommended best practices for bridge deck preparation and application of bridge deck crack sealers will help ensure a quality end product:

1. Clean surface by shot-blasting to remove all contaminants and open surface and cracks. Remove dust and debris by blowing off with oil-free compressed air.
 - a. If excessive debris exists on deck surface remove with broom, compressed air or similar prior to shot-blasting.
 - b. Remove excess debris in a way as to not impact or drive existing debris deeper into cracks.
 - c. Larger cracks or heavily impacted cracks may benefit from vacuuming.
 - d. Surfaces should not be overly prepared, the idea is to expose and open existing surface cracks and create a porous surface that can accept the sealer.
 - e. If open to traffic time is an important element of the installation, consider utilizing larger more efficient blasting equipment or numerous machines.

2. Mechanically mix components by volume per the manufacturer's recommendations with Jiffy type mixer and low-speed variable drill at 300 rpm for a minimum of 2-5 minutes, depending on product. Mix only the quantity that can be used within its gel time.
 - a. Some sealers have longer gel times in mass than others; consult with the manufacturer for the thin film set time versus pot life of product. The gel time will vary as ambient temperatures change.

Application Guidance

Recommended Application Rates

Recommended Minimum Coverage Rates		
Deck Finish	Sealer Rate	Aggregate Rate
Tined	1 gal./ 60-100 sq. ft.	4-8 lbs./ sq. yd. (5.4 kg/m ²)
Smooth	1 gal. / 150-200 sq. ft	4-8 lbs./ sq. yd. (7.6 kg/m ²)

Deck Seal Matrix Sample

Bridge Deck Crack Sealing Products	Cost Range (\$/sq ft)	Self Reported Expected Life (Years)	Viscosity (low, Super low)	Set Time (Time to Traffic) (E,G,F, P)
Liquid Concrete Ure-Kote R-60	0.65 - 0.92 Sq ft	15	15 cps	20 minutes
Euclid Chemical Company Dural 335	\$.54 Sq ft	3-5	90 cps	3-5 hours
Euclid Chemical Company Dural 50 LM	\$.54 Sq ft	3-5	90 cps	3-5 hours
Sika Corporation - Sikadur 55 SLV	\$.75 - \$1.00 Sq ft	10	105 cps	6 hours
Transpo Sealate T-Sealate T70-MX30 HMWM	\$1.00-2.00 Sq Ft	10	25	6 hours
Transpo T-78 MMA	\$1.00-2.00 Sq Ft	10	10	1 hour
Transpo Sealate T-70	\$1.00-2.00 Sq Ft	10	25	5 hours
E-Bond 310 Penetrating Concrete Flood coat Sealer	\$.10-\$.19 Sq ft	Unknown	66 cps	4 hours
E-Bond 523 Penetrating Sealer - Crack Healer Epoxy Primer	\$.017-0.34 Sq ft	Unknown	92 cps	5.5 hours
E-Bond 120 Epoxy Penetrating Sealer for Concrete Surfaces	\$.10-\$.19 Sq ft	Unknown	48 cps	4.5 hours
Unitex Pro Poxy Bridge Seal 75%	\$.029 -0.45 Sq Ft	5-7	40 cps	4 hours
Unitex Pro-Poxy 40 LV LM	\$.029 -0.45 Sq Ft	5-7	85 cps	4 hours

Deck Seal Matrix Sample

Increased Structural Stiffness (E,G,F,P)	Crack Penetration (E,G,F, P)	Freeze/Thaw Durability (E,G,F, P)	Permeability Reduction (E,G,F, P)	Western Rep Name	Product Website	Rep email	Rep Phone #
Poor	Excellent	Excellent	NA	KC	http://www.liquidconcrete.com/downloads/product-data-sheets/	kcs@liquidconcrete.com	206-321-0702
Good	Good	Good	NA	Quinn McGuire	http://www.euclidchemical.com/files/share/ProductFiles/techdata/dural_335.pdf	QMcGuire@euclidchemical.com	760-994-9445
Poor	Good	Good	NA	Quinn McGuire	http://www.euclidchemical.com/files/share/ProductFiles/techdata/Dural_50_LM.pdf	QMcGuire@euclidchemical.com	760-994-9445
Poor	Fair	Fair	NA	Brad Kamin	http://usa.sika.com/en/solutions_products/download/doc_download/iframe_and_dropdown/sikadur-pds.html	kamin.brad@us.sika.com	510-701-7198
Poor	Excellent	Excellent	NA	Mike Stenko	http://www.transpo.com/T-70.html	mstenko@transpo.com	914-636-1000
Excellent	Excellent	Excellent	NA	Mike Stenko	http://www.transpo.com/T-78.html	mstenko@transpo.com	914-636-1000
Excellent	Excellent	Excellent	NA	Mike Stenko	http://www.transpo.com/T-70.html	mstenko@transpo.com	914-636-1000
Poor	Good	Good	NA	Steve Frank		stevepolymerdek@sbcglobal.net	858-442-8185
Poor	Good	Good	NA	Steve Frank		stevepolymerdek@sbcglobal.net	858-442-8185
Poor	Good	Good	NA	Steve Frank		stevepolymerdek@sbcglobal.net	858-442-8185
Poor	Good	Good	NA	Todd Fraker	http://www.daytonsuperior.com/Artifacts/Unitex%20Bridge%20Seal.pdf	toddfraker@daytonsuperior.c	888-977-9600

Deck Overlay Product Matrix

Available at
www.tsp2.org

Western Bridge Preservation Partnership



Bridge Deck Overlay Product Matrix

2014

Overlay Matrix Sample

	Typical Thickness Range Min - Max (in)	Min Ambient Temp at Application (F)	Max Ambient Temp at Application (F)	Moisture Insensitive at Application	Time required from placement to traffic (hrs @ min temp)	Time required from placement to traffic (hrs @ +/- 70°F)	Expected Life (years)	Cost Range, Furnished and placed (\$/sq ft)	Compressive Strength @ 24 hrs (ASTM C579) (psi)	Tensile Strength (psi)
Kwikbond Polyester Polymer Concrete 1121	0.75-12	40 substrate	100 substrate	dry	2hrs	2	30	\$8-12	7000 composite	3900 composite
Kwikbond Polyester Polymer Concrete 1121 - MM	0.75-13	40 substrate	100 substrate	dry	2hrs	2	30	\$8-12	7000 composite	3900 composite
Kwikbond PPC - MLS	.375	40 substrate	100 substrate	dry	2hrs	2	8 to 15	\$5	>5000	3,900
Poly-Carb Mark 163 - Flexogrid	0.25 - 0.388	50	120	Fair	6-7	6	10-15	\$5-7	7000	> 2500
Poly-Carb Mark 163 FC - Fast Cure	0.25 - 0.388	40	90	Good	4	2-3	10-15	\$5.50-7.50	8000	> 2500
Poly-Carb Mark 154	0.25 - 0.388	40	120	Good	4-5	3	5-7	\$3-5	5500	> 2700
Poly-Carb Mark 154 Safe-T-Grid	.25	40	120	Good	4-5	3	5-7	\$2-3	5500	> 2700

Overlay Matrix Sample

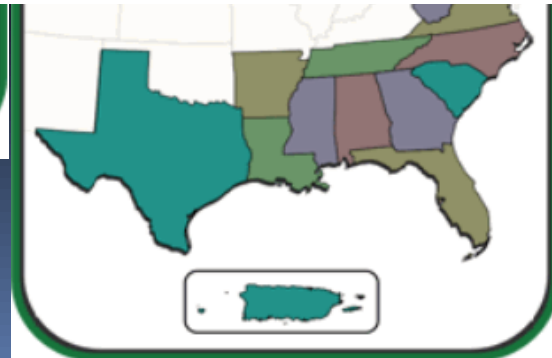
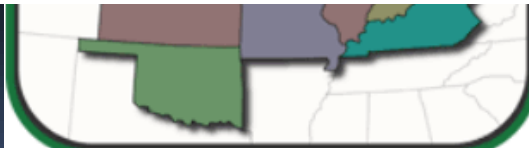
Expected Life (years)	Cost Range, Furnished and placed (\$/sq ft)	Compressive Strength @ 24 hrs (ASTM C579) (psi)	Tensile Strength (psi)	Bond Strength (psi)	Elongation at Break (ASTM D638) (%)	Permeability	Western Rep Name	Product Website
8 to 15	\$5	>5000	3,900	>300	35	<100 coulombs	Gregg Freeman	http://www.plycarb.com/content/uploads/2013/08/MLS.pdf
10-15	\$5-7	7000	> 2500	>250	35	No permeability	Mike Geist	http://www.plycarb.com/products/details
10-15	\$5.50-7.50	8000	> 2500	>250	35	No permeability	Mike Geist	http://www.plycarb.com/products/details
5-7	\$3-5	5500	> 2700	>250	50	No permeability	Mike Geist	http://www.plycarb.com/products/details
5-7	\$2-3	5500	> 2700	>250	50	No permeability	Mike Geist	http://www.plycarb.com/products/details
5- 10 years	\$3.50-\$4.50	5500	6525 psi	>536	30	No permeability	Doug Gray	http://construction.basf.com/infrastructure_products/dges&select=565&sort=A

Going Nationwide



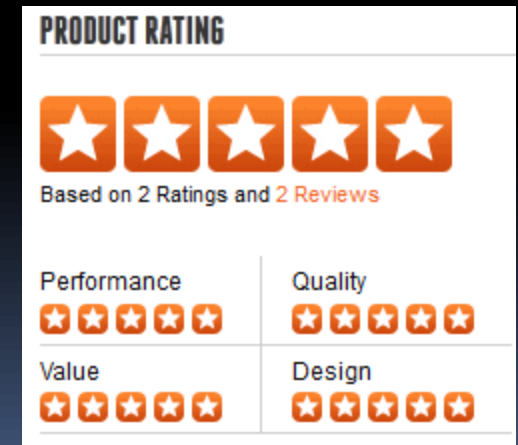
*Proposal for A Nationwide Pilot to
Develop a Product and Technology
Database and Web Based Software*

Submitted by: The National Bridge Deck Preservation Working Group



Pilot Project Proposal

- Dynamic Web Database
 - Bridge Deck Products
 - Expandable to Other Products and Tools
- Product Information Source
 - Available Products
 - Sharing of Specifications
 - Sharing of photos/video
 - Industry product information
 - User reviews of products



Next Steps

- Gain Nation TSP₂ Support
- Solicit Support from Regional Partnerships
- Solicit Support of SCOBS and SCOM
- Solicit FHWA Support
- Build the Database and Web Software