Bridge Deck Preservation

Jim Lippert
Crafco, Inc.
Agenda

- Definition of Bridge Preservation
- Current State of the State of Indiana bridges
- Causes of Deterioration
- Discuss materials and methods to economically extend service life and load rating of bridges
  - Usage, features, and benefits of these methods
    - Waterproofing Membranes
    - Patching
    - Asphaltec Plug Joints
Bridge Preservation Definition

• “Actions or strategies that prevent, delay or reduce deterioration of bridges or bridge elements…….” Source: FHWA BPETG
Indiana bridges

• There are more than 18,900 bridges in Indiana of which INDOT maintains 5,600 with a total surface area of 50,000,000 SF.

• Each bridge has on average of 10,000 elements.
Causes of Deterioration

- Moisture
- Chloride ion penetration
- Thermal-mechanical movements
- Loading
- Shrinkage & Flexure cracking
Causes of Deterioration

Liquid Calcium Chloride

Sodium Chloride
Causes

Loading
Shrinkage Cracking
Moisture
Thermo-Mechanical

Load

Crack

Crack
Corrosion Process

- Water
- Pavement Crack
- Seepage through porous concrete
- Rusting Rebar
- Foundation damage
Types of Deck Preservation

- Deck sealing & cleaning
- Crack repair

- OVERLAYS
- PATCHING
- JOINT REPLACEMENT
Areas of Preservation

Overlay’s
- Preformed Waterproofing Membrane w/asphalt concrete overlay
- PavePrep SA & TSA

Deck Patching
- Partial Depth Repairs
- HP Concrete Repair

Joint Replacement
- Asphalitic Plug Joint
- Matrix 501
Preformed Waterproofing Membranes
Preformed Waterproofing Membranes

Impermeable barrier (UMBRELLA) against moisture, chloride ions, and other chemicals.
Preformed Waterproofing Membranes
PavePrep SA & TSA

• Heavy Duty
• Flexible high density asphalt mastic
• Woven Polyester surface
• Self adhesive
Flexible Unroll/Position/Lap
Roll
Tack & Pave
INDOT Project B-35070-A
Structure: Arch bridge spanning White River
Location: Marion County-Indianapolis
B-35070-A
Product: PavePrep TSA
INDOT B-35070-A
General Contractor: Beaty Construction, Inc
Sub contractor: Ram Construction Services
Product: PavePrep TSA
District: Greenfield
Tippecanoe County
Contractor: Rieth-Riley Construction
Product: PavePrep SA
Tippecanoe County PavePrep SA
Warsaw, IN
Box Beam Bridge-PavePrep SA
Box Beam Bridge
Location: College Corner, IN
Product: PavePrep SA
Timber Bridge
Location: Marshall County
Product: PavePrep SA
Deck Patching
HP Concrete Repair

• Thermoplastic resin binder
• Fine aggregate chip
• Ideal for bridge deck patching
HP Concrete Repair

- Very adhesive
- Gray color
- No mixing
- Flexible
- Traffic on immediately
HP Concrete Install

[Images of concrete being installed]

Level
Level & Compact

CRAFCO INC
PRESERVATION PRODUCTS
Install

Compact

Open to Traffic
INDOT Bridge Deck approach HP Concrete Repair
INDOT I69 HP Concrete Repair
Crafco Matrix 501

Single-Component Asphaltic Plug Bridge Joint System
Asphaltic Plug Joint

What is it?

• Watertight bridge expansion joint system placed in the deck surfacing layer
• Blend of Polymer Modified Asphalt and select aggregate
• System consists of primer, bridging plates, mastic and cover aggregate
• ASTM Specification- D6297
Asphaltic Plug Joint

What is it?

- Wearing Surface (concrete or asphalt)
- Top Dressing of Matrix D Type Aggregate
- Sealed Expansion Gap
- Bridge Plate
- Matrix 501 Mastic
- Matrix 501 Adhesive Application
- Concrete Deck
- Approach Slab
- Backer Rod
Cutout Preparation

- Cutout must be level
- Cutout must be centered
Asphaltic Plug Joint

Seal and Bridge the Joint Expansion Gap / Seal the Blockout
Asphaltic Plug Joint
Asphaltic Plug Joint

Finish lift is leveled to pavement surface and allowed to cool.
Asphaltic Plug Joint

Finished Matrix
501 Joint is smooth and waterproof
# Bridges

## What system should be used?

### Bridge Deck Solutions

<table>
<thead>
<tr>
<th>No overlay Bare Deck</th>
<th>Overlay</th>
<th>&gt; 1.5&quot;</th>
<th>&gt; 2&quot;</th>
<th>May be open to traffic before overlay</th>
<th>Closed Deck</th>
<th>Light Duty (Damproofing)</th>
<th>Regular to Heavy Duty</th>
<th>Limited Rain</th>
<th>Smooth Deck</th>
<th>Cracks &gt; 1/8&quot;</th>
<th>Deck Irregularities</th>
<th>Spalling / Delamination</th>
<th>Joint Failure (w &lt; 1&quot; +/- movement)</th>
<th>Approach Issues / Header</th>
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**Note:** For limited materials, consult with manufacturer for specific applications and guidelines.
Bridge Preservation

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