A FLEXIBLE SOLUTION FOR PARTIAL DEPTH

REPAIRS

PICCP

Tim Morris Crafco Inc. SWIFT Conference Vancouver BC September 18, 2014

I Know You Have Days When You Think Everyone You Meet Is An Inspector



TOPICS

•Review current spall repair materials and methods- advantages / disadvantages

•Introduction Flexible PCCP Spall Repair Material

Review Installation

•Review Repair Candidates



As defined by the American Concrete Pavement Association;

"Patches for restoring localized areas of surface deterioration; Usually for compression spalling problems, severe scaling, or other surface problems that are within the upper one-third of the slab depth."



Types of damage appropriate for spall repair





DETERIORATED JOINTS









TRANSVERSE CRACKING

LONGITUDINAL CRACKING Swift 2014





D-CRACKING **Swift 2014**



POPOUTS



Partial Depth Spall Repair

Materials Currently Used Include; Concrete Repair Material, Portland Cement Based •Rapid Hardening Concrete Repair Material Cementitious / Non-cementitious •Class D Concrete Out of Truck •Hot Mix Asphalt



Considerations for Repair Material Selection;

Repair Material Properties
Climatic Conditions
Repair Time Frame
Expected Service Life
Cost

·LIKELYHOOD OF SUCCESS



REPAIR TIMEFRAME

3+ Days;

Class D Concrete out of truck

Overnight up to 24 hours;

Concrete Repair Material, Portland Cement Based

2-3 Hours;

Rapid Hardening Concrete Repair Material Pre-Asphalt Overlay or Very Old Pavement; Hot Mix Asphalt



Installation of Conventional Materials

Identification of repair area – sounding Pavement Preparation-

-Perimeter saw cutting -2" -4" depending on material selected

-Removal of concrete- uniform depth

- -Sand Blasting –drying/cleaning
- -Application of bonding agent / primer

Material Preparation-

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-Field blending- Per manufacturers Instructions -Extend with aggregate / water

-Mix multiple components

Install- Per Manufacturers Instructions

-Establish joints / cracks – seal after material sets / cures

CRAFCO INC

LIKELYHOOD OF SUCCESS

Most common causes of partial depth patch failure include; (FHWA Report No. FHWA-RD-99-152)

-Improper selection of repair materials.

-Lack of bond between patch and pavement. (Adhesive failure)

-Compression failure.(Loading of pavement by vehicle traffic)

-Variability of repair material. (QC/QA – Field blending)

-Improper use of repair materials.



LIKELYHOOD OF SUCCESS <u>Most common causes of partial depth patch failure include;</u> (FHWA Report No. FHWA-RD-99-152)

-Insufficient consolidation.

-Incompatible thermal expansion between the repair material and the original slab. (*differences in expansion/contraction coefficients*)

-Feathering of the repair material.

-Incompatibility between the joint bond breaker and the joint sealant material.



LIKELYHOOD OF SUCCESS





LIKELYHOOD OF SUCCESS







Sometimes You May Need to Change Directions







INCREASE LIKELYHOOD OF SUCCESS

FLEXIBLE PCCP SPALL REPAIR MATERIAL

Pre-blended Polymer Modified Resin extended with select aggregate
Flexible
Compressive Resistant
High Tensile Strength

- •Excellent Adhesion- PCCP and ACP
- •Fast Set time
- •Spans cracks and joints
- •Resistant to Deicing Chemicals
- •Waterproof
- Swift 2014





REPAIR CANDIDATES •CORNER BREAKS •POTHOLES •DETERIORATED JOINTS •LONGITUDINAL CRACKING •CENTER SLAB CRACKING •D CRACKING •POP-OUTS •DAMAGED JOINT HEADERS •SPALLS



INCREASE LIKELYHOOD OF SUCCESS FLEXIBLE PCCP SPALL REPAIR MATERIAL





EQUIPMENT- PATCHER-



Oil Jacketed Diesel Fired Horizontal Agitator Dual Thermostat Control



I Know You Have Days When You Think Everyone You Meet Is A Contractor





Repair area preparation similar to that for conventional materials



Sound and mark perimeter





Saw cut perimeter 2" min. depth Remove concrete to sound pavement Swift 2014









Abrasive Clean

Dry

Clean with hot compressed air (Heat Lance) Swift 2014 Apply primer Allow time to dry





Apply material to repair area

< 3" depth- 2 lifts

> 3" multiple 2"
lifts











Material is brought to within $1'' - \frac{1}{2}''$ of pavement surface





Final lift is ironed to grade.







Bauxite cover adds skid resistance, UV protection, aesthetic value

If specified- cover aggregate is broadcast on surface while material is still hot *Swift 2014*





When material cools excess aggregate is recovered and pavement is ready for traffic.

1 ¹/₂ - 3 hours depending upon depth and surface and air temperaturesSwift 2014





Sometimes You run into a Barrier









Cementitious Materials



Flexible materials can not be subjected to test methods of conventional materials. Their flexibility, low modulus, tensile strength and high adhesive characteristics require a shift in thinking















Applied on Rt 17 in Corning, NY in 2001. This picture taken 2010.
Repairs span cracks.
Repair functioning 100% adhesively and cohesively.
Repair remains waterproof.





Installed in upper repair in 2001. Picture taken June 2008. Lower patch originally repaired with Class D concrete. It has been removed and replaced with various materials at least 3 times since 2001. Currently maintained with HMA **CRAFCO**





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GATWICK















DULLES
Swift 2014











Colorado Springs Swift 2014

































LIKELYHOOD OF SUCCESS EXCELLENT

Prepackaged Flexible Highly adhesive Waterproof - resistant to deicing chemicals Compressive resistant Produces no compressive or tensile stress on surrounding pavement Spans cracks and joints



IF YOU DON'T MAKE THE RIGHT CHOICE CIRCUMSTANCES CAN OVERWHELM YOU





13 year old application. Guess where????







Repair of PCC Pavements Through Non-Conventional Flexible Materials

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QUESTIONSP



