Lessons Learned on Concrete Pavement Patching

Virginia Concrete Conference
March 9, 2012

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Patching Special Provision

Background

• Efforts began in early 1999
• Objective was to consolidate into a single spec and incorporate the state-of-the-practice
• An innovative warranty was incorporated to address opening to traffic issues
• An ongoing process to improve the spec and a new revision is expected this year
Patch Types

Jointed Concrete Pavement, Type I
One full lane, 6’ to 15’ in length, no mesh

Jointed Concrete Pavement, Type II
One full lane, greater than 15’ in length, with mesh

Jointed Concrete Pavement, Type III
Partial depth (not greater than 1/3 the slab thickness, not used at joints or cracks)

Continuously Reinforced Concrete Pavement, Type IV (full depth repairs)
Type IV-A, full lane width and not less than 6’ long
Type IV-B, partial lane width and not less than 6’ X 6’
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Type I and II Patches

- Saw cut full depth at perimeter
- Oversaw at corners to cut full depth
- Areas damaged during removal may require re-sawing
- Bond breaking material at longitudinal joint
- Eight dowels per joint
- Dowels installed with grout retention ring
- Fill joints around patch with silicone

LESSON: inspectors need to monitor damage to adjacent concrete and require correction if needed
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NOTE: If the length of patch is greater than 15 feet, re-establish joint in center of patch with the standard dowel basket and if the distance between remaining joints is greater than 15 feet, steel wire mesh shall be placed in a manner which will provide for a final location in the middle third of the slab thickness, maintaining a minimum of 2 inches of concrete cover.

FIGURE 1
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**TYPICAL TYPE I AND TYPE II PATCHES**

* Bond Breaker required at longitudinal joints for patches less than 15' (Type I)
* Longitudinal Tie Bars between adjacent lane required for patches greater than 15' (Type II)

**No. 5 Deformed Bars 30° Long, 30° C-C**

@ 1/4" x 1/8" Smooth Epoxy Coated Dowel Bars @ 12" C-C

**Patch**

**Typical Load Transfer Steel Layout for Patching Jointed Concrete Pavement**

**FIGURE 2**
Damage to Adjacent Pavement
Damage to Adjacent Pavement
Damage to Adjacent Pavement
Preparing Patch Area

Add and compact new base material if necessary
Use of vibratory plate compactors preferred
Drain rainwater as necessary
Remove & replace unsuitable material if necessary

**LESSON:** there clarification about what to do with significant base removal
Base Removal/Damage

![Base Removal/Damage Image]
Base Removal/Damage
Base Removal
Placement of Bond-Breaker
Placing Concrete

Distribute evenly
Avoid excessive shoveling
Vibrate uniformly
  Use vertical penetrations of vibrator
  Do not drag!!

LESSON: inspection is important to ensure proper placement & consolidation
Measurement & Payment

Patching Hydraulic Cement Concrete Pavement (Type and Original Thickness) Square Yard*

Aggregate 21A, 21B, etc. Ton

*SY price includes everything necessary to deliver the patch – complete in place

**LESSON:** without specifying the pavement thickness, the contractor cannot price the work (quantity of concrete, rebar size, etc.)
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Type IV Patches

- Type IV B (partial lane width) typically not installed
- Damaged edges will be repaired at Contractor’s expense
- Two-cuts each end of patch. Partial depth exterior cut, full depth interior cut
- Expose existing reinforcing steel – length of specified lap plus 2”
- Tie or weld in new reinforcing steel

**LESSON:** proper lap length and tying are important for good performance
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TYPICAL SECTION ELEVATION VIEW OF TYPE IV-A&B PATCHES

NOTE: Longitudinal Tie Bars Necessary for Patches Greater Than 15'.
   \[ T = \text{Pavement Thickness} \]

FIGURE 3
Final Lesson Learned

• We can’t possibly address all the situations encountered in the field
THANK YOU
Questions?