



Lessons Learned on Concrete Pavement Patching

Virginia Concrete Conference
March 9, 2012

Bob Long
Executive Director
ACPA Mid-Atlantic Chapter

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 $\frac{1}{3}$ 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'

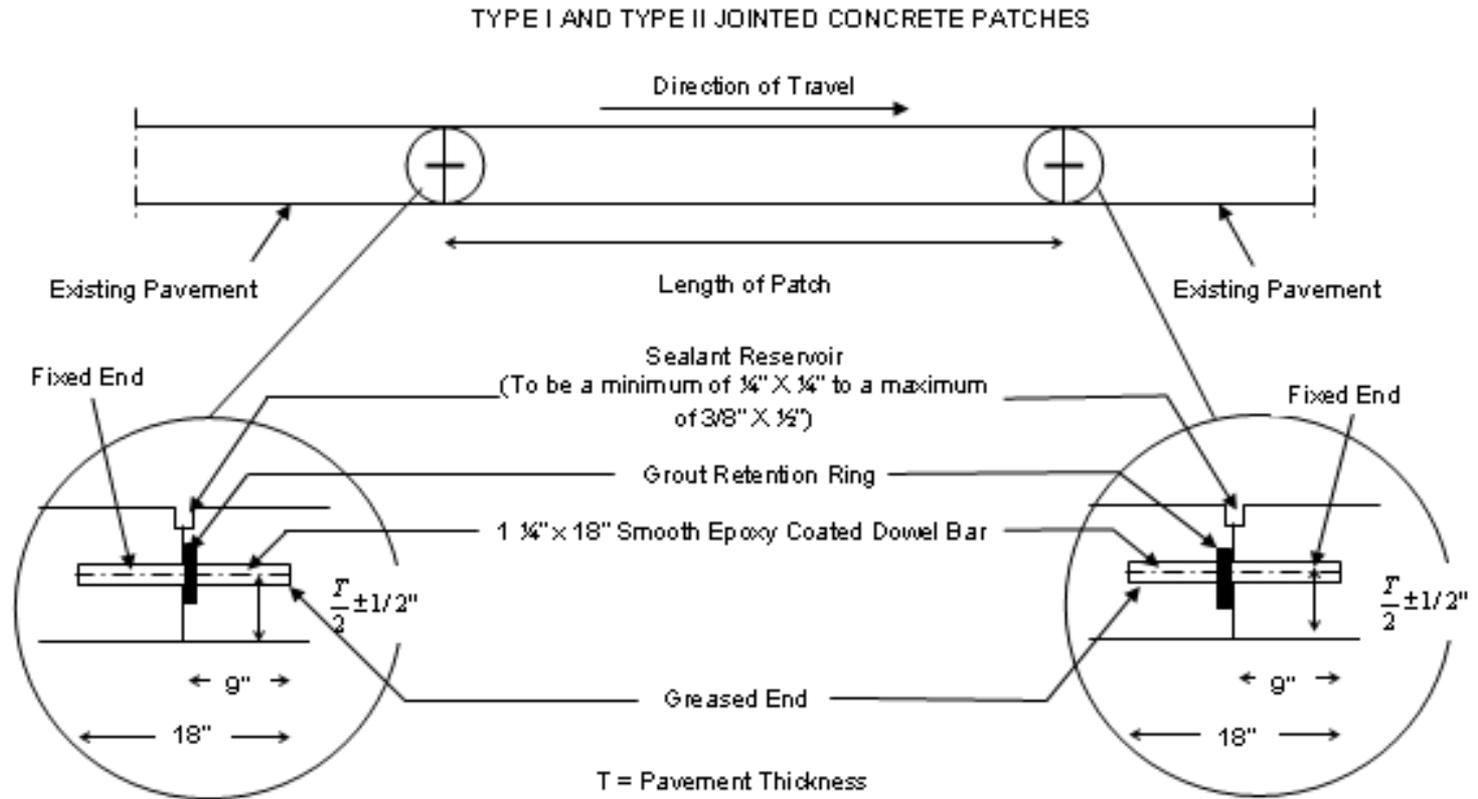
Concrete Patching Special Provision

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

Concrete Patching Special Provision

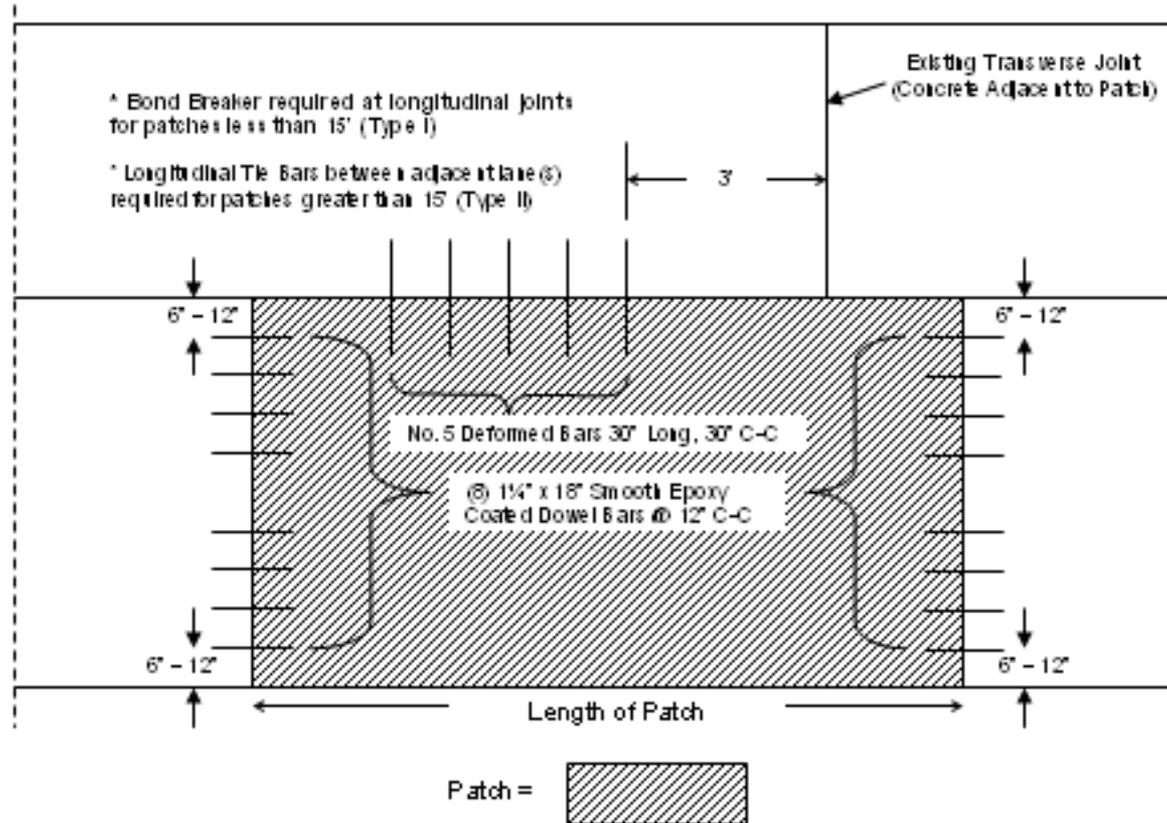


NOTE: If the length of patch is greater than 15 feet, re-establish joint in center of patch with the standard dowel basket and if the distance between remaining joints is greater than 15 feet, steel wire mesh shall be placed in a manner which will provide for a final location in the middle third of the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

FIGURE 1

Concrete Patching Special Provision

TYPICAL TYPE I AND TYPE II PATCHES



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



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.)

Concrete Patching Special Provision

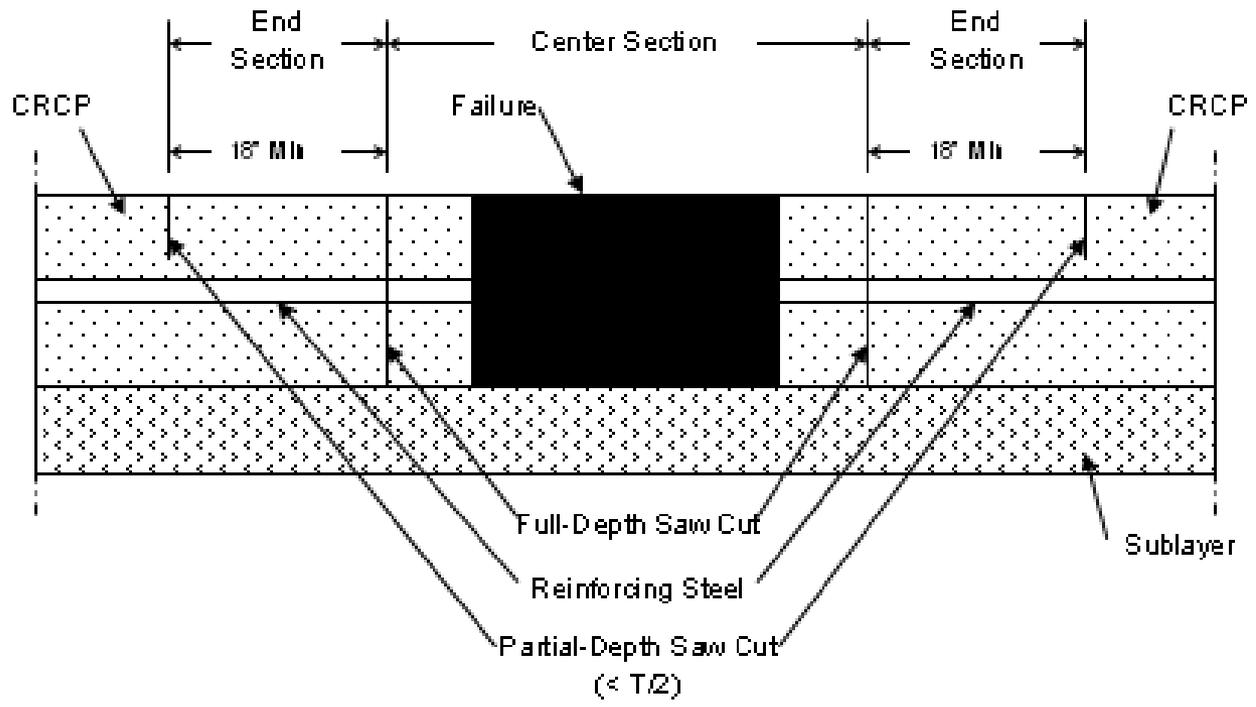
Type IV Patches

- 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

Concrete Patching Special Provision

TYPICAL SECTION ELEVATION VIEW OF TYPE IV-A&B PATCHES



NOTE: Longitudinal Tie Bars Necessary for Patches Greater Than 15'.
 T = Pavement Thickness

FIGURE 3

Final Lesson Learned

- **We can't possibly address all the situations encountered in the field**

THANK YOU

Questions?