


## Southwest Regional ACPA/PA Concrete Pavement Forum

**Concrete Pavement Restoration  
Initiatives**





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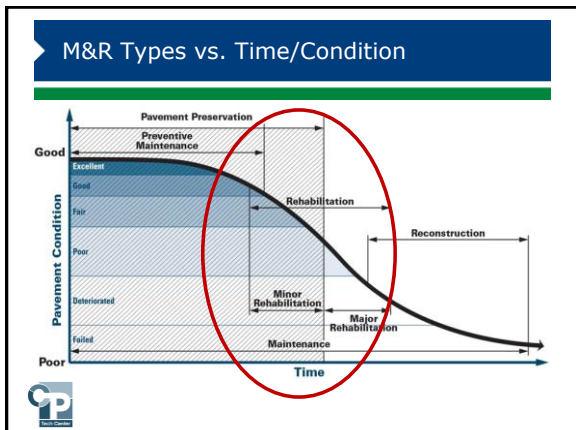
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## Concrete Pavement Quality Improvement

- The CPQI committee works to improve the quality of concrete pavements via improving standards, specifications, best practices and training
- Many updates to the CPR standards and specs have been spearheaded by this group
- Group includes
  - Three ADE's (design, construction, and maintenance)
  - Central office design, quality assurance, roadway management and the lab
  - The Turnpike & FHWA
  - Representing industry are contractors, suppliers, consultants, and ACPA/PA

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## Concrete Pavement Distress Types

  
Transverse Cracking

  
Longitudinal Cracking

  
Alkali Silica Reactivity


  
Joint Seal Damage


  
Faulting

  
Scaling

  
Blow-Up

  
Joint Spall

  
Corner Crack



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## Typical Pavement Preservation Treatments

### Concrete Pavements

A	Crack Sealing
B	Joint Resealing
C	Spall Repair
D	Dowel Bar Retrofit
E	Cross-Stitching
F	Partial Depth Repairs
G	Full-Depth Repairs (< 10% of pavement area)
H	Ultra Thin Bonded Wearing Course
I	Slab Stabilization
J	Slab Jacking
K	Diamond Grooving
L	Diamond Grinding



Source: Pub 242, Chapter 12

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## Typical Performance (Nationally)



Treatment	Expected Treatment Life (years)
Concrete joint resealing	2 to 8
Concrete crack sealing	4 to 7
Diamond grinding	8 to 15
Diamond grooving	10 to 15
Partial-depth concrete patching	5 to 15
Full-depth concrete patching	5 to 15
Dowel bar retrofit	10 to 15

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### CPQI Initiatives Implemented



- Standardized Paving Mixtures
- Revised Pavement Texturing and Surface Tolerance Requirements
- Revised Opening to Traffic Requirements
- High Performance Dowel Bars

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### CPR Initiatives Implemented



- Longitudinal Joint Repair Spec. and RC
- Corner Repair Spec. and RC
- Dowel Retrofit Spec. Revision
- Joint Sealant Revision to Type IV only
- Sawing and Sealing of Joints for Patching

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### CPQI Initiatives Implemented

- Standardized Paving Mixtures
  - Optimized aggregate gradations for all new pavements
  - Reduced cement contents allowed including accelerated and HES
  - 7.0% plastic air content for all mixes
  - HES reduced to 3-day strength test






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### CPQI Initiatives Implemented

Revise Section 704 **TABLE A – Cement Concrete Criteria** and referenced Notes to read as follows:




Class of Concrete	Use	Cement Factor (lb./cu.-yd.)		Water Cement Ratio(w/c)		Minimum Mix Design Compressive Strength (psi)			Proportions Coarse Aggregate Solid Volume (cu.ft./cu.-yd.)	28-Day Structural Design Compressive Strength (psi)
		Min.	Max.	Min.	Max.	3	7	28 <sup>(1)</sup>		
AA	Slip Form Paving	517	611	0.37	0.42	—	3,000	4,000	—	3,500
AA	Form Paving	517	611	0.37	0.45	—	3,000	4,000	—	3,500
AA	Accelerated Paving <sup>(2)</sup>	517	752	0.37	0.45	—	3,000	4,000	—	3,500
HES	Paving	517	752	0.37	0.42	2,000	—	4,000	—	3,500

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### CPQI Initiatives Implemented



- Revised Pavement Texturing and Surface Tolerance Requirements
  - Revisions requiring broom or turf drag after finishing
  - Making longitudinal texture the preferred texture
  - Measuring surface tolerance with a 12-foot straightedge

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### CPQI Initiatives Implemented

- Revised Opening to Traffic Requirements
  - Removed the time requirements - 7 hours in Sec. 516. Moved the 1200 psi minimum to - Sec. 501.
  - Reduced the required compressive strengths for Opening to Traffic. Pavements  $\geq 9"$  in depth will only require 2,000 psi for opening to traffic - Table D Sec. 501.



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### CPQI Initiatives Implemented

New 501 Table D

**Table D**


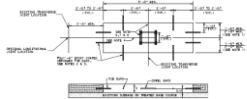


Slab Thick., inches	Strength for Opening to Traffic, psi			
	Slab Length < 10 ft		Slab Length ≥ 10 ft	
	f <sub>c</sub>	MR (3rd)	f <sub>c</sub>	MR (3rd)
5.0	3000	490	3600	540
7.0	2400	370	2700	410
8.0	2150	340	2150	340
9.0	2000	275	2000	300
10.0 +	2000	250	2000	300

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### CPR Initiatives Implemented



- Longitudinal Joint Repair Spec. and RC



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### CPR Initiatives Implemented

- Full Depth Corner Repair Spec. and RC



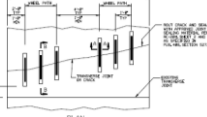


- Drill hole at an angle
- Drive or grout in tie-bar, and bend parallel with finished surface

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### CPR Initiatives Implemented




- Dowel Bar Retrofit Spec. Revision

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### CPR Initiatives Implemented

- Joint Sealant Revision to Type IV only
  - Went from a Type II sealant to a Type IV sealant for concrete pavement joints to help reduce sealant failures (road snakes).

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### CPR Initiatives Implemented

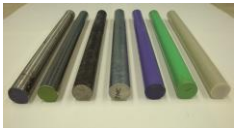
- Sawing and Sealing of Joints for Patching
  - If overlay will be completed in the same construction season, only an initial sawcut is required
  - If the overlay is the following season, a widening cut with a reservoir and the sealing of the joint are required
  - For accelerated patches, there's an initial sawcut with backer rod prior to opening to traffic, and must be sawed and sealed within 24 hours






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### CPQI Initiatives Implemented

- High Performance Dowel Bars
  - Change establishing structural adequacy evaluation of dowels with various coatings approved by FHWA 5/30/19. (Sec. 705.3 effective 4/10/2020)
  - Tubular dowels are now approved for use








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### Questions & Dialogue

- What kind of performance are you getting with partial depth spill repairs?
- How are Type IV seals performing? Have you tried resealing joints without backer rods?
- How are you assuring that dowels are properly embedded when performing full-depth repairs?

*Your Questions/Comments*

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