Thin PCCP Overlays
- Best Construction Practices

PCCP Workshop
February 10, 2017
Concrete Overlays

A VERY LONG History of Performance and Cost Effectiveness
Pathways Van Data Collection of existing PCCP overlays
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PCCP Overlay Preservation Option

Original Pavement

Increase due to Rehabilitation

Min. Acceptable Rating

Terminal Condition

Age or Traffic
What are we talking about??

- Concrete overlays over old concrete
- Concrete overlays over old asphalt pavements
- Concrete overlays over old composite pavements
Widely Used Across the Country

The National Concrete Overlay Explorer

overlays.acpa.org
Concrete Overlays

Guidance on Design and Construction
Mechanics of PCCP Overlays

Unbonded

Bonded
Short Joints
Reduce Stresses
PCCP Overlay Design Advancements
FHWA pooled fund TPF-5(165)

BONDED CONCRETE OVERLAY OF ASPHALT PAVEMENTS
MECHANISTIC-EMPIRICAL DESIGN GUIDE (BCOA-ME)

VALIDATION STUDIES

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Prepared for:
FHWA Pooled Fund Project: TPF-5-165
Single Best Reference

www.cp.techcenter.org
PCCP Overlay Construction

Projects & Lessons Learned
SECTION 509 – QCQA, PCCP OVELAY

509.01 Description
This work shall consist of a USP/QCQA. PCCP overlay placed on a prepared existing asphalt pavement in accordance with 365.01. The requirements of 361 shall apply except as modified herein.

509.02 Lots and Sublots
Lots will be defined as 14,440 sqyd (12,960 m²) of PCCP. Lots will be further subdivided into sublots of 4,800 sqyd (4,000 m²) of PCCP within a lot. Partial sublots of 960 sqyd (800 m²) or less will be added to the previous sublot. Partial sublots greater than 960 sqyd (800 m²) will constitute a full sublot. Partial lots of one or two sublots will constitute a full lot.

Lots and sublots will be numbered and listed for a given project by lot number regardless of the number of CMC’s used and will be closed out at the end of the paving season or construction phase.

509.03 Preparation of Existing Asphalt Pavement
The requirements of 291.10, 291.11, and 291.12 shall not apply.

Preparation of the existing asphalt pavement shall be in accordance with the requirements of 301 except as modified herein.

Asphalt removal and pavement preparation shall be performed on the existing asphaltic pavement in accordance with 390.06 and 390.07. The milling shall be in accordance with INDOT Specification 509.03. The milling depth shall be as noted on the project plan. The surface shall be rough and granular in accordance with INDOT Specification 509.03.

The Contractor shall obtain milled surfaces approved by the INDOT and approved by INDOT for the project. The milled surfaces shall be left open to traffic for longer than 30 days or shall be closed to traffic longer than 30 days.

Prior to placement of PCCP, the milled surfaces shall be clean and free of loose material. The surface of the milled pavement shall be uniformly cleaned with water just prior to placement of PCCP. Excessive standing water shall not be permitted.

Placement of PCCP overlay shall be by the slipformed or formed methods with equipment specified in 398.01.

509.04 Sublots
The requirements of 391.11 shall not apply.

Longitudinal and transverse construction joints shall not be sawed or beveled. The vertical surface of transverse construction joints shall be formed as shown in the plans.
Thin PCCP Overlays
- INDOT Projects
INDOT Overlay – Bonded over Asphalt

- SR 161 – SR 64 to Freeman - 6”
- 2 lane – approx. 4 mi. in length
- Overlay over milled existing HMA pavement
- Joints sawed at 10’ – 10’x12’ panel
- No Dowels – No tie bars
- Road closed to thru traffic
- Local traffic maintained one way
- Access maintained to residents
- 77,000 sys – bid at $14.00/sy
- Built 2010
SR 161 Concrete Overlay
INDOT Overlay – Bonded over Asphalt

- SR 55 – SR 2 to US 231 - 4"
- 2 lane – 8.7 mi. in length
- Utilized Structural Macro fibers
- Overlay over milled existing HMA pavement
- Joints sawed at 7’ – 7’x6’ panels
- No Dowels or tie bars
- Road closed to thru traffic
- Local traffic maintained one way
- Access maintained to residents
- 151,000 sys – bid at $21.00/sy
- Built 2015
SR 55 Concrete Overlay
SR 55
Evaluations of Existing Pavements for Overlays

• An evaluation of the existing pavement is necessary to ensure it is a good candidate for resurfacing and structurally sound to carry the anticipated traffic loads.

• Information gathered through the evaluation is used to determine required repairs where needed and to establish the concrete overlay design thickness.

• Strongly suggest – take cores of existing pavement

• Concrete material condition can be obtained through analysis of cores taken from the existing pavement.
Also Evaluate/Core Shoulders
Pavement Evaluation:

On high-volume roads, falling weight defectometer (FWD) testing can provide subgrade k-values and variability, concrete modulus, load transfer efficiency, and presence of voids.
Joint Spacing/Layout

- 2 ft x 2 ft
- 3 ft x 3 ft
- 4 ft x 4 ft
- 6 ft x 6 ft

Traffic

Outer Shoulder
Surface Preparation
Cleaning the Surface to Prepare for Bonding

• Sweeping surface followed by compressed air cleaning in front of the paver.

• Air blasting or water blasting is only necessary to remove material that cannot be removed any other way.

• Water or moisture should not be on the surface prior to paving or de-bonding can occur.

Duct Tape Test
Milling: Bonded and Unbonded Resurfacing of Asphalt or Composite Pavements

• The amount of asphalt removal depends on the types and severity of distresses and the thickness of the asphalt pavement.

• The objective of removing material is not to obtain a perfect cross section. It is not necessary to completely remove ruts. Usually 1"–2" of asphalt is removed.

• A minimum of 3"–4" of asphalt should be left after milling because of the reliance on the asphalt pavement to carry a significant portion of the load.

• Profile mill helps achieve desired PCCP thickness
Too Much Preplacement Repairs
Traditional Construction
Traditional Construction
Placement
Placement

SR 55
Placement

SR 161
Finishing
Finishing
Pay attention to finishing & its impact on smoothness
Finishing

Too small – builds in roughness
Finishing

Use longer float/straightedge
Tined Surface
Curing

• Curing is especially critical to concrete resurfacing because their high surface area to volume ratio makes them more susceptible to rapid moisture loss.

• Apply ASAP

• Coat all exposed edges.

• Avoid extreme weather.

• Avoid contact of cure with prepared surfaces because it is a bond breaker.
Curing – Be Prepared!!

- Paving operation moves quickly on overlays
- Need curing crew on site ready to apply as paving starts
- Keep curing operation up close behind finishing operation
Curing – desired uniform coverage
Sawing – Be Prepared!!

- Paving operation moves quickly on overlays
- Shorter joint spacing = lot of joint to cut
- Need multiple saws
Sawing
Traffic Control – Lessons learned

• Can manage traffic through the project
• Closed to thru traffic – local access only appears to work best
  ➢ One way thru work zone
  ➢ Contractor needs to aggressively manage
  ➢ Need adequate signage
  ➢ Need cones & warning tape
  ➢ Aggressive flaggers

• Can manage local access to home & businesses
  ➢ Requires regular communication with locals – discuss schedule & options
Local Traffic – one-way thru project
Access to local drive – SR 161
SR 161
Access to local drives – SR 55

Make sure surface is clean & provide compression relief at construction joint
How Handle Overnight Lane Restriction??

- Portable Traffic Signals
- Pilot Vehicles
Freshly Cured PCCP – looks a lot like hardened PCCP traffic driving on
Need good MOT markings & barriers
CONCRETE OVERLAYS

Payment

Cubic Yard

Square Yard

Divided payment - most equitable and economic
Summary - What Have Learned

- Cost competitive
- Good Performance History
- Don’t need dowels on bonded overlays
- Don’t need tie bars
- Keep panels sized properly
- Joints – single cut – unsealed
Summary – Best Practices

• Build with traditional construction practices
• Old surface must be clean – free of debris – duct tape test
• Traffic control is very manageable
• Must be attentive to signage & public communications
• Good finishing practices = smooth pavement for overlays
• Need curing & sawing plan
Questions?

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