1. **Overlays**
2. New Full-depth
3. Pervious
4. Roller Compacted
5. Full Depth Patching
6. Partial Depth Patching
7. Diamond Grinding
What are we talking about?

- Concrete overlays over old concrete
- Concrete overlays over old asphalt pavements
- Concrete overlays over old composite pavements
What Know or Have Learned

- Cost Competitive
- Long Lasting
- Versatile
- Traditional Construction
- Constructed Rapidly
- Sustainable
- Wide Spread Use Across Country
Competitive
Traditional Construction
Traditional Construction
Constructs
Rapidly

Single pass – full depth
Constructs Rapidly

Bremen Highway
Joseph Co., IN
Bonded Overlay

4” PCCP Inlay
24’ wide – 0.9 mi.
Paved in 1 day
Sustainable

- Local Materials
- Recycled materials
- One-pass placement
- Longevity, fewer cycles
- Light reflective
- Mitigates “Heat Island” effect
Widely Used Across the Country
How do we know?

Let’s look at a few projects
Indiana’s Concrete Overlays

- Local Streets/Roads
- Airports
- Interstate Highway
- State Highway
Indiana Overlays
Local Roads

- Harding Street – Indianapolis – 6” 1985
- 121st Street – Fishers – 9” 1992
- Indianapolis Bus Lanes – 3.5” 1997
- Allisonville Rd – N. of 96th – 7” 1999
- 56th Street – Brownsburg – 5” 2001
- Market & Columbia – Warsaw – 3.5” 2002
- Rudisill/Broadway Inter. – Fort Wayne – 6” 2006
- Bremen Highway – St. Joseph Co. – 4” 2007
Indiana Overlays
Interstate and State Routes

Interstate and State Routes
- I – 69 North of SR 18 – 11” 1986
- I – 65 North of SR 114 – 10.5” 1994
- I – 94 West of SR 39 – 13” 1998
- I – 70 at US 27 – Richmond – 12” 2000
- SR 161 – Dubois Co. – 6” 2010
Indiana Overlays

Airports

- Madison Airport Apron – 3.5” 2000
- Grissom AR Fueling Apron – 6” 2007
- Delphi Runway – 5.75” 2008
- Elkhart Runway – 10” 2009
- Jasper Co. Runway – 6” 2009
- Columbus Runway – 10” 2010
Life & Cost Analysis of Three Rehabilitation Techniques on I-65 Between SR 2 & SR 114
I-65 Pavement Rehab Comparison

LIFE AND COST COMPARISON OF THREE REHABILITATION TECHNIQUES ON I-65 BETWEEN SR-2 AND SR-114
3 Rehabilitation Techniques

- “Crack and Seated”
  Fiber modified HMA overlay on cracked and seated concrete
  - 8.7 miles

- “Rubblized”
  HMA overlay on the rubblized concrete - 5.7 miles

- “Unbonded Concrete Overlay”
  on 30mm intermediate HMA layer on the existing concrete - 6.2 miles
I-65 Rehab Options

- MP 217.2 – 223.4 – Concrete Overlay
  - Built 1993 - $239,800/center line mile

- MP 223.4 – 229.1 – 13” HMA Overlay over Rubblized old Concrete Pavement
  - Built 1994 - $236,000/center line mile
  - 2000 – route & seal cracks - $17,200/cl mile
  - 2010 – Mill 2” & overlay – $96,800/cl mile

- MP 229.1 – 237.8 – 7.5” HMA Overlay over crack & seated old concrete pavement
  - Built 1993 & 1994 - $180,500/ center line mile
  - 2000 – route & seal cracks - $17,200/cl mile
  - 2008 – mill & overlay all HMA - $355,942/cl mile
I-65 Rehabilitation Options

- 7.5” HMA Overlay over crack & seated PCCP
  - Built 1993 & 1994
  - Route & seal cracks
  - Mill all HMA & overlay 2009
  - 30 years service - $18,455/center line mile/year of service

2009 contract to mill 7.5” & overlay
I-65 Rehabilitation Options

- 13” HMA Overlay over Rubblized old PCCP
  - Built 1994
  - Route & seal cracks 2000
  - Mill 2” & 2” HMA overlay July 2010
  - 30 years service - $11,667/center line mile/year of service

2010 contract to mill 2” & overlay
I-65 Rehabilitation Options

- Concrete Overlay
  - Still “Like New” condition
  - 30 years service - $7993/center line mile/year of service

No Rehab contracts to date - route & seal 2014??
2004 Findings and Implementation

“Unbonded concrete overlay is a very effective rehabilitation technique for eliminating reflection cracks.”

“Annual visual condition surveys suggest that “concrete” segment has better performance than the “rubblized” and “cracking and seating” segments.”

“Life cycle cost analysis suggests that “concrete” segment is the most cost effective…”

“Unbonded concrete overlays are viable rehabilitation techniques which should be employed on appropriate highway sections.”
Example Projects

Bremen Highway
Joseph Co., IN
Bonded Overlay

4” PCCP Inlay over milled HMA
Built: July 2007
# Alternate Bid Results

<table>
<thead>
<tr>
<th>Option</th>
<th>Low Bid</th>
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<tbody>
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<td>A. 4&quot; HMA</td>
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<tr>
<td>B. 6&quot; PCCP</td>
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<tr>
<td>C. 4&quot; PCCP</td>
<td>$244,300.25</td>
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</table>
Bremen Highway

Mill 4” out & sweep surface

Fill with 4” PCCP

24’ Wide, single pass

0.8 mile long
Bremen Highway

Standard Finishing & Texturing

Saw Cut 4’x4’ Panels
Bremen Highway

Excellent Results
SR 161
(INDOT RS-30682-A)

6” PCCP Overlay
3.77 Miles long
71,000 SY
SECTION 169 - QC/QA, PC/P OVERLAY

599.01 Description
This work shall consist of a QC/QA, PC/P overlay placed on a prepared existing asphalt pavement in accordance with 599.03. The requirements of 599 shall apply except as modified herein.

599.02 Lawn and Sidewalks
Lawn will be reseeded on 10,000 to 11,000 sq ft of PC/P. Lawn will be further subdivided into sections of 1,000 sq ft. All PC/P within a 10,000 sq ft area of PC/P and 1000 sq ft of lawn will constitute a full section. Partial loss of lawn into sidewalk will increase cost.

Lawn and sidewalks will be watered and seeded for a green cover in accordance with the number of CMU's used and will be blown out at the end of the parking season or construction phase.

599.03 Preparation of Existing Asphalt Pavement
The requirements of 599.01, 599.02 and 599.12 do not apply.

Preparation of the existing asphalt pavement shall be in accordance with the requirements of 599.04 and 599.05.

Asphalt overlay and street pavement shall be performed on the existing asphalt pavement in accordance with 599.05. The surface of the existing asphalt pavement shall be so finished that it is in accordance with FM 621. The same procedure of the existing surface shall be so finished as to be in accordance with FM 621.

The Contractor may leave millings surfaces open for an indefinite period of time. Liquidated damages will not be assessed in accordance with 599.04 for milled asphalt areas left open to traffic for longer than 3 working days or for non-accessible areas left open to traffic longer than 10 working days.

Prior to placement of PC/P, the milled asphalt pavement shall be clean and free of loose material. The surface of the milled asphalt pavement shall be thoroughly mopped with water 24 hours prior to placement of PC/P. Liquidated damages will not be permitted.

Placement of PC/P may occur by the rumble strip or surround methods with equipment specified in 599.06.

599.04 Delays
The requirements of 599.01 shall not apply.

Liquidated and excessive construction joints shall not be counted or sealed. The vertical surface of transverse construction joints shall be allowed to weather to the time.
What Have Learned - Contractor

- Don’t be afraid of different practice
- Don’t make too complicated
- Basic straight forward construction practices
- Traffic control plan on project was very manageable – non-issue
- Profitable – good work
What Have Learned

- Don’t over engineer
- Cost competitive
- Don’t need dowels
- Don’t need tie bars
- Keep panels sized properly
- Joints – single cut - unsealed

Keep it simple
SR 161

Scarify/profile mill  Pave one lane at time
SR 161

Maintain local traffic
one way
SR 161

Bid Tab: $14.00/SY
$2.33/sy/in
($42.36/Ton Equivalent)
Urban Arterial – Allisonville Road - 1999

96th Street to Eller Road
Project Information

- Traffic: 26,360 vpd
- Existing 24’ asphalt pavement
- Scope:
  - widen to outside
  - maintain traffic
  - mill & overlay existing
Pavement Design

- PCCP
  - plain, non-doweled with skewed joints
  - overlay: 7 1/2 “ PCC
  - widening: 10 1/2” PCC on 4” #53 aggregate base
  - Lime treated subgrade

- HMA
  - overlay: 5” HMA
  - widening: 15” HMA
  - Lime treated subgrade
Allisonville Road Cross Section

TYPICAL CROSS SECTION
Scale \( \frac{3}{16}\)" = 1' - 0"

STA. 56+42 "A" to STA. 62+69.47 "A" 
STA. 62+69.47 "PR-1" to STA. 75+33 "PR-1"

Varies
Grade as Shown on Profile

Existing Pavement

6" Special Subgrade Treatment

Agg. fo
Allisonville Road

7 ½” PCCP Overlay of old asphalt with 10 ½” PCCP full depth widening Built: 1999
Airports - Delphi Runway 18-36

5” PCC Overlay of old HMA
2600’ – 60’ wide
Delphi Municipal Airport
Design – Concrete Overlay

- 5” Plain Concrete Pavement placed over existing asphalt runway
- Transverse joints spaced @ 12’-0”
- Longitudinal joints spaced @ 10’-0”
- All joints – sawed, beveled and sealed
- Outside longitudinal joint and the 3 transverse joints at north and south ends of runway – tied with ½” deformed bars spaced 3’- 0 c-c

As constructed – concrete overlay averaged 5.75”
# Project Bid

**Tabs - Base: FDR w/ HMA Overlay**

$912,999.85

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>QNT</th>
<th>Unit</th>
<th>Engineer's Estimate</th>
<th>Total Price</th>
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**Alternate Bid No. 1**

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<tbody>
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Base Bid Total: $912,999.85
### Project Bid
#### Tabs - Alternate: Concrete Overlay

**Total Bid Amount:** $715,935.58
Surface Preparation
Finishing
Curing
Sawing
Notice crack & broom finish
Concrete Overlays - Resources

Guide to Concrete Overlays
Sustainable Solutions for Resurfacing and Rehabilitation

The National Concrete Overlay Explorer
http://overlays.acpa.org/

Wonder how far concrete overlay technology has come?
Wonder where concrete overlays are being used and how well they are performing?
Visit the National Concrete Overlay Explorer and investigate construction and performance
details from more than 275 concrete overlay projects
across the United States.

Guide to the Design of Concrete Overlays
Using Existing Methodologies

October 2012
DESIGN SPREADSHEET

Portland Cement Concrete Inlay / Overlay Thickness Design
Version 1.0, August 1, 2008

Use of this treatment shall be according to Bureau of Design and Environment Procedure Memorandum 64-08.

There are two options for designing a PCC inlay/overlay on a pavement with a hot-mix asphalt (HMA) surface.

Option 1 (Left Button):
Specify the underlying HMA thickness and determine the required PCC inlay/overlay thickness.

Option 2 (Right Button):
Specify the PCC inlay/overlay thickness and determine the required thickness of underlying HMA.

Acknowledgements
The Illinois Center for Transportation (ICT) is an innovative partnership between the Illinois Department of Transportation (IDOT) and the University of Illinois at Urbana-Champaign (UIUC).

Disclaimer
The contents of this spreadsheet are based on the results of ICT R27-3, "Design and Concrete Materials Requirements for Ultra-Thin Whitelining." ICT R27-3 was conducted in cooperation with the Illinois Center for Transportation, the Illinois Department of Transportation, Division of Highways, and the U.S. Department of Transportation, Federal Highway Administration. The author(s) of the contents of this spreadsheet are (are) responsible for the facts and the accuracy of the data and calculations presented herein. The contents have been developed for Illinois use based on Department input regarding Illinois conditions and materials, as well as Department specifications and guidelines, which may not produce valid results for others.

ILINOIS DEPARTMENT OF TRANSPORTATION
ILLINOIS CENTER FOR TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
What Have We Learned

- Cost Competitive
- Long Lasting
- Versatile
- Traditional Construction
- Constructed Rapidly
- Design & Tech Guidance Tools Available
- Wide Spread Use Across Country
Questions?

Contacts for further information

www.irmca.com

ACPA

www.indianaconcretepavement.com

INDIANA CHAPTER