A Few Questions

1). What is your No. 1 solution to pavement problems?

2.) Are those the same solutions we can afford to use in the future?

3.) How do you do it with concrete?
Recent Trends in Costs
PPI Jan. 2012

Producer Price Indices - Competitive Building Materials

Source: Bureau of Labor Statistics
Concrete Overlays for Local Roads

History & Experience

Randell C. Riley, P.E.

Executive Dir. - Engineer

P.O. Box 9530

Springfield, IL 62791-9530

pccman@ilacpa.com
PCC Overlays in Illinois
Prior to ‘94

Overlay Type

- Bonded (PCC/PCC) (8)
- Unbonded (PCC/Comp.) (1)
- Whitetopping (UB) (2)
- Ultra-Thin WT (B) (0)
- UTW/Unbonded Hybrid (0)
PCC Overlays in Illinois
As of End of 2011

Overlay Type

- Bonded (PCC/PCC) (12)
- Unbonded (PCC/Comp.) (7)
- Whitetopping (UB) (14)
- UTW or WT (B) (31)
- UTW/Unbonded Hybrid (10)

http://www.ilacpa.com/Whitetopping%20Links/WT_index.htm
LaSalle Co. 56 – Built 1974
Age 36 Years
LaSalle County
(As Built 1974)

5" CENTERLINE MINIMUM NON-REINFORCED P.C.C. PAVEMENT

EXISTING 18' BITUMINOUS SURFACE WITH ± 8" GRAVEL BASE

4' x 8" AGGREGATE BASE COURSE TYPE - A
CPR on 28-Yr Old Whitetopping
LaSalle County 56
(10 YEARS AGO!)
North from Mercer County
Rock Island County Rd. “L”
63rd St off Knoxville Rd. to Sherrard

- 5” Min. at centerline
- Built 1984
- Approx. 3 mi.
Rock Island Co. "L" – Age 24 years
September, 2007
1998 Clay County
Whitetopping
Sailor Springs Road
## Summary of Bids

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Bid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinzy Construction</td>
<td>$2,892,920.52</td>
</tr>
<tr>
<td>Howell Paving Inc.</td>
<td>$1,754,025.19</td>
</tr>
<tr>
<td>Illinois Valley Paving Co. * *</td>
<td>$1,491,426.91</td>
</tr>
<tr>
<td>McCarthy Improvement</td>
<td>$1,589,748.71</td>
</tr>
<tr>
<td>Engineer’s Estimate</td>
<td>$1,807,000.00</td>
</tr>
</tbody>
</table>

** 17.5 % Below Engineer’s Estimate**
Clay County, Illinois, Stretches Dollars with Durable Whitetopping

Sailor Springs Road in Clay County was typical of many southern Illinois county roads - a soil and cement base course with an oil and chip seal coat surface. Built in the 1960s, widened in the '80s and beginning to deteriorate in the late '90s, the road is a main thoroughfare between the towns of Louisville and Sailor Springs.

“The road was in fairly good condition,” said Gary Wenthe, Clay County engineer, “with a few areas of deterioration. But the riding surface was wavy.” The county decided to rehabilitate the road because each year the spring thaw limited the weight on the route. “We needed year-round service from it,” said Wenthe.

The county chose whitetopping to cost-effectively increase the weight limits on the road. “We could have gone with asphalt,” said Wenthe. “The price per inch is about the same. But, based on our past experience, concrete is cheaper in the long run.”

First Time Successes

Illinois Valley Paving Company of Decatur milled off about 1-1/2 inches of the existing surface, and placed a 5-inch layer of concrete. “The 5-inch thickness was considered experimental,” said Wenthe. The pavement thickness was increased in a half-mile.

(continued on page 3)
Macon County 27
Lincoln Memorial Parkway
Whitetopping
Open House
September 11, 2003
Loss % Varies by Depth

<table>
<thead>
<tr>
<th>Expected Loss</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% @ 10 in.</td>
<td>= 0.0% @ 3 in.</td>
</tr>
<tr>
<td>3% @ 10 in.</td>
<td>= 10% @ 3 in.</td>
</tr>
<tr>
<td>5% @ 10 in.</td>
<td>= 16.7% @ 3 in.</td>
</tr>
<tr>
<td>8% @ 10 in.</td>
<td>= 26.7% @ 3 in.</td>
</tr>
</tbody>
</table>
Illinois’ First
“Sq Yd/Cu. Yd.” Project
### Lowers Contractor Risk & Owner Cost

Coded Pay Items: The pay items in the Schedule of Prices are abbreviated and have code numbers assigned. The complete wording of the pay items, the abbreviations and the code numbers used in the Schedule of Prices are listed below, for pay items not listed in code books.

<table>
<thead>
<tr>
<th>Pay Items</th>
<th>Unit</th>
<th>Abbreviation</th>
<th>Code No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORTLAND CEMENT CONCRETE PAVEMENT 5 1/4&quot; PLACEMENT</td>
<td>SQ YD</td>
<td>PCC PVT 5 1/4 PLACEMENT</td>
<td>XX005345</td>
</tr>
<tr>
<td>PORTLAND CEMENT CONCRETE PAVEMENT 5 1/4&quot; FURNISHED</td>
<td>CU YD</td>
<td>PCC PVT 5 1/4 FURNISHED</td>
<td>XX005346</td>
</tr>
<tr>
<td>AGGREGATE SHOULDERS (SPECIAL)</td>
<td>FOOT</td>
<td>AGGREGATE SHLDS SPL</td>
<td>XX005348</td>
</tr>
<tr>
<td>BITUMINOUS SHOULDERS 6&quot; SPECIAL</td>
<td>SQ YD</td>
<td>BIT SHOULDS 6 SPECIAL</td>
<td>XX005349</td>
</tr>
</tbody>
</table>

Cross reference 91288
Recent Whitetopping Projects

Livingston Co. ‘98
Piatt Co. ‘00
Cumberland Co. ‘01
LaSalle Co. ‘01
Coles County Hwy 18
June 2005
Macon ‘03
Paxton ‘00
Clay Co. ‘98
Recent Whitetopping Projects

Logan Co. ‘09
Clay Co. ‘08
Richland Co. ‘10
N. Lorang Rd.
Kane Co. ‘04
Clay Co. ‘10
Henderson Co ‘10
Macon Co. 27 ‘03
Shelby Co. ‘10
UTW vs. “Whitetopping”

- Whitetopping:
  - Well-established
  - Proven pavement rehabilitation technique

- Ultra-Thin Whitetopping:
  - Incorporates new technology & design concepts
  - Bonding, short joints
  - Fiber technology frequently used
First UTW Project

Mix Requirements
3500 psi in 24 hrs.
3 LBS./C.Y. (ASTM 1018)
Air: 4% - 7%
Crushed Stone
28 Day Strength: 7000 - 8000 psi

Sawed Full Depth
Continuity Break

4 Panels To Be Sawed In 2' Squares

NATIONAL FLEXCRETE EXPERIMENTAL PROJECT
Louisville, Kentucky
3.5- in. – 6 months
2 - in. – 6 months
Koke Mill Subdivision
Springfield, Illinois
21
Years and Running
Bonding
The Key to UTW
Mechanics of Composite Section

Unbonded

Bonded
Stresses Affecting Bonded Systems

- Drying Shrinkage
- Temperature Shrinkage
- Both work against bond
Short Joints
Reduce Stresses

6'

2'  2'  2'
New Tools for New Problems
EXPWide Load Setup
Principal Stresses

Unbonded -8 F Top Principal Stresses

EXP Unbonded Wide Cold
Principal Stresses

Unbonded -8 F Top Principal Stresses

EXPBB Unbonded Cold
Decatur, Oakland & Eldorado, May 98
The Reason
Prepared Surface

- Macrotexture
- Exposed aggregate face
- Free of loose debris
- Cracks not a problem as concrete will bridge them
Early Entry Saws are Used
Oakland & Eldorado, 2004
16,500 ADT/1450 ADTT
Still there after 14 years
The Reason!

4/22/02 - 12,600 ADT/630 ADTT, Most on UTW
3-inch Min.
High Pressure Cleaning of Surface
Intersection Wide Angle Complete

12,600 ADT/630 ADTT, Most on UTW
10 years old 2012
Brick Exposed, South Leg
Tuesday 6/05/01
Tuesday, June 12, 2001
Actually Opened Saturday

16,000 ADT/1500ADTT
VILLAGE OF LOMBARD
CAPITAL IMPROVEMENT
PROJECT

GRACE STREET
ULTRA-THIN WHITETOPPING
DEMONSTRATION PROJECT

IMPROVEMENTS FUNDED BY: STREET MAINTENANCE FUND

PROJECT COST: $83,940.00
SCHEDULED COMPLETION: JUNE 16, 2003
U.S. 36, Decatur

U.S. 36, Tuscola
UBOL Parallel Municipal Efforts
High Volume Bus Stops

- Recurring repair problem
- Normal repair, full-depth replacement - $
- Always in rehab mode - base unpredictable
  - Asphalt
  - Concrete utility patches
  - Granite paving block
- Accurate prediction of bond unlikely
- Grades & elevations an issue -> Thin sections
Steel Fibers
Fiber count

40 lbs/cyd (24 kg/m³) vs 4.5 lbs/cyd (2.7 kg/m³)
Steel Fibers
Low Fiber Count
STRUX 90/40
High Fiber Count
Con Expo Demo
March 2002, Las Vegas
In service 2007

Built 2003 - 4-inch Concrete Inlay/Overlay built same time as adjacent asphalt overlay. Looks good at last survey in summer 2011 with a couple of tightly held corner cracks. No slab creep as of that time. – Note ruts in asphalt approaching the inlay.
Most Fiber Handling
Paving with Fibers
Paving with Fibers
Paving with Fibers
• Holiday Inn, Decatur, 1994
• Ahlstrom Filtration, Taylorville, 1997
• Johnson Concrete, DeKalb, 1998
• U.S. 36, Eldorado & Oakland, Decatur, 1998
• Talbot Laboratory, U of IL, Urbana, 1998
• U.S. 51 & Pleasant Hill Rd, Carbondale, 1998
• Stage Coach Trail Road, Lena, 1998
• ADM, Decatur, 1998
• U. S. 36, East of Tuscola, 1999 (Hybrid UTW/UBOL)
• Interlake Corp., Pontiac, 1999 Phase II 2000
• Harrisburg U.S 45 & IL 13 June 2000
• Anna, IL US 51 Intersection Let January 2001
• Oak Park, Marion Street – Hybrid UBOL July 2001
• Peoria, Jefferson Street – Mixed Bonded/UTW April 2002
• Marion IL, IDOT Project – Completed July 2002
• St Charles – Dominick’s Loading Area – October 2002
• Grace St. Lombard – June 2003
• Long John Silvers, Peoria – July 2003
• Western Ave. Cook County Bus Pads – August/Sept 2003 (hybrid)
• Illinois State University, Normal – July 2004
• IDOT, District 1 Lot, Schaumburg – August 2004
• Pearl St. Intersection, City of Macomb – August 2004
• N. Lorang Road, Elburn – November 2004
• City of Chicago – S. Michigan Ave. Bus Pads – November 2004
• Marion IL 13 Left Turn Lanes – Built by City – Summer 2004
• Schank Ave. – Lake County, June 2005
• Illinois State University, Normal – Summer 2005
• Illinois State University, L-86 – Summer 2006
• University of Illinois – Summer 2006
• Lawrence Ave Bus Pads – Cook Co. Highway/City of Chicago ’06
• University of Illinois – McKinley Lot, Summer 2007
• St Charles, 4th St. - 2 intersections – September, ’07
• Olney Central College – Summer 2008
• Macomb, Downtown Intersections, Some Brick – Spring, ’09
• IL State University, Milner Library – Summer ‘10
• IL State University, Bus. 51 & College, NE – Summer ‘10
- State Farm Ins. – Bloomington Sept. ’10
- North Industrial Park, Village of Lombard – Fall ’10
- Tower Hill Rd, Shelby County – Spring ‘10
- Richland County Overlay – Fall ’10
- Clay Co. No. 3 – Fall ‘10
- Henderson Co. – Fall ‘10
- City of Macomb – University Ave, ‘11
- Mike Miller Hyundai, Peoria – Summer 2011
- Jct. I-57 & U.S. 24 Left turn Lane – UBOL Hybrid, IDOT – Fall ’11
- Grant Street, Sycamore, IL – Classic UTW, Fall ‘11
- IL 53, IDOT, Will Co. – Let June ‘11 (Completion ‘12)
“...The performance of the ultrathin whitetopping sections has been very good. The whitetopping was successful at mitigating the rutting and shoving present at several of the rehabilitated intersections...”

“...The performance of the thin whitetopping projects has been excellent. The whitetopping was successful at mitigating surface rutting and providing a surface with an improved ride quality. There has been little to no distress identified with the thin whitetopping overlays...”
46-5 PCC INLAY/OVERLAY ON EXISTING ON HMA SURFACES

46-5.01 Introduction

The stopping, starting, standing, and turning actions of vehicles at intersections or other locations may create rutting and other severe conditions for pavement structures with HMA surfaces. The volume and type of vehicles may also distress HMA surfaces. Standing water in ruts (e.g., from rain events) may create a hydroplaning hazard. In addition, snow and ice left in the ruts after snowpoeing may be hazardous to the traveling public. Therefore, a PCC inlay/overlay may be a better alternative than HMA. The PCC inlay/overlay has no risk for rutting and a longer service life may be achieved.

A PCC inlay/overlay consists of placing a thin concrete layer on an existing HMA surface. Construction of an inlay/overlay includes milling the existing rutted HMA to correct longitudinal profile and cross-slope irregularities and providing a surface for bonding of the overlay. A PCC inlay/overlay may be considered as an alternative at intersections or other locations where HMA overlays have shown a tendency to rut or have shortened performance lives.

Synthetic fibers are required where the inlay/overlay is 4.0 in. or less, and optional where it exceeds 4.0 in. The synthetic fibers currently used are much different from the fibers originally used in inlay/overlay projects. The original fibers used were mainly to prevent plastic shrinkage cracks. The new fibers will provide structural reinforcement, which will increase flexural toughness and cracking resistance.

These procedures do not apply to a thickness greater than 6.0 in. which is considered an unbonded concrete inlay/overlay.
Fast Track Whitetopping Township Road

- Uses (mostly) the new IDOT Procedures
- Opened a little earlier
- Widened “on the fly”
- 4.5 inches structural fiber reinforced
Completed Project

- Approx. 2900+/trucks/month
- One year of city street life every week
- ~ 381 weeks since construction
Why the interest?
From IDOT Bidtabs

5-inch asphalt overlay
- Bit prime coat ~ $0.30
- 5 – in HMA SC “D” N70 ~ $22.21
- Square Yard ~ $22.81
- Service life ~ 10 to 16 yrs.

5 1/4-inch structural fiber reinforced concrete overlay (Logan Co. 2009)
- Materials - $15.28
- Placement – $6.06
- Square Yard - $21.34
- Service life – 20+

Basic Bidtabs Report
Saturday, September 26, 2009
qryBidtabs Dist 1-4Yr >= 2008 ClassPct>30

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40603540</td>
<td>P HMA SC &quot;D&quot;</td>
<td>N70</td>
<td>TON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200801</td>
<td>72933-12</td>
<td>IL-VAL</td>
<td>$83.05</td>
<td>1,138.00</td>
<td></td>
</tr>
<tr>
<td>200801</td>
<td>70266-57</td>
<td>IL-VAL</td>
<td>$94.83</td>
<td>4,454.00</td>
<td></td>
</tr>
<tr>
<td>200801</td>
<td>68190-59</td>
<td>GNTHER</td>
<td>$61.00</td>
<td>5,885.00</td>
<td></td>
</tr>
<tr>
<td>200906</td>
<td>68861-138</td>
<td>MILERW</td>
<td>$110.90</td>
<td>1,521.00</td>
<td></td>
</tr>
<tr>
<td>200906</td>
<td>64E55-114</td>
<td>CHARLS</td>
<td>$71.76</td>
<td>562.00</td>
<td></td>
</tr>
<tr>
<td>200906</td>
<td>68818-20</td>
<td>GNTHER</td>
<td>$127.00</td>
<td>742.00</td>
<td></td>
</tr>
<tr>
<td>200906</td>
<td>72C81-55</td>
<td>IL-VAL</td>
<td>$103.30</td>
<td>1,241.00</td>
<td></td>
</tr>
<tr>
<td>200906</td>
<td>68824-95</td>
<td>CULNAN</td>
<td>$123.08</td>
<td>1,791.00</td>
<td></td>
</tr>
<tr>
<td>(40 detail records)</td>
<td>Total</td>
<td>232,473.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Weighted Avg. = $81.12
Single Best Reference
IDOT Design Spreadsheet
(UTW & WT Bonded Systems)

http://www.dot.state.il.us/desenv/pdp.html
IL ACPA Project List

Illinois Concrete Overlay Projects
1974 to Present

Kane Co. — N. Lorang Road
- Approx. 2900+ trucks/month
- One year of city street life every week
- ~313 weeks since construction
Completed Project

Rock Island Co. “L” — Age 24 years
September, 2007

Count on Concrete Industry Alliance

North Industrial Park, Village of Lombard, 2010
Benefits of Whitetopping & UTW

- **New choice** for pavement overlays
  - Readily available
  - Increases competition
- Durable surface-eliminates rutting
- Fast-Track construction - open 24 hours
- Reduce interim maintenance
- Environmentally Friendly
  - Light Reflective - Day and Night
  - Reduces Urban Heat Island Effects
- In today’s environment, it may even cost less!
Maybe it’s time to quit sticking to old ideas.

Concrete Overlays – A New Choice