

Experience in Indiana with UBWC and Spray Pavers

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Indiana Specifications

- **Standard Specification Section 414**
Ultrathin Bonded Wearing Course, Warranted

<http://www.in.gov/dot/div/contracts/standards/book/index.html>



UBWC Mixture

Aggregate Materials

- High quality and angular coarse aggregate
- Gap gradation

Mixture Designation – Control Point (Percent Passing)			
Sieve Size	12.5 mm	9.5 mm	4.75 mm
3/4 in. (19.0 mm)	100.0		
1/2 in. (12.5 mm)	85.0 - 100.0	100.0	
3/8 in. (9.5 mm)	55.0 - 80.0	85.0 - 100.0	100.0
No. 4 (4.75 mm)	22.0 - 38.0	22.0 - 38.0	40.0 - 55.0
No. 8 (2.36 mm)	19.0 - 32.0	19.0 - 32.0	20.0 - 32.0
No. 16 (1.18 mm)	15.0 - 24.0	15.0 - 24.0	15.0 - 24.0
No. 30 (600 µm)	11.0 - 18.0	11.0 - 18.0	11.0 - 18.0
No. 50 (300 µm)	8.0 - 14.0	8.0 - 14.0	8.0 - 14.0
No. 100 (150 µm)	5.0 - 10.0	5.0 - 10.0	5.0 - 10.0
No. 200 (75 µm)	4.0 - 5.5	4.0 - 5.5	4.0 - 5.5
Binder Content, %	4.6 - 6.1	4.8 - 6.1	5.0 - 6.3
Plan Lay Rate (lb/sq yd)*	90	75	65

* Plan lay rates are based on 100 lb/sq yd/in. using a mixture with a specific gravity of 2.5. Mixtures with different specific gravity will require an adjusted equivalent lay rate.

Asphalt Materials

- < 10,000,000 ESALS
 - PG 64-22 binder
- ≥ 10,000,000 ESALS
 - PG 70-22 binder
 - Elastic recovery requirement
- Emulsion
 - ~ 0.20 gal/sys application
 - Elastic recovery requirement



UBWC Mixture

Recycled Materials

- 25% Binder Replacement
- RAS
 - 100% passing the 1/2 in. sieve.
- RAP
 - 100% passing the 3/8 in. sieve
 - 95 to 100% passing the #4 sieve.

3-Year Warranty Acceptance

Distress	Single Location	Multiple Locations
Delamination/Raveling	1/2 sq yd	1 sq yd/mi
Rut Depth	1/4 in.	average 1/4 in./mi
Friction Number	no less than 30	average 35



Spray-Paving Equipment

- Three spray-paver machines are in operation:
Vogele, Roadtec and Midland
- Two spray-paver manufacturers currently exist:
Vogele and Roadtec
- The Roadtec spray-paver requires a MTD and can pave the widest at ~19.5 feet.
- The Vogele and Midland spray-pavers can pave the narrowest at ~8 feet.
- The spray bars for all spray-pavers are linked with screed extension movement.
- Emulsion storage ~2,000 gallons.



Roadtec



Vögele



Since 2009...

42 contracts constructed thru 2015 totaling ~ 46,000,000 sys

11 contracts constructed in 2013 alone totaling ~ 11,500,000 sys

8 contracts to be constructed totaling ~11,000,000 sys

Type	DISTRICT	Constructed	Interstate	Non-Interstate	Planned
UBWC	West Central	11	0	11	1
UBWC	North East	4	1	3	1
UBWC	East Central	9	0	9	2
UBWC	North West	1	1	0	1
UBWC	South East	8	1	7	0
UBWC	South West	9	0	9	3
Totals		42	3	39	8



East Central District (SR-28)

2002 UBWC



2013 UBWC w/Seal Coat



First UBWC Constructed atop HMA

South West District (SR-145)

Friction Reduction (Bleeding)



Warranted Item

Damage (Farm Implement)



Non-Warranted Item

West Central District (SR-47)

Delamination



Warranted Item

Raveling



Warranted Item

Reflective Cracking

Case Studies



East Central District (SR-1)

2011 Pre-UBWC Surface



2012 UBWC Surface



East Central District (SR-1)

2011 Pre-UBWC Surface



2014 UBWC Surface



South West District (SR-37)

2012 Pre-UBWC Surface



2014 UBWC Surface



Surface Preparation

Fine Mill



2x – Cutting Teeth



Post-Mill / Pre-Overlay Crack Filling

Overbanded PG 64-22 atop HMA Fine Mill



West Central District (US-52)

2015 PCCP Fine Mill



2015 UBWC atop
PCCP Fine Mill



First UBWC Constructed atop PCCP

Speaker Disclaimer...

“I know you believe you understand what you think I said, but I am not sure you realize that what you heard is not what I meant.”

** Alan Greenspan **



Questions?

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