

Warm Mix Asphalt Implementation on Illinois Projects

Matt Mueller, PE

Illinois Department of Transportation

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Illinois is a North Central State



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The Challenge of Implementing WMA

- Aggregate
- Asphalt Binder
- RAP
- Mixes
- Acceptance

The Challenge of Implementing WMA – Too Much Going On!

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Aggregate

- Loss of Slag Due to Collapse of Steel Industry
- Introduction of Siliceous Sources (granite, quartzite, diabase)
- Restart of Lab Abrasion Track
- Renewed Focus on Field Friction Testing
- Investigate Effect of RAP on Friction
- Investigate Finer Gradations for Thin Lift Construction
- Aggregate Industry Objective to Market More -200

Asphalt Binder

- Alternate Polymers Proposed (ground tire rubber “GTR”, Elvaloy)
- Alternate Modifiers Found (polyphosphoric acid PPA, recycled engine oil bottoms “ReOB”)
- Double Bumping of Grades for 20% or More Binder Replacement (PG 70-22 -- PG 64-28)
- New Binder Grades PG 46-34



RAP / RAS

- More RAP Piles Fractionated – FRAP
- Increased Percentages Allowed by Specification
- Unknown Aggregates
- Unknown Asphalt Binders
- Durability of Coarse Fraction Determined with Micro-Deval
- Combination of Asphalt Binder Replacement with RAP and RAS
- RAS Asphalt Binder Graded at PG 100-0
- RAS Fibers Cloud T 283 Testing
- More -200 Generated, Excess Baghouse Fines



Fine FRAP



Coarse FRAP



RAS – FA/ABR/Fibers



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- WMA Chemical Additives and Foamers

Too Many Changes Too Fast!!!

- A New Acceptance Program Meeting FHWA Guidelines is Needed for Small to Mid-sized Projects
- Too Many Component Variables
- Experimental Feature Process of Field Installations Takes Too Long
- Academic Research is Behind the Pace of Industry
- Existing Tests Do NOT Measure Adhesion or Cohesion of the Mix
- Existing Tests May NOT Ensure Mix Performance
- WMA Foaming Cannot be Reproduced in Dept. Lab

Where Does WMA Fit In?



Accepting Risk

A photograph of a newly paved road. The road is dark asphalt with white lane markings. In the foreground, there is a concrete curb on the left and a large white arrow painted on the asphalt pointing towards the viewer. Further down the road, several orange and white striped traffic cones are placed along the edge. The background shows a clear sky and some distant structures.

Mix Production and Lay Down



How to Move Forward in the Face of:

- Rutting ✓✓✓
- Cracking ✓✓
- Raveling ✓
- Shoving ✓
- Polishing N/A

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Hamburg Wheel Tracking Criteria

Asphalt Binder Grade	# Wheel Passes	Max Rut Depth in. (mm)
PG 76-XX	20,000	½ (12.5)
PG 70-XX	15,000	½ (12.5)
PG 64-XX	10,000	½ (12.5)
PG 58-XX	7,500	½ (12.5)

+ Min. & Max Tensile Strength criteria (modified T 283)

Asphalt Binder Grade	Tensile Strength psi (kPa)	
	Minimum	Maximum
PG 76-XX	80 (552)	200 (1379)
PG 70-XX		
PG 64-XX	60 (414)	200 (1379)
PG 58-XX		

- WMA is aged 2 hours @ 270 °F prior to Hamburg Wheel Tracking Device testing
 - Mix to be aged loose, then compacted into pucks.
- WMA Compaction Temp is 270 ± 5^0 F unless mix allowed to cool & reheated.

Texas Overlay Tester



WMA

