

Binders in FL HMA Surfaces

Future for Hybrid Binders

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A Prince of a Man

Summary of Presentation

- Timeline on the Use of Asphalt Binders
- FL Use of Asphalt Rubber Binders
- Issues Using Asphalt Rubber
- Use of Polymer Modified Binders
- The Future of Hybrid Binder



Florida Surface Course Mixes

- 2 Dense Graded
 - FC 9.5, FC 12.5
 - Rural and Urban, Design Speed <45mph
- 1 Open Graded
 - FC 5
 - Design Speed > 45mph
 - Typically Interstate divided highways.

Fine graded FC-12.5 texture



FC-5 OGFC macro texture



Raveling OGFC I-75 Marion County

(old slide / only 2 trucks)

Binder in FL HMA Surfaces

- Neat Binders
 - AC 30 / PG 67-22 (experiments w latex)
- Asphalt Rubber Binders : 1994
 - ARB 12 - OGFC (more binder for durability)
 - ARB 5 – Dense (more stiffness for rutting)
- Polymer Modified Binders : 2004
 - PG 76-22

Background on Asphalt Rubber in FL

- State Law 1988 Comprehensive Solid Waste
- Research and Lab Phase
- 3 Experimental Projects, 1989-1990
- 3 Demo Projects around the State, 1993
- On all Projects let after January, 1994



Asphalt Rubber Construction Issues

- The Rubber in the Binder settles out
 - Can coat the heating coils
 - Variable binder material properties
 - Fat spots in pavement
- Another Binder to handle
 - 2 Neat PG Binders
 - 2 Asphalt Rubber Binders
 - 1 Polymer PG Binders
 - 4 Recycle Agents (low viscosity asphalt)



Polymer Modified Binder

- Florida began using Polymer Binder 2001
 - Based on FL APT & NCAT
 - Use on Interstate in Structural
 - +> Rut Performance of good mix
- Use in Interstate OGFC surface 2004
 - Based on UF lab data (+ rut & crack improvement)
 - Simplify Construction (one binder)
- Direction to Make Rubber work like Polymer



Estimated FL Asphalt Binder Usage

Based on 5 million tons of HMA

- Neat Binders 112,000 tons 40%
 - PG67-22, PG64-22
 - 4 Recycle Agents
- Polymer Modified 126,000 tons 45%
 - PG76-22
- Asphalt Rubber 45,000 tons 15%
 - ARB-5, ARB-12

The Future is NOW



- Hybrid Binder

- Called by some: Terminal Blend Crumb Rubber
- One Way to Address Shortage of Polymers
- Ground Tire Rubber + Elastomeric Polymer
- Proprietary Processes
 - But this an issue with Polymer Modification Processes

The Future is NOW



- Hybrid Binder
 - Can Replace 3 Current FL HMA Binders
 - PG76-22 (polymer modified)
 - ARB-12, ARB-5 (asphalt rubber)
 - If you can do Polymer, you can do Hybrid
 - Asphalt Supplier (some ingenuity/investment may be required in process and equipment)
 - HMA Contractor (it handles the same)

The Future is NOW

- FHWA Modifier ALF Research



Section 5 Hybrid Binder



The Future is NOW



- Research at U of Florida
 - Hybrid must meet Solubility Requirement
 - Got to be homogeneous / Rubber not just in solution
 - Can meet all PG+ Requirements: Polymer Modified
 - MSCR, Elastic Recovery, Phase Angle
 - Mix tests verify rut and crack resistance = Polymer
 - Dissipated Creep Strain Energy (DCSE) & Energy Ratio
 - Not just a stiff (possible brittle) binder
 - UF Report Available (www.dot.state.fl.us/research-center)
 - Hopefully, a basis for change in FL

Hybrid Binder Implementation

- Road Map for FL DOT Actions
- Takes a Policy Decision to Use
 - Just like it did with Polymer Modified
 - Good Engineering (get the performance)
 - Environmentally responsible (be green)
 - Improve & Simplify Construction Issues (KISS rule)
 - Can potentially increase use of recycled tire rubber
 - Input requested from asphalt suppliers

Hybrid Binder Implementation

- Can replace Asphalt Rubber & Polymer Binder
 - Lab and Field Testing (possible use of APT)
 - Possible Phase 1, **ALLOW** as alternate binder
 - Possible Goal, **REQUIRE** its Use
- Simple Spec Developed
 - Like PG76-22+ (solubility, phase angle, ID modifier)
 - Modifier GTR+SB or SBS with GTR>polymer
- Work w Suppliers on input & timetable

Hybrid Binder Implementation

- Hybrid binders may cost more BUT
 - Can meet same specs as polymer modified
 - Replace recipe spec for performance spec
 - Reduce Agency oversight of recipe spec
 - Simplify binder at the HMA plant
 - Will not settle out like asphalt rubber
 - FL can increase use recycled rubber
 - Improved performance of dense surface mix

A scenic photograph of a beach at sunset. Three palm trees are silhouetted against a vibrant sky of orange, yellow, and blue. The sun is low on the horizon, creating a bright glow. The ocean is visible in the background, and the beach is in the foreground.

Thank You....Questions?