Binders in FL HMA Surfaces
Future for Hybrid Binders

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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
  - $\Rightarrow$ 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
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
Thank You….Questions?