What is High Polymer Binder?

- FDOT's premium binder to address severe rutting, bottom-up fatigue (alligator) cracking, and raveling (OGFC)
- Replaced PG 82-22 binder in the July 2017 Specification Workbook

FDOT High Polymer Requirements

- SBS or SB polymer only
- No Polyphosphoric acid
- More stringent RTFO test residue requirements
- No RAP in HP mixtures

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Binder Type</th>
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</thead>
<tbody>
<tr>
<td>60°C (modified binder only)</td>
<td>Vf = 1.0% maximum; Minimum Tnast = 57°C</td>
</tr>
<tr>
<td>60°C (high polymer binder only)</td>
<td>0.1% LBF max.</td>
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<tr>
<td>60°C (modified binder only)</td>
<td>5% RAC ≥ 25.23% (κ ≤ 0.90)</td>
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<td>κ ≤ 0.90</td>
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Rutting

- Only 0.3% of FDOT’s system is deficient due to rutting
- However rutting is a significant safety concern
- Traffic is increasing

FDOT HVS High Polymer Research

- High polymer vs. PG 76-22 (PMA)

US 90 Midway Project

- US 90 pilot project was paved in August 2015
- Westbound travel lanes at the I-10 interchange
  - Between two truck stops
  - Rutting up to two inches
- Maintenance project that was programmed to be reconstructed with concrete pavement
- Resurfaced top 2.5" with a single lift of FC-12.5 containing high polymer binder
- Concrete reconstruction delayed
Bottom Up Fatigue (Alligator) Cracking

- Like rutting, low percentage of deficiencies in FL
- However, very expensive fix, especially when geometrically constrained by curb or guard rail

High Polymer Research

- Determine the Structural Coefficient for Asphalt Mixes Containing High Polymer Binder (BE321)
- Research Organization: University of Nevada Reno
- The objective of this project was to determine the additional structural value of high polymer mixtures compared to asphalt mixtures containing PG 76-22 binder.
- Research showed there is roughly a 20% increase in structural capacity for high polymer binder mixtures.

Bridge Approaches
High Polymer Research

- Evaluation of FC-5 with High Polymer Binder to Reduce Raveling (BE287)
  - Research Organization: Texas A&M Transportation Institute
- The objective of this research was to determine if the use of high polymer binder in FC-5 mixtures (in lieu of PG 76-22 binder) will increase the performance/longevity of FC-5 mixtures.
- Research indicated a minimum of 2 year increase in pavement life for FC-5 mixtures containing high polymer binder.

Open Graded Friction Course

Florida Department of Transportation's Experience with High Polymer Binder

11/20/2019
High Polymer Projects

- Completed 17 projects with high polymer binder
- Placed over 280,000 tons of high polymer mix in Florida
- First two demonstration projects were built in 2015

Constructability

- Try to avoid hand work areas, but they can be successfully paved with HP binder
- Contractors have averaged a bonus on all projects except one.
- Smoothness data has been good
  - Average IRI for completed projects has ranged from 33 to 47 at acceptance.

Lessons Learned

- Limited supply
- HP binder is more difficult to produce
  - Good communication needed to assure timely supply
- Expensive
  - Only use it where you need it
- Finite storage period
  - Allowances provided to minimize storage issue
    - Blend down procedure
    - Usage in non-HP applications with RAP
Lessons Learned

- Limited supply
- HP binder is more difficult to produce
  - Good communication needed to assure timely supply
- Expensive
  - Only use it where you need it
  - Give the contractor options
- Finite storage period
  - Allowances provided to minimize storage issue
  - Blend down procedure
  - Usage in non-HP applications with RAP

One More Research Project

- Enhanced Characterization of RAP for Cracking Performance (BDV31-977-70)
- Research Organization: University of Florida
- One of the components of this project is to determine if RAP can be utilized in high polymer mixtures without sacrificing performance.
- Project should be completed in 2020
Thank You

Questions?