IDOT HMA Tech Briefs

63rd Annual Bituminous Conference

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Illinois Dept. of Transportation
Asphalt Binder & HMA Research Timeline

2017 – 2019 => ICT R27-175, Development of LTA Protocol for I-FIT

2018-2021 => ICT R27-196HS, Rheology-Chemical Based Procedure to Evaluate Additives/Modifiers used in Asphalt Binders for Performance Enhancements.
- Completed & Drafted BDE Spec for Jan. 2022 to modify Article 1032.05 to include $\Delta T_c$, Softener Modified (SM) binder requirements & GTR
- Industry had concerns & was therefore postponed 1 year

2022 => Worked w/ Industry to address concerns w/ BDE Spec & will be implemented Jan. 2023

2022 – 2024 => ICT R27-250, Using Advanced Binder Rheological Parameters to Predict Cracking Potential of Hot-Mix Asphalt Mixtures w/ Modified Binders
- Picks up where ICT R27-196HS left off
- Uses new protocol to evaluate Softener Modifiers used with Polymer Modified binders
- Determine relationship between Asphalt binder perf. tests with HMA perf. tests (I-FIT & H.W.)
Full Lane Sealant
Four Years Later - No visible difference between controls and FLS applications
FLS Waterproofing System

- Waterproofing system for bridge decks
- Uses FLS and low permeability HMA mixtures that are easier to achieve a higher density with static rolling
- Prevents the ingress of water and chlorides
- Provides an improved wearing surface
- More efficient & cost-effective means of construction than System in 581
Full Lane Sealant Waterproofing System (FLSWS)

1. Tack Coat
   - 0.05 lb./sq. ft.

2. Full Lane Sealant Interlayer
   - 0.25 lb./sq. ft.

3. HMA IL-4.75
   - ¾ Inches

4. Full Lane Sealant Tack
   - 0.15 lb./sq. ft.

5. 9.5 SMA
   - 1 ½ Inches
Full Lane Sealant Waterproofing System

Dist. 8 (I-255) Year 2
Full Lane Sealant Waterproofing System Summary

1. Easier installation and construction.
2. System provides superior waterproofing
   - Water and chloride ingress mitigated.
   - After three years, levels of chlorides same as at time of installation
3. Bridge deck surfaces are wearing and performing well after 3 years
4. No Longer Needs Experimental Features
Longitudinal Joint Sealant (LJS) Update
November 2022 Letting

Added half width applications for inlays or narrow stage construction

Added language requiring a fine agg. cover when LJS will be open to traffic
  ▪ When rain forecasted &
  ▪ When traffic/temperature is causing pickup/damage to the LJS
LJS Pre-formed Roll Specification Req’ts

1032.12 Longitudinal Joint Sealant (LJS). Longitudinal joint sealant (LJS) in the form of spray applied liquid or pre-formed roll will be accepted according to the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure”. The Department will maintain a qualified producer list. The bituminous material used for the LJS shall be according to the following table. Elastomers shall be added to a base asphalt and shall be either a styrene-butadiene diblock or triblock copolymer without oil extension, or a styrene-butadiene rubber. Air blown asphalt, acid modification, or other modifiers will not be allowed.

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic shear @ 88°C (unaged), $G^*$/sin $\delta$, kPa</td>
<td>1.00 min.</td>
<td>AASHTO T 315</td>
</tr>
<tr>
<td>Creep stiffness @ -18°C (unaged), Stiffness (S), MPa m-value</td>
<td>300 max. 0.300 min.</td>
<td>AASHTO T 313</td>
</tr>
<tr>
<td>Ash Content, %</td>
<td>1.0 – 4.0</td>
<td>AASHTO T 111</td>
</tr>
<tr>
<td>Elastic Recovery, 100 mm elongation, cut immediately, 25°C, %</td>
<td>70 min.</td>
<td>ASTM D 6084 (Procedure A)</td>
</tr>
<tr>
<td>Separation of Polymer, Difference in °C of the softening point (ring and ball)</td>
<td>3 max.</td>
<td>ILTP “Separation of Polymer from Asphalt Binder”</td>
</tr>
</tbody>
</table>

1/ For LJS in a pre-formed roll, the ash content shall be a maximum of 20 percent.

2/ For LJS in a pre-formed roll, this test shall be waived.
Contact Ron Price regarding Sampling & Testing of a proposed LJS Pre-formed Roll product

- Ronald.Price@illinois.gov
QC/QA Implementation for Local Agencies
Local Agency QC/QA Special Provision

- Bureau of Local Roads & Streets (BLRS) Special Provision LR1030-2
  - Effective Jan. 1, 2022

- Local Public Agency (LPA) QC/QA Modifications of 2022 Std Spec Book
  - Eliminate QMP Specified based on Tonnage (i.e. QCP ≥ 1200 tons ...)
  - Sampling at the HMA Plant
  - Optional Nuclear Density Testing
Local Agency QC/QA Training

- Live Webex Training Sessions held:
  - March 10 & 18, 2022

- Recordings available thru IDOT Technology Transfer (T2) Center

- Consultant developing additional training videos on:
  - Truck Sampling at HMA Plants
  - HMA Blending & Splitting
  - Random Density Location Determination
  - Random Mix Sample Determination
HMA Plant Approval Policy Memo Update

- Updated to require High ESAL & Low ESAL Approval Process for new plants only
- CBM still notified of all plant modifications for previously approved plants
IDOT Manual of Test Procedures Updates
IL Modified Standards

Temperature & Thermometers

- Majority of AASHTO standards updated for thermometers/ovens/water baths
- AASHTO Re:source is delaying enforcement of these changes for accredited labs to late 2024
- 2023 Plan for HMA-Related IL Mods.
  - Change new temperature & thermometer requirements to optional while maintaining previous IL Mod. requirements
Updates for 2023

- B.6 – QC/QA Initial Daily Plant & Random Samples
  - Shifting Sample Locations for Safety
  - Plant Sampling Road Widener Paving Applications
- B.10 – Drum Plant Calibration

2022 Addenda

- B.9 – Mix Design
- E.5 – PFP Dispute Resolution
- E.8 – PFP & QCP Calculations of Monetary Deductions
Miscellaneous Topics
Recertification:
- Continuing to work w/ LLC to set up QMP Recert Program beginning in Fall of 2023
- 3-year Phase-In w/ most recent being lowest priority (i.e. 15 or longer, 10-15, 5-10)
- Required every 5 years
- Written exams for highest Level taken but will include material from lower levels
- Self-Paced Online Review Sessions
- Lab Proficiency Testing required for 5-Day Aggregate & Level I Techs (held during the Fall of each year)
2022 Asphalt Release Agent (ARA) Field Testing
37 samples submitted
- 9 different ARA manufacturers & 13 different products
- Multiples & replicates from different Contractors submitted
- 110 individual Ultrasonic Strip Tests completed
- ALL tests passed Ultrasonic Strip Test
All approved products have FTIR fingerprint now

CBM currently has threshold limit of 85% min.

32 of 37 samples met the 85% limit

2 samples did not meet 85% limit

3 samples not tested

1 sample => Dilution issues

2 samples => Not on the QPL
Thank You For Your Attention

Illinois Department of Transportation

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Happy Trails