IDOT HMA Update

Illinois Asphalt Paving Association - Annual Meeting

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Illinois Dept. of Transportation
Topics

- I-FIT
- Spec Revisions for 2017
- Thicker Level Binder
- LJS
- Tack Coat
- PG Binder Usage
Findings to Date

2016 Pilot Projects

Spec Revisions for 2017

Training Classes

2017 Round Robins

Implementation Goals
Grade bumping makes a significant impact in terms of FI improvement

- > 20% ABR results demonstrate need for bumping
- > 35% ABR results demonstrate need for second bump

Poly mod => significant improvement in FI

Increased FI with:

- Smaller NMAS
- Increases in VMA
- Increases in Total AC
- Increases in Virgin AC
FI Results for All Pilot Project Mixes

Flexibility Index

Design Prod Prod. (Aging) Cores

D1 P1#1 D1 P1#2 D1 P2#1 D1 P2#2 D2 #1 D2 #2 D3 #1 D3 #2 D3 #3 D4 #1 D4 #2 D4 #3 D5 P1#1 D5 P1#2 D5 P2#1 D6 #1 D6 #2 D6 #3 D7 #1 D7 #2 D7 #3 D8 #1 D8 #2 D9 #1 D9 #2 D9 #3
Observations

- Most everything passed except 4 production tests
- Some production FI increase from Design
  - Moisture blocking absorption of AC
- FI from cores typically much higher
  - Due to being thin

\[
F_{\text{Adjusted for Thickness}} = F_l \times \left( \frac{\text{Thickness}}{50} \right)
\]

Where: Thickness ≥ 2.5 \times \text{NMAS} (recommended)
I-FIT Spec Changes for 2017

- Eliminated DCT testing requirement
- Clarify best 3 out of 4 results
- Reduced Production Sample Size
- RAP/RAS Incentives Remain for I-FIT Projects
Training Classes

- CTL ½ day Classes
  - 11/29 : 2 Classes @ CTL in Chicago
  - 12/1 : 1 Class @ LL College in Mattoon

- Course Content
  - Sample Prep
  - Running Test
  - Use of Software

- Future Training – HMA Level I @ LL
2017 I-FIT Round Robins

- All I-FIT’s (State & Industry)
- 3 Round Robins - Same Mix
  1. Perform Test
  2. Make All Necessary Cuts / Perform Test
  3. Compact Gyratory Spec / Make Cuts / Perform Test
Implementation Goals

- **2017**
  - 2 – I-FIT Projects / District
  - 3- I-FIT Round Robins
  - ICT Phase 2 Research – Develop Long Term Aging Protocol (LTA)
- **2018 & 2019**
  - Increase # of I-FIT Projects
  - Implement LTA Protocol
  - ICT Phase 3 Research - Develop Precision & Bias for AASHTO TP-124
HMA Spec Revisions for 2017
Quality Management Programs

- **PFP** - ≥ 8,000* tons
  - No Temp pavements, incidental, shoulders*
  - No Apps where Thickness < 3 X NMAS
  - No Level Binder applications

- **QCP** – 1,200 → 8,000 tons

- **QC/QA (modified)**
  - < 1,200 tons
  - Shoulders placed w/ Road Widener
  - Patching & Incidental
9.5 CG – 100% for Density Pay Factor

9.5 FG & IL-4.75 – QCP Pay Adj Apply
- Thin Cores < 3/4 inch excluded from Pay Adj
- Contractor marks longitudinal offsets along shoulder for defects such as punchouts, patches, scabs etc..
- QCP Pay Adjustments Apply
  - Thin Cores < 3/4 inch excluded from Pay Adj

Or

- Intelligent Compaction to monitor roller passes & mat temperature prescribed in Mix Reqmnts Table in Plans
The following HMA mixture requirements are applicable for this project:

<table>
<thead>
<tr>
<th>Location(s):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixture Use(s):</td>
<td></td>
</tr>
<tr>
<td>PG:</td>
<td></td>
</tr>
<tr>
<td>Design Air Voids:</td>
<td></td>
</tr>
<tr>
<td>Mixture Composition:</td>
<td>(Mixture Gradation)</td>
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<tr>
<td>Friction Aggregate:</td>
<td></td>
</tr>
<tr>
<td>Mixture Weight:</td>
<td></td>
</tr>
<tr>
<td>Quality Management Program:</td>
<td></td>
</tr>
<tr>
<td>Sublot Size:</td>
<td></td>
</tr>
<tr>
<td>Number of Roller Passes</td>
<td>1/</td>
</tr>
</tbody>
</table>

1/ When a number of roller passes is specified, the Contractor may opt to use intelligent compaction in lieu of density testing for leveling binder placed under the Quality Control for Performance (QCP) program.

**HMA MIXTURE REQUIREMENTS TABLE**

Figure 53-4.M
Moving Random Core Locations

- For Obstacles
- When Paving over Distressed Areas
C) Moving Core Locations.

There are two scenarios in which random core locations may be moved longitudinally using the same random transverse offset. The first scenario is to avoid only the obstacles listed under Case 1 below. The second scenario is to avoid pavement defects in the surface being overlaid as described in Case 2 below.

1) Case 1. In the event the random core location will not allow the necessary compactive effort to be applied, the Engineer will adjust the longitudinal location of the core in order to avoid the obstacle. Using the same random transverse offset, the core location will be moved longitudinally, ± 15 feet to avoid the following obstacles only:

   a) Structures or Bridge Decks
   b) Detection loop or other pavement sensors
   c) Manholes or other utility structures appurtenances

2) Case 2. In the event there are pavement defects in the surface being overlaid, the Contractor may place temporary markings on the shoulder to represent longitudinal locations where a defect is present. These pavement defect locations shall will be approved by the Engineer. If a random core location lands at the same longitudinal location as the temporary mark, the core will be moved 5 feet in the direction toward the paver at the same transverse offset. In the case of an asphalt scab (i.e. thin layer of less than 0.5 inches of asphalt pavement remaining after milling) the temporary markings shall be connected to show the extent or length of the defect. The core location will then be moved to a longitudinal distance 5 feet past the end of the defect toward the paver.
Leveling Binder Thickness

- Pursuing 1 inch Lev Binder for Policy Overlay (Off - Interstate)

- Why Thicker?
  - \( \frac{3}{4}'' \) IL-9.5 LB doesn’t meet 3 X NMAS & therefore difficult to density, hence .... No Density Requirement
  - Increasing LB to 1” brings lift closer to 3 X NMAS & thus allowing a density requirement

- If successful, eliminate 9.5 CG Lev Binder

- Adopt 9.5 FG & IL 4.75 w/ Density Reqmnt for Lev Binder
Longitudinal Joint Seal (LJS)
Implementation Goals:

- 2016 – 2 Projects per District
- 2017 – 50% of Projects per District
- 2018 – Full Implementation
2016 - LJS Projects

- Total of 20-plus projects statewide
- Average awarded cost $2.17/lineal ft
- Observations:
  - Some minimal sporadic flushed spots < 25 feet in 10 plus miles (not a hindrance & shows migration is occurring)
  - Shear tear will occur if required tack not in place
  - Mix will pull up over unbonded scabs
LJS – Life Cycle Cost Analysis
4 Lane - Divided Highway

Cost per lineal foot

<table>
<thead>
<tr>
<th>Additional Service Life (Years)</th>
<th>Breakeven LJS Unit Price</th>
<th>Ave. Awarded LJS Unit Price</th>
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<tbody>
<tr>
<td>1</td>
<td>$19.95</td>
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<td>2</td>
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<tr>
<td>5</td>
<td>$35.84</td>
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</table>
LJS - Spec changes for 2017

- Under Surface lift only Off-Interstate
- Under both lifts for Interstate Overlay
- Increase Elastic Rec. Min. from 58 to 65%
- Ash Content from 0.0 to 6.0% to 1.0 to 4.0
- Remove reqmnt of sandwiching Tack w/in NWJ
- One LJS sample per job from Applicator
Implementation Goals:

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- 2017 – 50% of Projects per District
- 2018 – Full Implementation
Evaluate Bond Strength of New Products

- Bond Strength ≥ SS-1h
- Products to be Evaluated:
  - PG64-22 w/ & w/o wax
  - LJS at 0.10 #/ft² (gal/yd²)
  - Tri-State QS
  - Tri-State QST
  - Asphalt Materials

Testing at ATREL
PG Binder Usage
Thank You

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