HMA Changes on the Horizon

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- Contract research carried out by ICT
- Intergovernmental agreement (IGA) between IDOT and University of Illinois Board of Trustees
- Federal SPR funds; state funds
- Current FY09 to FY11 IGA: $15,050,000
- New 5-year IGA being negotiated
Structures 23 (21%)

Pavements 28 (25%)

Traffic Ops./Maint. 18 (16%)

Safety 13 (12%)

Environment 7 (6%)

Public Trans. 7 (6%)

Planning 9 (8%)

Construction 3 (3%)

Other 2 (2%)
Illinois’ Research Cycle

- Solicit Problem Statements
  - January/June

- TAGs vote
  - mid-March/mid-August

- ICT Executive Committee votes
  - April/September

- Select Researchers
  - TRP signs off on work plan/budget

- Project begins
  - Fall/Spring Semester
Research Problem Statement

http://ict.illinois.edu/RFPs.aspx
R27-42
Thin, Quiet Long-Lasting High Friction Surface Layers

Dr. Imad Al-Qadi and Dr. Sam Carpenter

Tom Zehr
Develop a cost-effective mix for wearing surface and overlay cross-sections

- Utilize locally available aggregates
- Effective and efficient (cost, friction, & durability)
Construction Site

- **Location:** Hoffman Estates & Barrington, IL
- **Road:** IL-72 (Bartlett Rd. to Glen Lake Rd.)
- **Length:** 3.27 miles (each direction)
- **Lane:** 2 lanes (each direction)
- **Old Pavement:** Asphalt overlay over PCC
Quartzite Mix

Standard paving procedure

4.75 SMA

Scalping CM13 Quartzite & FM22
### Fiber/Slag Mix

- **Steel Slag:** High friction, good resistance to stripping and rutting
- **Fiber:** High tensile strength (Polyolefin and Aramid)

### Sprinkle Mix

**Quartzite (+ #4) Chips**
- Pre-coated with 0.75% of PG 64-22
- Avg. Spreading Rate = 1.6 lb/yd²
<table>
<thead>
<tr>
<th>Performance</th>
<th>Test</th>
<th>Method</th>
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<tbody>
<tr>
<td>Friction</td>
<td>• Laser Texture Measuring</td>
<td>In Place</td>
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<tr>
<td></td>
<td>• Locked Wheel Skid Test</td>
<td>Plant Mix</td>
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<td></td>
<td>• Variable-Speed Friction Test (Lab)</td>
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<tr>
<td>Noise</td>
<td>• On-Board Sound Intensity Test</td>
<td>In Place</td>
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<tr>
<td>Rutting</td>
<td>• Dipstick Transverse Profiler</td>
<td>In Place</td>
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<tr>
<td></td>
<td>• Wheel Track Test (Lab)</td>
<td>Core/Plant Mix</td>
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<tr>
<td>Durability</td>
<td>• Cantabro Loss Test (Lab)</td>
<td>Plant Mix</td>
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<tr>
<td>Moisture Susceptibility</td>
<td>• IL Modified Lottman Test (Lab)</td>
<td>Plant Mix</td>
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<tr>
<td>Dynamic Modulus</td>
<td>• Dynamic Modulus Test (Lab)</td>
<td>Plant Mix</td>
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<tr>
<td>Fracture</td>
<td>• Semi-Circular Bending Test (Lab)</td>
<td>Core/Plant Mix</td>
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Thin, Quiet Long-Lasting High Friction Surface Layer

- Completion date – 6/30/12

- What can we expect?
  - More options for durable, long-lasting HMA surfaces that recognize limited friction aggregate availability
  - Spec revisions to accommodate new mixes
R27-79
Designing, Producing, and Constructing Fine-Graded HMA on IL Roadways

Dr. Bill Buttlar, Tim Murphy, and Bill Pine
Matt Mueller and Laura Shanley
Develop fine-graded (F-G) HMA mix designs

Test in lab (rutting, fatigue, thermal cracking, moisture susceptibility)

Construct mixes in field and conduct accelerated load testing
Designing, Producing, and Constructing Fine-Graded HMA on IL Roadways

ATLAS - Accelerated Transportation Loading System
Designing, Producing, and Constructing Fine-Graded HMA on IL Roadways

- Completion Date – 12/31/2011

- What can we expect?
  - Recommendations for the development/refinement of F-G HMA spec
  - Recommendations for new aggregate gradations, if necessary
R27-37
Impact of High RAP Content on Pavement Structural Performance
Dr. Sam Carpenter and Dr. Imad Al-Qadi
Jim Trepanier
Impact of High RAP Content on Pavement Structural Performance

- Characterize properties of mixes with high RAP and with no RAP
- Evaluate durability
- Examine effect of single and double grade bumps
Impact of High RAP Content on Pavement Structural Performance

- Completion date – June 30, 2011

- What can we expect?
  - Knowledge of impact of higher RAP percentages on mix properties
  - Spec revisions to accommodate usage of greater RAP percentages with respect to design and construction
R27-78
Evaluating the Effects of Various Asphalt Binder Additives/Modifiers on Moisture Sensitivity in HMA

Dr. Imad Al-Qadi
Jim Trepanier
Evaluating the Effects of Various Asphalt Binder Additives/Modifiers on Moisture Sensitivity in HMA

- Determine the effects of additives/modifiers

- Additives/Modifiers
  - Liquid anti-strip
  - Hydrated lime
  - SBS
  - Poly-phosphoric acid
  - Foamed binder
Evaluating the Effects of Various Asphalt Binder Additives/Modifiers on Moisture Sensitivity in HMA

- Completion Date – 8/15/2012
- What can we expect?
  - Documented performance of asphalt binder additives/modifiers on HMA pavements
  - Recommendations for specification changes as necessary
Best Practices for Implementation of Tack Coat TRP Recommendations

- Tack Coat Optimization For HMA Overlays
  - Lab and field/ATLAS testing
  - Questions remained
- Identify best methods for
  - Applying tack coat at the verified rate to optimize tack coat material
  - Pavement cleaning equipment
Best Practices for Implementation of Tack Coat TRP Recommendations

- Completion Date – 3/15/2013
- What can we expect?
  - Information on tack coat material selection, optimum rate for various interfaces, surface cleaning methods, application equipment, in-place application rate measurement
  - Recommendations for specification changes as necessary
Questions?