NCHRP 09-49
Performance of WMA Technologies
Stage I - Moisture Susceptibility
General Information

- PI – Amy Epps Martin
- Co-PI – Cindy Estakhri
- 30 Months
- $450,000
- Start: July 26, 2010
- Texas Transportation Institute
Panel Members

Chair: Kim Willoughby (Washington DOT)
Ravi Chandran (Connecticut DOT)
Stacey Diefenderfer (Virginia TRC)
James Horn (Alaska DOT)
Scott Schram (Iowa DOT)
Matt Corrigan – FHWA
Dale Decker - Consultant
Syed Haider – Michigan State University
Rita Leahy – California APA

NCHRP : Ed Harrigan
Related NCHRP WMA Projects

- 9-43 – Mix Design
- 9-47A – Properties, Performance and Environment
- 9-49 – Moisture Susceptibility
- 9-49A – Long Term Performance
Objectives

- WMA Technologies Adversely Affect Moisture Susceptibility?
- Guides for Identifying and Limiting Moisture Susceptibility
Work Plan

- 4 Phases
- 10 Tasks
PHASE I
INFORMATION COLLECTION
Phase I – Information Collection

DOT’s
Contractors
Equipment Manufacturers
Additive Suppliers
Local Government
Internal/External Advisory Groups

TASK 1.0
Identify WMA Projects

TASK 2.0
Literature Review

TASK 3.0
PHASE II Work Plan
Select Puts Field Eval Lab Tests

TASK 4.0
Report Panel Meeting
Goals – Phase I and Phase II

- Reasons for Moisture Susceptibility (Field Performance)
- Time Horizons Associated with Moisture Susceptibility
- Ability of Standard Tests to Predict Moisture Susceptibility
- Materials and Methods to Minimize Moisture Susceptibility
- Evaluate Different Specimen Types (Lab/Field)
WMA Pavement Sites - General

- Climate
- Aggregate Type
- Binder Type
- Anti Stripping Agent
- Age
- Traffic
- Structural Section
- WMA Technology
- Performance
- Data Available
WMA Pavement Sites Selection

A. Develop Detailed List

B. Select About 20 Pavement Sites
   1. Collect More Details

C. Select About 12 Pavements Sites
   1. 7 – Water Susceptibility Problems
   2. 5 - No Water Susceptibility Problems
WMA Pavement Sites Selection

D. Select About 5 Pavement Sites (12 Sections)

1. Control HMA Section
2. Multiple WMA Technologies
3. Original Materials and Mixtures
4. Performance Information
5. Laboratory and Field Test Data Available
6. DOT Cooperation

E. Field Work Cooperation

1. Visual Condition Surveys
2. GPR?
3. Cores?
WMA Pavement Sites – Likely Candidates

- FHWA Mobile Asphalt Testing Laboratory
- 9-47A Projects (NCAT)
- NCAT Test Track
- TxDOT
- Other States
- New Construction Sites (2011)
Specific Project Requirements

- Specimen Preparation
  1. Lab Mixed-Lab Compacted (LMLC)
  2. Plant Mix-Lab Compacted (PMLC)
  3. Plant Mix-Field Compacted (PMFC)

- Curing and Conditioning (Short and Long Term)
  1. Mixing Temperature
  2. Compacting Temperature
  3. In Service Temperature
  4. Length of Time
Specific Project Requirements

- Anti-Stripping Agents
  1. Lime (Hydrated)
  2. Liquid A
  3. Liquid B
# Moisture Susceptibility Tests

<table>
<thead>
<tr>
<th>Conditioned vs Non-conditioned</th>
<th>Wheel Tracking</th>
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<tbody>
<tr>
<td>Soak, Vaccum Saturation, Freeze-Thaw</td>
<td>Hamburg</td>
</tr>
<tr>
<td>Indirect Tensile Strength</td>
<td>Asphalt Pavement Analyzer</td>
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<tr>
<td>Resilient Modules</td>
<td>Dynamic Modules (E)</td>
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<tr>
<td>Dynamic Modules (E)</td>
<td>Dynamic Mechanical Analyzer</td>
</tr>
<tr>
<td>Compressive Strength</td>
<td>Stability (Marshall and Hveem)</td>
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<tr>
<td>Repeated Load Triaxial (Permanent Deformation)</td>
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</tbody>
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PHASE II

CONDUCT AND DOCUMENT WORK PLAN DEVELOPED IN PHASE I
Phase II Conduct and Document Work Plan Developed in Phase I

- Task 5.0 – Conduct Experimental Plan
- Task 6.0 – Document Results
PHASE III AND IV
GUIDELINES, SPECIFICATIONS AND DOCUMENTATION
Phase III and IV
Guidelines, Specifications and Documentation

- Task 7.0 – Guides for Identifying and Minimizing
- Task 8.0 – Revisions to AASHTO Specs and Test Methods
- Task 9.0 – Document Results/Work Plan for Future Research
- Task 10.0 – Final Report
Key Information for WMA Studies

- Existing Pavement Sites with Evidence of Water Susceptibility
- Planned Pavement Sites
- Laboratory Water Susceptibility Studies
- Curing and Conditioning Times
- Water Susceptibility Tests
- Relationships between Tests and Performance
Advisory Groups

- Internal
- External
External Advisory Group

- Existing Pavement Sites
- Planned Pavement Sites
  - Identify Location
  - Assist with Planning/Placement
- Group Existing Technologies
- Identify New Technologies
- Sample Preparation
- Curing and Conditioning
- Anti Stripping Agents
- Review Test Programs, Results and Documents (NCHRP Approval)
External Advisory Panel

- Meet at WMA TWG
- Express Interest
- Willing to Help
- Contact Information
Questions ?