HMAC Inspector

Self Introductions

• Name
• Who you work for
• What your job duties are

Class Rules

• Informal Format – Participate…Ask questions as they arise
  – Rewards for participation!
• Respect Others
• Follow along in class binder
• Turn cell phone ringer off
Class Purpose

- The purpose of the HMAC Inspector class is to provide each participant with information and tools to be an effective HMAC inspector.
- Attention will be focused on items that can be inspected that are critical to the performance of HMAC and necessary for fulfilling contract documentation requirements.
- Best practices will be covered to a limited degree and related to the specifications.

AGENDA

Module 1: HMAC Performance Theory
Module 2: Specifications/Inspectors Role
Module 3: Quantity Calculations
Module 4: Surface Preparation
Module 5: Delivery
Module 6: Pavers & Mix Laydown

Module 7: Compaction Fundamentals
Module 8: Compaction Equipment & Operations
Module 9: Compaction & Smoothness Testing
Module 10: Joints
Module 11: Miscellaneous Issues
Module 12: Critical Inspection Items
Introduction to Performance Theory

Module 1
Terminology

• In-Place Air Voids
  In-Place Air Voids = 100 - Compaction

• Compaction
  If Compaction is 93%, then In-Place Air Voids is _____________

Performance Theory

Over time………….

If In-Place Air Voids < 3%, then the pavement will ____________

If In-Place Air Voids > 8%, then the pavement will ____________, ___________, and ____________
Performance Theory

• Washington DOT Study

• For every 1% In-Place Air Voids in excess of 7%...
  – Lose _______ % Fatigue Life
  – Fatigue = Alligator Cracking
Rutting

When the total pavement structure is ok, but rutting occurs due to an unstable mix...

The rutting is confined mostly to the top ________ of mix

Mix deeper than _________ will not compact substantially more over time

Mix Design Selection

Freeway Mix Design in Cul-de-sac

Cul-de-sac Mix design on Freeway
Goals of HMAC System

- Design overall pavement structure thickness to carry the traffic loadings over the intended life
- Design and construct HMAC that will ultimately compact to 4 to 5% In-Place Air Voids over time and under traffic

Warm Mix Asphalt
What is WMA

- Technologies that allow a reduction in temperatures at which asphalt mixes are produced and placed.
- Viscosity of the asphalt are reduced to allow a drop of 35 to 100 °F.

<table>
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<th>Technologies</th>
<th>Process Type</th>
<th>Production Temp drop by 30 to 50 °F</th>
<th>Production Temp drop by greater than 50 °F</th>
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<td>Foaming</td>
<td>Frequently observed</td>
<td>Observed</td>
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<td>Crushers</td>
<td>Chemical Additive</td>
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<td>Low Energy Asphalt</td>
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<td>Rediset WMM</td>
<td>Chemical Additive</td>
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<tr>
<td>WAM-Foam</td>
<td>Foaming</td>
<td>Frequently observed</td>
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Plant Modifications

Plant Additives

- Examples
  - Advera WMA
  - Aspha-min
  - Rediset WMX
  - Sasobit
- For drum plant, goal is to encapsulate with binder in mixing chamber
- Modifications
  - Inlet into mixing chamber (like fiber)
  - Feeder
HMAC Construction Inspector Training
Inspector Quality Assurance Program

Plant Modifications

Foaming Process

- Examples
  - Astec Double Barrel Green
  - Gencor
  - Stansteel
  - Terex
  - WAM-Foam

Best Practices for Producing WMA

- Reduce stockpile moisture content
- Tune burner to ensure complete combustion
- Drying aggregate while maintaining baghouse temperatures

Plant Modifications

Terminal Blend Binder Additives

- Examples
  - Rediset WMX
  - Sasobit
- Both products can be added at the terminal without high-shear blending
- Requires binder certification test
Why Warm Mix?

- Paving Benefits
  - Compaction aid
  - Cold weather paving
  - Longer haul distances
  - Use of higher percentage of RAP
  - Specific pavement rehabilitations
- Reduced Fuel Usage
- Reduced Emissions
- Improved Working Conditions

ODOT Warm Mix Asphalt

- Permissible by special provisions – will become part of standard specs soon.
- Acceptable process will be posted on Pavement Services web site

WMA Startup

WMA – Separate JMF is issued

- HMA design with WMA process identified and temperature range changed
- HMA must be produced with 2 running averages showing acceptable volumetrics, before WMA production
  - Goal is to complete any JMF adjustments before WMA starts – then see volumetric with WMA production
WMA Startup

WMA – Separate JMF is issued
• Suggest Pb changes be limited to 0.3% for WMA production
• WMA production may be stopped and changed back to HMA at the discretion of the Engineer.

WMA Lesson Learned

Compaction Drives Temperature Change
• Most successful Contractors start with 10 degree temperature drops, while CDT closely monitors compaction
• Temperature drops range from 10 to as high as 40, typical target is 30.