Warm Mix Asphalt
“A Contractors Perspective”

Lincoln Noel – Payne & Dolan, Inc.
Introduction

- Payne & Dolan, Inc.
- WMA definitions and uses
- WMA technologies
- QC/QA practices “BMP’S”
- Past experiences
- Summary
Payne & Dolan, Inc.  
Vertically Integrated Construction Company
Operations Aggregates-Asphalt
WMA – What is it?

- European Scan Tour investigated to lower emissions.
- Hot Mix Asphalt adjusted in order for it to be produced and placed at lower temperatures; “Warm Mix”.
- Production and placement temperature MAY be lowered by 50°F – 70°F +.
- The reduction in temperature allows reduced fuel consumption and plant emissions.
WMA – Is Also This!

- A method used to achieve one of more following:
  - Improve Ride Quality (Paving over crack sealant)
  - Increase Workability
  - Allow increased haul distances from the asphalt plant to the jobsite (Great for rural areas!)
  - Allow for Cold Weather paving and extend the paving season (Perfect for Michigan climate)
  - Compaction Aids
Different WMA Technologies

- LEA-CO
- Eco-Foam II
- Rediset WMX
- CECABASE RT
- Aspha-min
- Double Barrel Green System
- Green Machine
- HGrant Warm Mix System
- Qualitherm
- Aquablaclack WMA
- Low Emission Asphalt
- Evotherm
- Aqua Foam WMA
- Advera
- Sasobit
- Thiopave
- Accu-Shear Dual WMA System
- WMA System

www.warmmix.org
Typical Mixing Temperature Ranges
QC/QA Practices “BMP’S”

- Know the specification
  - Mixing Temperature Requirements
  - Rheology Testing
  - Proposed use-Dosage Rates
  - Mix volumetrics

- Decide on compaction Temperatures
  - Reheated Samples

- Aggregate
Cases Studies......so far!

- County Road 513, Rapid River (2010) – Advera & Evotherm
- Rice Lake Road, Houghton Co. (2011) - Evotherm
M-95, Iron Mountain

- Passing relief lane
- MDOT PWL Specification
- NCAT on-site
M-95, Iron Mountain

- **Mix Design**
  - Existing approved MDOT 5E3 design
  - Binder: PG 58-34
  - AC Target: 5.52%
  - Recycle: 14% RAP

- **Project Specifics**
  - Surface Layer: 1¾” 9.5 mm
  - Normal Mix Temperature: 317° F
M-95, Iron Mountain
M-95, Iron Mountain

- PWL = 100 for both Control and WMA sections

<table>
<thead>
<tr>
<th>Property</th>
<th>JMF</th>
<th>Control</th>
<th>Sasobit</th>
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<td>5.61%</td>
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</table>
M-95, Iron Mountain

- Final product
County Road 513, Rapid River

- **Mix Design**
  - MDOT approved 13A
  - Binder: PG 52-34
  - AC Target: 5.30%
  - Recycle: 17% RAP

- **Project Specifics**
  - Lower Layer: 2” 12.5mm
  - Surface Layer: 2” 12.5mm
  - Length: 11.25 miles
  - Tonnage: 25,000
County Road 513, Rapid River

- Funded by MDOT and the Delta County Road Commission
- Part of NCHRP 09-47A,
  Being conducted by the National Center for Asphalt Technology (NCAT) in cooperation with Advanced Materials Services, LLC
County Road 513, Rapid River
County Road 513, Rapid River

- **Infrared Photos**

| Spot 1 | 257° F |
| Spot 2 | 262° F |
| Spot 3 | 261° F |

- **Warm Mix**
- **Hot Mix**
## County Road 513, Rapid River

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County Road 513, Rapid River

- **Plant Production Benefits**
  - Energy Savings (>15%)
  - Lower Emissions
    - Improve Air Quality
  - Lower Drum Temps (-15%)
  - Decrease Inlet / Exit Temps of Baghouse
  - Wearpart Longevity
    - Flighting / Gearboxes / Motors
## Fuel & Emissions

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<tr>
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<th>Control HMA</th>
<th>Advera</th>
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<td>Production (TPH)</td>
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Rice Lake Road

- **Mix Design**
  - MDOT approved 13A
  - Binder: PG 58-28
  - AC Target: 5.42%
  - Recycle: 27% RAP

- **Project Specifics**
  - One Lift at 2” 12.5mm
  - Length: 1.41 miles
  - Tonnage: 2,500
Rice Lake Road
Rice Lake Road

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<th>Property</th>
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<td>Pb</td>
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<td>5.61</td>
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Cold Weather Paving (WI) - WMA
Cold Weather Paving (WI) - WMA

Infrared Temperatures

Spot 1: 242°F
Spot 2: 234°F
Spot 3: 239°F

Ambient Temperatures
The end you still need to know your stuff

- Know your WMA product
- Know your aggregates
- Know your processes (BMP’S)
- Know your customers expectations!
The data collected thus far is consistent with national results and there has not been a significant difference between HMA and WMA testing results.

- Hot sample volumetrics are no different than reheated sample volumetrics.
- No concern with early rutting.
Summary

- Most WMA additives don’t require the mix design to be recreated (NCHRP Report 691).

- Field trials have shown that mixture volumetrics are nearly identical between HMA and that same HMA mix design with WMA additives.
The benefits of WMA are numerous. They include:

1. Reduction in fuel consumption
2. Reduction in plant emissions
3. Extension of the paving season (i.e. compaction aid for cold weather paving)
Summary

- The benefits of WMA are numerous
  4. Increased haul distances
  5. Increased workability
  6. Improved ride quality
Finally, WMA is really just HMA with improved workability and the ability to be produced at lower temperatures if desired.

a.k.a. It’s another tool in the contractor’s toolbox!
Questions?

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