Warm Mix Asphalt a Contractor’s Perspective

**SEAUPG**
Southeastern Asphalt User/Producer Group
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**Overview**
Payne & Dolan Inc
What is Warm Mix Asphalt
What are the Features & Benefits
P&D Experience and Perspective
Future Expectations

**Payne & Dolan Inc**
Vertically Integrated Construction Company

**Operations Aggregates-Asphalt**

**What is Warm Mix Asphalt?**
Hot Mix Asphalt is modified in order for it to be produced and placed at lower temperatures "Warm Mix".
Production and placement temperature is lowered by 20 – 70 F. Used to make the asphalt more workable at lower temperatures.

**Warm Mix Asphalt Processes**
- Organic, Wax-like additives
  - Sasobit® – Sasol International
  - Asphalan B – Romanta
  - Fatty Acid Amides – Licomont S 100
- Foaming Processes
  - Aspha-min Zeolite – Advera
  - Low Energy Asphalt – Fairco/Eiffage Travaux Publics
  - Foam Water-Gencor, Astec, Maxam, Terex
  - LEAB® – BAM
- Emulsion Based-Chemical Based
  - Evotherm™ – MeadWestvaco
- Vegetable based synthetic binders
- Emerging U.S. Technologies
Warm Mix Asphalt Benefits:
Reduced Plant Emissions

Typical reductions:
- 25% CO₂
- 25% SO₂
- 35% VOC
- 20% CO
- 40% NOₓ

Warm Mix Asphalt Benefits:
Reduced Fuel Usage

Burner Fuel Savings are typically 11% to 25%

Warm Mix Asphalt Benefits:
Paving Benefits

- Improved workability
- Extend Paving Season
- Pave through cooler temperatures
- Haul longer distances
- Improved Compaction
- Better Ride IRI

Warm Mix Asphalt Benefits:
Reduced Worker Exposure

Typical reductions:
- 30% to 50% asphalt fumes and poly-cyclic aromatic hydrocarbons (PAHs)

Payne & Dolan’s Interest

Experiences

First Warm Mix Project In Wisconsin and Michigan 2006-350K ton To Date
- Sasobit-Wax
- Evotherm-Emulsion Based and 3G
- Advera-Zeolite “Foaming”
- Gencor-Green Machine “Foaming”
- Maxam-AquaBlack “Foaming”
Sasobit

- Sasobit – Wax Additive
  - Added to bitumen at the Asphalt Cement plant or pneumatically fed through the fiber port of a drum plant.
  - Superpave E-1, E-3
  - Binder Type 64-22, 58-28
  - Used in Conjunction RAP (10-20%)
  - Average Mix Reduction Temp 45 F
  - Average Field Density Improvement 9 Percent

Sasobit – Benefits
- Field Crews - Slightly better hand work
- Mix Tests and Volumetrics consistent
- No change in TSR values noticed
- Mix costs associated with material $2.25-$3.00 ton
- May give slightly stiffer binder grade
- Plant modification costs $60K

Evotherm

- Manufactured by MeadWestvaco
- Three Products:
  - Evotherm Emulsion Technology with Chemical Package - 30% water
  - Evotherm DAT Chemical Package – 10% water
  - Evotherm E3 Waterless technology
  - Evotherm 3G M1 - Waterless technology
  - Superpave E-3, E-1, E-3
  - Binder 64-22, 58-28
  - Average Temp Reduction 65 F
  - Average Field Density Improvement 1.1 Percent

Evotherm Attributes
- Improved Workability and Handwork
- Handwork slightly better than Sasobit
- Mix Tests and Volumetrics consistent but not as repeatable when reheated samples taken
- TSR ratios slightly better
- Mix costs associated with material $1.75-$2.75 ton
- New chemical package very easy to use at plant
- Plant modification costs $25-$30K

Advera® WMA

- Advera Foaming
  - Added through fiber port
  - Superpave E-1, E-3, E-10, SMA, Commercial Mixes
  - Binder 58-28, 64-22, 70-28P
  - Mix Temperatures Reduced 10-50 F
  - Densities are always equal to or better than control mix
  - Compaction aid cooler temperatures
  - Paving over crack sealant

Advera® Attributes
- Handwork segregation much improved at higher temperatures
- Can be stored for 8 plus hours in silo and maintain properties
- Improved ride with harsh mixes
- Very consistent volumetrics
- No change in TSR ratios
- Very versatile in being used as compaction aid or warm mix
- Paved in December in Wisconsin E-10 with 70-28P oil
- Extends the paving season
- Cost $1.25-$2.25 ton
- Plant modifications $50-$80K
Gencor Green Machine

- Installed directly on AC Line
- Superpave E0.3,E-1,E-3
- Binder S8-28, 64-22
- Mix Temp. Average Reduction 10-35F
- Densities equal to or better than control
- Workability and handwork improved
- Material laydown behind screed improved less dragging

Maxam AquaBlack

- Installed directly on AC Line
- Superpave E0.3,E-1,E-3
- Binder S8-28, 64-22
- Mix Temp. average reduction 35F
- Densities equal to or better than control
- Workability and handwork improved
- Material laydown behind screed improved – less dragging

Maxam AquaBlack

- Installed directly on AC Line
- Superpave E0.3,E-1,E-3
- Binder S8-28, 64-22
- Mix Temp. average reduction 35F
- Densities equal to or better than control
- Workability and handwork improved
- Material laydown behind screed improved – less dragging

Things to Watch

- Production
  - Make sure aggregates are dried properly
  - Monitor by watching TSR values
  - Don’t go too cold too fast
  - Double check procedures
  - BMP’s for adding modifiers
- Laydown
  - Cold weather make sure to warm up equipment
  - Start hotter and cool down slowly
  - Longitudinal joint – Joint Heater?
  - Listen to the field crew
- Testing
  - Have a procedure for repeatability
  - Reheated samples – not the same as fresh samples

Benefits

- Production
  - Quality consistent mix/Rap/Shingles
  - Fuel Savings
  - Ability to sell Superpave mix to FOB customers
  - Higher production makes late season
  - Longer haul distances
- Laydown
  - More consistent mat temperature
  - Better densities
  - Better ride (less summer paving over crack sealants)
  - Less settled/warping
- Quality/consistent mix (Rap/Shingles)
  - Work later in season
  - More consistent mat temperature
  - Better densities
  - Better ride (Less summer paving over crack sealants)
  - Less settled/warping
- Profitability
  - Work later in season
  - Customer based-FOB customers
  - Lower operational costs (fuel usage/ rollers)
Future Expectations

- Extension of paving seasons
  - Stimulus Package - Ability to work longer even a month
  - Ability to work longer seasons drops operational costs for the year
- All the various technologies had benefits
  - Further Development of testing procedures
  - Further reduction in material additive costs
- 3-5 Years
  - Warm Mix / Compaction Aid used in 75 percent of mixes
  - See the benefits of improved compaction and smooth ride
  - Have true performance data "Better Compaction and Ride="

Questions?