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Warm Mix Asphalt a Contractor's Perspective

SEAUPG
Southeastern Asphalt User/Producer
Group
November 9-12

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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

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Payne & Dolan Inc
Vertically Integrated Construction Company


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Operations Aggregates-Asphalt



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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.

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Warm Mix Asphalt Processes

- Organic, Wax-like additives
 - Sasobit® – Sasol International
 - Asphaltan 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

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Warm Mix Asphalt Benefits: Reduced Plant Emissions



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Typical reductions:

- ✓ 25% CO₂
- ✓ 25% SO₂
- ✓ 35% VOC
- ✓ 20% CO
- ✓ 40% NO_x




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Warm Mix Asphalt Benefits: Reduced Fuel Usage



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Burner Fuel Savings are typically 11% to 25%

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Warm Mix Asphalt Benefits: Paving Benefits




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



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Warm Mix Asphalt Benefits: Reduced Worker Exposure



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Typical reductions:

- ✓ 30% to 50% asphalt fumes and poly-cyclic aromatic hydrocarbons (PAHs)



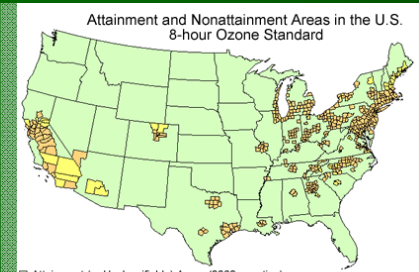
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Payne & Dolan's Interest



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Attainment and Nonattainment Areas in the U.S. 8-hour Ozone Standard



- Attainment (or Unclassifiable) Areas (2668 counties)
- Nonattainment Areas (432 entire counties)
- Nonattainment Areas (42 partial counties)

Experiences




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- 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"




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Sasobit




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- 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




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Sasobit




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- 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



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Evotherm




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- 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

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Evotherm




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- 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


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Advera® WMA




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- 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




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Advera® WMA




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- 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




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Gencor Green Machine




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- Gencor-Foaming Water
 - Installed directly on AC Line
 - Superpave E0.3,E-1,E-3
 - Commercial mixes
 - Binder 58-28, 64-22, 64-28
 - Mix Temp - Average Reduction 10-35F
 - Densities equal to or better than control
 - Workability and handwork Improved
 - Material laydown behind screed improved less dragging




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Gencor Green Machine




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- Gencor-Foaming Water
 - Mix Volumetrics slightly harder to control - not as consistent as with control
 - Mix cools faster in cold temperatures than control at same temperature, much faster using high % FRAP
 - Ideal for use during the summer and on commercial mixes
 - Unit cost \$45-\$60k
 - Water costs minimal
 - Very economical
 - User friendly




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Maxam AquaBlack




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- Maxam-Foaming Water
 - Installed directly on AC Line
 - Superpave E0.3,E-1,E-3
 - Binder 58-28, 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




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Maxam AquaBlack




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- Maxam
 - Mix Volumetrics slightly harder to control - not as consistent as with control
 - Mix cools faster in cold temperatures than control at same temperature
 - Ideal for use during the summer & commercial mixes
 - Mix aggregate film thickness more consistent than control
 - Unit cost \$55-\$65k
 - Water costs minimal
 - Very economical



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Things to Watch




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- 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 joints - Joint Heater?
 - Listen to the field crew
- Testing
 - Have a procedure for repeatability
 - Reheated samples - not the same as fresh samples

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Benefits




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- Production
 - Quality/consistent mix (Rap/Shingles)
 - Fuel Savings
 - Ability to sell Superpave mix to FOB customers
 - Higher production rates late season
 - Longer haul distances
- Laydown
 - More consistent mat temperature
 - Better densities
 - Better ride (Less bumps paving over crack sealant)
 - Less shadowing/segregation
 - Aesthetics better handwork
- Profitability
 - Work later in season
 - Customer base-FOB customers
 - Lower operational costs (fuel usage/ rollers)?

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Future Expectations



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- **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="

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Questions?



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