

Warm Mix Asphalt

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What is WMA?

- Process or additive that allows for the production and compaction of asphalt pavements at temperatures lower than traditional HMA
 - Reduction can range between **275 - 185°F**
 - Different mixes and technologies dictate temperature change



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WMA Technologies Used in North America

- Foaming
 - Double Barrel Green
 - Terex Warm Mix Asphalt System
 - Gencor
 - Stansteel
 - LEA
 - Aspha-min
 - Advera WMA
 - WAM Foam
- Organic Additive
 - Sasobit
- Chemical Additive
 - Evotherm
 - Evotherm DAT
 - REVIX
 - Rediset WMX
 - Cecabasa RT

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Summary of WMA Introduction to Drum Plants

- Foaming Devices
 - Foaming unit injects pressurized water into binder
- Additives
 - Typically injected near binder line

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General Differences Between Technologies

- Foaming using just water is less expensive but the drop in temperature is also less
- Some of the additives alter binder properties
 - i.e. Sasobit
- Some additives act like additional fines
 - i.e. Aspha-min and Advera WMA

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Benefits of WMA

- Energy savings
- Reduced emissions
- Extended paving season
- Increased haul distance
- Reduced issues with crack sealant
- Less oxidized binder
 - Less brittle, may endure cold better
 - Softer binder good for high RAP content mixes



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Similarities With HMA

- Same plants, just modified in many cases
- Same paving equipment
- Same rolling equipment

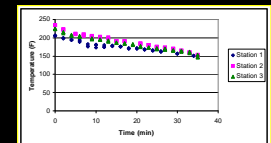


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Concerns About WMA

- Moisture susceptibility
- Rutting
- Affect on baghouse
- Coating
- Cooling
- Activate RAP and RAS binder
- Compatibility with polymer modified binder
- Expense



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How Are The Concerns Being Addressed?

- Moisture susceptibility
 - Anti-stripping agents
 - Monitoring of pavement performance
 - Checking moisture content of mix
- Rutting
 - Binder is less oxidized but lab and early field result indicate it is not an issue

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How Are The Concerns Being Addressed?

- Affect on baghouse
 - Monitoring high tonnage projects
- Coating
 - Some mixes look poorly coated prior to the silo but at the site are fine
 - Adjusting temperature
- Cooling
 - Properly tarped trucks
 - WMA does not cool at the same rate as HMA
 - Compaction window broader for WMA

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How Are The Concerns Being Addressed?

- Activate RAP and RAS binders
 - Field and laboratory studies underway
 - Evaluating blending of virgin and RAP binder for HMA and WMA
- Compatibility with polymer modified binder
 - Test sites constructed
 - Higher temperature than neat mixes
- Expense
 - Offset by energy savings
 - Add RAP

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How Do You Design For WMA?

- In the past as a drop in
- New WMA mix design guide
 - NCHRP 09-43
 - March 2010
 - Addresses different technologies

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WMA Resources

- WMA Technical Working Group
 - NAPA, FHWA, DOTs, Industry, and NCAT
 - Guide specification
 - www.warmmixasphalt.com
- NAPA Documents
- Researchers, DOTs, and contractors with experience
 - At least 35 states have had WMA demos

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Questions?

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