Warm-Mix Asphalt

An Opportunity for Environmental Protection

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What is Warm-Mix Asphalt?

- Hot-Mix Asphalt (HMA)
  - 94% of all roads
  - Asphalt Binder + Aggregate
  - 280°F - ~350°F

- Warm-Mix Asphalt (WMA)
  - Binder + Aggregate + Additive
  - 212°F - 280°F
  - 31.2% of total tonnage
How is Warm-Mix so cool?

- Reduced Viscosity
  - Aggregate coated easier at lower temperatures

- 3 methods:
  - Water injection (foaming)
  - Organic Additives (waxes)
  - Chemical Additives
Asphalt Manufacturing

1. Cold aggregate supply system
2. Drum dryer
3. Coal Burner
4. Coal feeder
5. Cyclone dust collector
6. Baghouse dust collector
7. Hot aggregate elevator
8. Vibrating screen
9. Filler supply system
10. Weighing and mixing system
11. Asphalt storage
12. Bitumen supply system
Environmental Benefits

• Reduces Air Pollution & GHGs:
  • VOCs – 50%
  • NOx – 60%-70%
  • SO2 – 30%-40%
  • CO – 10%-30%
  • PM – 20%-25%
  • CO2 – 30%-40%

• Reduces Odors & Fumes

• Improved Conditions for Workers

• LEED Credits
Economic Benefits

- Lowering temperatures reduces fuel use by 20%-35%
- Increased Production
- Shorter project timelines
- Longer hauls
- Increased use of Reclaimed Asphalt Pavement
- Cold-weather paving
Performance Benefits

• Compaction Aid
  • Improved in-place density
  • Better Durability — every 1% = 10% increase in pavement life

• Decreased Plant Wear

• Improved temperature uniformity

• Longer placement window

• Increased workability
Why We Care

Figure 17: Estimated Percent of Total Production Using WMA by State, 2012–2016
Outreach Efforts

• Previously:
  • Case by case – driven by community member complaints
  • Outreach to trade associations (e.g. NAPA, State DOTs, etc.)

• Currently:
  • Illinois, Michigan, & Wisconsin
  • Municipal governments
  • Regional institutions
  • Procuring agencies
  • Utilities
Specifications

• Illinois Department of Transportation permits WMA use
• WMA is treated as HMA in all testing specs
• Section 403.02: Recommended Weather Conditions
  • WMA: 15°F to 30°F – 60°F to 85°F
• There are 16 companies on IDOT’s approved technologies list: 12 “Mechanical” and 4 “Additive”
• WMA defined by minimum temperature of 215°F
Obstacles

- Specifications
- Contract bids
- Initial investment
- Lack of supply
- Lack of demand
- Lack of awareness
- Longevity & performance fears
Going Forward

- Published Articles
- Case Studies
- Webinars
- WMA Resources
- Research
Questions?

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