Hot, Warm, Luke
Warm and Cold Mix
Asphalt

How to be a Hometown Environmental Hero
Hot Mix Asphalt Mixes

- First Recorded Use: 620 B.C.
- 1870: 1st true Hot Mix Asphalt pavement in the US was laid in front of City Hall in Newark, NJ

Invoice:
Nebuchadnezzar Paving, Inc.
1896, New York City adopted asphalt paving in place of brick, granite and wood block.

1900, Frederick J. Warren filed a patent for “Bitulithic” pavement, a mixture of bitumen and aggregate.
Hot Mix Asphalt Mixes

- 1900: natural sources of Lake Trinidad and Bermudez Lake in Venezuela.
- Warren Brothers built the first asphalt facility to contain virtually all the basic components of those of today in 1901.
Hot Mix Asphalt Mixes

- Originally placed by hand
- 1920s Portland cement concrete mechanical spreaders "could be easily transported in one hand."
- 1930s Barber Greene first produced an asphalt finisher

Originally placed by hand

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Hot Mix Asphalt Mixes

- Automated Plants
- Automated Pavers
- High Tech Vibratory Compactors
Cold Mix Asphalt Mixes

First used Cutbacks developed in early 1900s. The Energy Crisis of the early 1970s increased the use of Emulsions for Cold Mix Asphalt Mixes.

Mix equipment using rapid curing cutback. Old methods persisted for years.
Cold Mix Asphalt Mixes

- Flexible but strong to withstand temperature fluctuations
- Mixed at a central plant or on-site in portable plants
- Ambient temperatures reduce emissions, fumes and energy needs
- Minimizes transportation and material costs
- Cost-effective paving for upgrading rural roads far from a hot mix plant
Warm Mix Asphalt Mixes

What is “warm Mix”?

- Technologies
- Allow aggregate coating at lower temperatures
- Reduce Viscosity of the asphalt
- Temperatures 35 to 100°F Lower
Warm Mix Asphalt Mixes

- Classification By Temperature

![Graph showing classification of Warm Mix Asphalt Mixes by temperature](image.png)
Warm Mix Asphalt Mixes

Classification By Type

1. Organic Additives
2. Foaming
3. Other Stuff
Warm Mix Asphalt Mixes

- Organic Additives
  - Fisher-Tropsch Wax
  - Montan wax
  - Fatty Amides

Sasobit®
Warm Mix Asphalt Mixes

- Foaming
  - Foaming nozzle
Warm Mix Asphalt Mixes

- Foaming
- Hydrophilic Material

Advera

ASPHA-MIN

BLADES
Warm Mix Asphalt Mixes

- Foaming
  - Other Methods

Low Emission Asphalt
Warm Mix Asphalt Mixes

- Other Stuff
  - WAM-Foam
  - Rediset WMX
  - Cecabase
Why Warm Mix?

- Sustainable development is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."
Why Warm Mix?

- Worker Safety: Asphalt Fumes
Why Warm Mix?

- **Reduced Emissions**

<table>
<thead>
<tr>
<th>Emission</th>
<th>Average</th>
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</thead>
<tbody>
<tr>
<td>CO$_2$</td>
<td>28%</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>27%</td>
</tr>
<tr>
<td>VOC</td>
<td>35%</td>
</tr>
<tr>
<td>CO</td>
<td>24%</td>
</tr>
<tr>
<td>NO$_2$</td>
<td>63%</td>
</tr>
<tr>
<td>DUST</td>
<td>47%</td>
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</tbody>
</table>
Why Warm Mix?

- Reduced Fuel and Energy Usage
  - Burner Fuel – over 35%
  - Electric: No Increase
Why Warm Mix?

- Improved Field Compaction
- Reduced Viscosity of binder
Why Warm Mix?

- Longer Haul Distances
- Extending Paving Season
Why Warm Mix?

- Higher RAP Percentage

Fine and Coarse RAP Sizing
Why Warm Mix?

- Thick Lift Patching
- Frankfurt Airport:
  - 24” Deep in 7.5 Hr.
Why Warm Mix?

- Better Working Conditions
  - Fumes
  - And Heat
Why Warm Mix?

Sustainability

- Reduced Emissions
- Better Working Conditions
- Fuel and Energy Savings
- Higher RAP %
- Improved Field Compaction
- Extend Paving Season
- Thick Lift Compaction

Social

- Bearable

Environment

- Viable

Economic

- Equitable

WMA
What does this all mean?

- Great Stuff – **But** How Much does it Cost?
  - Additional Cost to produce.
  - **BUT** Lower Energy costs
What does this all mean?

- National Gurus: 90% Warm Mix in 5 years
- NYSDOT: Preliminary Specification Imminent
- “Environmental” Climate of the day will promote its use

It's coming to a Plant near you!
What does this all mean?

- Business as usual
- Results that are as good if not better!
Warm Mix Asphalt

Change We Can Live With!

Pave The Planet
One World
One People
One Slab of Asphalt