Asphalt Emulsions
What They Can Do For You

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Presented by
LADA of New York

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What is emulsification?
- Emulsification is a process using mechanical and chemical processes that allows the combining of two or more incompatible materials.
- Examples include mayonnaise, hair dyes, paints, and ice cream.
- Shake a bottle of oil & vinegar salad dressing – a temporary emulsion is formed!

History of Emulsified Asphalts
- First developed in early 1900’s
- 1920’s – spray and dust control emulsions
- 1930 – 1950, steady increase in usage
- 1953 – McConnaughay perfects the High Float system and initiates Cold Mix work
- As traffic loads and higher volume roads were built, emulsion use lagged
- 1960 – present, steady increase for pavement maintenance
What is an asphalt emulsion?

- Consists of three basic ingredients – asphalt, water, and an emulsifying agent (soap)
- The asphalt is sheared into minute particles and suspended in the water through the use of an emulsifier

Basic Asphalt Emulsion Components

- Asphalt
- Emulsifiers
- Water
- Emulsifier + Water = “SOAP”

Common Emulsifiers

- Vegetable Fatty Acid such as Tall Oil
- Animal Fatty Amine such as Tallow Diamine
- Quaternary Ammonium Salts, Nonyl Phenol

Asphalt Emulsion Mill

Three Categories of Emulsions

- Anionic
- Cationic
- Nonionic

The differences are based on basic laws of electricity
---Like charges repel and unlike charges attract

Other Ingredients of Asphalt Emulsions

- Neutralizers for the emulsifier, such as Caustic soda or HCL
- Wetting agents to help with coatings
- Adhesion agents to mitigate stripping of the asphalt film from the aggregate
**RS – Rapid Setting**

- RS-1, RS-1h, CRS-1, CRS-1h, HFRS-2, RS-2, CRS-2
  - These grades are formulated to break quickly and set up fast
  - These grades are normally used for spray applications, surface treatment, tack coat
  - Have little or minimal ability to mix and satisfactorily coat aggregates

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**Specialized Fiber Application Machine**

**Fog & Sand**

**Paver Placed Surface Treatment**

**MS – Medium Setting**

- MS-2, CMS-2, HFMS-2, CMS-2h, HFMS-2h, HFMS-2s, HFMS-2GH
  - Have the ability to adhere to dirtier aggregates for surface treatments on lower volume roads, and will mix with coarse, graded, and fine aggregates
**MS Grade**

**Emulsified Asphalt Cold Patch**

**Open Graded Cold Mix Paving**

**Dense Graded Cold Mix Paving**

**Cold-In-Place Recycling**

SS – Slow setting

- SS-1, SS-1h, CSS-1, CSS-1h
- Have the ability to mix with fine or dirty aggregates
Reprofiling, FDR, Stabilization, Type III

Reprofiling

QS – Quick setting

CQS-1h, CQS-1hP
Used for quick set slurry seal or micro-surfacing

Fiber Modified Micro-Surfacing
Polymer Modified

- A polymer is a group of many units called monomers
- Examples of monomers commonly used in asphalt modification are styrene and butadiene

Tack Coat 702-90XX

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<thead>
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<th>Table 702-6 Grades of Asphalt Emulsions Used for Tack Coats</th>
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<td>Antisiccative (Table 762-3)</td>
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<td>Antisiccative (Table 762-3)</td>
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<table>
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<th>Table 702-13 Tack Coat</th>
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<td>Material Designation</td>
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<td>Residue by Distillation, %</td>
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<td>Oil Emulsion, Volume of Total Emulsion, %</td>
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<tr>
<td>Test on Residue from Distillation, Penetration, 77°F (25°C), 100 g, 5 sec</td>
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<td>Suggested Spraying Temperature, °F</td>
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Finished Product Testing

- Products meet or exceed NYSDOT specs
- Meet ASTM, AASHTO specifications
- Quality control tests performed daily