Storage & Handling of Emulsions

John Christensen
Product Development Engineer
LTRC Emulsion Conference
Emulsion Storage & Handling

- Briefly – What is an Emulsion
- Handling
- Storage
- Pumping
- Loading
- Destruction
Asphalt Emulsions

Emulsifiers

CH₃CH₂CH₂CH₂CH₂
CH₂CH₂CH₂CH₂CH₂
CH₂CH₂CH₂CH₂CH₂

CH₂CH₂CH₂CH₂CH₂

O
NH₂CH₂CH₂
NH
NH₂CH₂CH₂
Asphalt Emulsions

- Mixture of Asphalt & Water
- Asphalt Particles Suspended in Water
- 3 to 7 micron Particle Size
- 1g of Asphalt Produces 10 Billion Particles
- Emulsifier Coats the Particles and Prevents Coalescing
Asphalt Emulsions

Cationic Emulsion

Anionic Emulsion
Asphalt Emulsions
# Asphalt Emulsions

<table>
<thead>
<tr>
<th>Cationic</th>
<th>Anionic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CRS, CMS, CQS, CSS</strong></td>
<td><strong>RS, MS, QS, SS</strong></td>
</tr>
<tr>
<td><strong>Suffix</strong></td>
<td><strong>Suffix</strong></td>
</tr>
<tr>
<td>▶ 1 or 2 – Viscosity</td>
<td>▶ 1 or 2 – Viscosity</td>
</tr>
<tr>
<td>▶ H – Asphalt Base Hardness</td>
<td>▶ H – Asphalt Base Hardness</td>
</tr>
<tr>
<td>▶ P – Polymer</td>
<td>▶ P – Polymer</td>
</tr>
<tr>
<td><strong>Prefix</strong></td>
<td><strong>Prefix</strong></td>
</tr>
<tr>
<td>▶ HF – High Float</td>
<td></td>
</tr>
</tbody>
</table>
Handling

Never Mix the Two Chemical Types
Handling

Mixing of Cationic & Anionic
Handling

Avoid

- Combining Different Source Emulsions
- Combining Different Aged Emulsions

Drain Tanks if Combining Different Types
Handling

Never

Never Add Hot Asphalt to Emulsion
Never Violent Boiling Over Reaction

Adding Asphalt to Emulsion Transport

Never Add Small Amount of Asphalt
Never Let Water Boil Off
Never May Have to Repeat

Avoid Adding Emulsion to Asphalt
Handling

Temperature

✗ Avoid the Extremes

✗ Freezing – Lose Emulsifier Coating

✗ Excess Heat
  ✓ Water Evaporates – Lose Mixture
  ✓ Localized Hot Spots – Torches, Fire Heating

✗ Do Not Exceed 190°F

✗ Tanks & Pumps
Handling

Storage Temperatures

- **#1 Viscosity – CSS & CQS**
  - 50°F to 140°F

- **#2 Viscosity – CRS, CMS, RS, MS**
  - 125°F to 185°F
Storage

- Tanks Should Be Agitated
- Dedicated Tanks for Different Types
- Do Not Heat Without Circulation or Mixing
- Vertical Tanks Preferred
- Minimize Surface Area Exposed to Air
- Use Oil Heating over Fire Burners
- Minimize Storage Time

Contact – John Houston
Storage

In the Field

- More Surface Area in Field
- Keep Transport Lid Closed
- Drain Tank by Using All Product
- Diluting – Use What You Dilute!
Pumping & Loading

- **Pumping**
  - Pre-Heat Pumps – 150°F
  - Do Not Excessively Circulate – Excessive Shear

- **Loading**
  - Minimize Air Entrainment
  - Minimize Multiple Transfers
Destruction

- Do Opposite of Everything I Mentioned Today
- Change the Ph!
Thank You! - Questions
Easy Questions Only!!