How to **Plan and Implement** a Dust Control Program

Presented by

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Senior Tribal Coordinator with the Tribal Transportation Program
Large Area and remote Villages
Inaccessible by roads
Remote Alaskan Villages and Dust
Close the windows!
Typical Alaskan dusty road
Fine dust particles stay suspended
What we will cover in this presentation:

• Dust is the problem
• Understanding what dust is and how it impacts us
• Roadway shape and potholes
• Ways to reduce or eliminate dust
• Dust control products
• Delivery of equipment and products
• Costs for lightweight equipment
The Take away from this presentation:

- A cost effective Dust Control Program is available and realistic for remote villages in Alaska.
- Resources and technical assistance are available through the Tribal Transportation Program.
- Dust in your community can be reduced or eliminated.
What is Dust?

DUST IS:

* Very fine particle size
* Material that has broken free from the rest of the surface material
* The particulate matter that can float in the air
* Particles from soil and rocks
What is Dust?

- Airborne particles
- Formed by tire friction, vehicle speed, and air stream
- Fines leave, coarse remains = raveling

- Blading exposes more
- PM10 & PM2.5
- Blade/moisten/compact
- Prevention: < 25 mph
- Prevention: Palliative
Communities Identify Dust as a major health and safety problem.

Vehicles on gravel roads produce dust.

Application of Dust Control methods can reduce or eliminate dust in the air.

Many Rural Alaskan communities do not have access to heavy equipment to apply dust palliatives.
Unpaved Road Materials

- Dirt
- Sand
- Shell
- Soil
- Base Course Gravel
- Driving Course Gravel

Alaska is predominately Silt, sand and gravel
How roads go bad

Potholes

- Rounded depressions
- Formed from tire bounce on weak spots
- Flat road; ponding of water

- Drivers move to miss, but form new ones
- Prevention: Restore Drainage with Crown and Ditches
- Don’t just fill the hole
Roadway Shape: Flat <bad>

- Lanes undefined
- No drainage
  - Ponding
  - Potholes
  - Hydroplaning
Good Roadway Drainage

- Good Surface Drainage
- Good Ditch Drainage
- Good Cross-Flow Drainage: Culverts

RECOMMEND 4% Crown

* Water is not your friend!
Water is not our friend!
Stabilization and Dust Control Categories

* Water
* Water Absorbing
* Organic Petroleum
* Organic Non-Petroleum
* Concentrated Liquid Stabilizers
* Synthetic Polymer Emulsion
* Clay Additives
# Dust Products Chart

<table>
<thead>
<tr>
<th>Family</th>
<th>Product</th>
<th>Climate</th>
<th>Traffic ADT</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wet</td>
<td>Damp</td>
<td>Light &lt;100 Medium 100 to 250 Heavy &gt;250 Plasticity Index % Fines #200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Rainy</td>
<td>Dry</td>
<td>&lt;3 3-8 &gt;8 &lt;5 5-10 10-20 20-30 &gt;30</td>
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<tr>
<td>Water</td>
<td>water</td>
<td>XXX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td>Water Absorbing</td>
<td>calcium chloride</td>
<td>XXX</td>
<td>X</td>
<td>XXX</td>
</tr>
<tr>
<td></td>
<td>magnesium chloride</td>
<td>XXX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td></td>
<td>sodium chloride</td>
<td>XXX</td>
<td>X</td>
<td>XXX</td>
</tr>
<tr>
<td>Organic Petroleum</td>
<td>asphalt emulsions</td>
<td>XX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td></td>
<td>cutback asphalt dust oil</td>
<td>XX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td></td>
<td>modified AC emulsions</td>
<td>XX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td>Organic Non-Petroleum</td>
<td>animal fats</td>
<td>XXX</td>
<td>X</td>
<td>XXX</td>
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<tr>
<td></td>
<td>lignosulfonate</td>
<td>XXX</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td>molasses sugar beet</td>
<td>XXX</td>
<td>X</td>
<td>XX</td>
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<tr>
<td></td>
<td>tali oil emulsions</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>vegetable oils</td>
<td>XXX</td>
<td>X</td>
<td>XXX</td>
</tr>
<tr>
<td>Electrochemical</td>
<td>enzymes</td>
<td>XX</td>
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<tr>
<td></td>
<td>ionic</td>
<td>XX</td>
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<td>XX</td>
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<tr>
<td></td>
<td>sulphonated oils</td>
<td>XX</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Synthetic Polymer</td>
<td>polyvinyl acetate</td>
<td>XX</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>vinyl acrylic</td>
<td>XX</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Clay Additives</td>
<td>bentonite</td>
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<td>X</td>
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<tr>
<td></td>
<td>montmorillonite</td>
<td>XXX</td>
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<td>X</td>
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</tbody>
</table>

This chart provides a comprehensive view of how different dust products behave under various conditions. Each cell in the chart indicates the compatibility or effectiveness of a specific dust product under specified environmental conditions, helping to guide selection based on practical needs.
EK35  Palliative in Tanana
EK35 Palliative
Solving Gravel Road Distress

- Use proper gradation
- Build it right
- Use palliatives
  - Stabilize
  - Control dust
Lightweight Blade [CAT 299d]
Stabilization and Dust Control

* Stabilization
  * Typical: 6 inches
  * Longer term effectiveness
  * Provides ~85% dust control

Dust Control
  - Typical: Surface Application
  - Shorter Term Effectiveness
  - No depth stabilization
Lightweight ATV & Trailer
Lightweight Equipment
Off loading the aircraft with CAT 299d
Off loaded 29,000 pounds in 54 minutes.
Liquid Palliative in 275 gallon tote
[1 Ton each]
Liquid totes, 275 gallon each
Three Application Passes
Lightweight Equipment

1. **CAT 299D** With fork lift attachment
   - Vibratory roller attachment
   - Blade/Grader attachment

2. **Trailer** [carries the palliative, sprayer and generator]

3. **Tow vehicle** [6 wheeler, 6x6 CanAm 1000cc]

4. **Sprayer**

5. **Generator**
## Typical Equipment Costs:

*(NOTE: pricing will vary, is estimated and based on 2014 pricing)*

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Caterpillar 299D Skid Steer</td>
<td>$100,000.00</td>
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<tr>
<td>Attachments:</td>
<td></td>
</tr>
<tr>
<td>Vibratory Roller</td>
<td>$20,000.00</td>
</tr>
<tr>
<td>Blade [grading]</td>
<td>$20,000.00</td>
</tr>
<tr>
<td>Trailer</td>
<td>$10,000.00</td>
</tr>
<tr>
<td>6 wheeler CanAm 1000cc</td>
<td>$15,023.00</td>
</tr>
<tr>
<td>Spraying unit</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>Pump</td>
<td></td>
</tr>
<tr>
<td>Spray bar</td>
<td></td>
</tr>
<tr>
<td>hoses</td>
<td></td>
</tr>
<tr>
<td>Generator</td>
<td>$3,999.00</td>
</tr>
<tr>
<td>12 CY Dump Truck [used]</td>
<td>$30,000.00</td>
</tr>
</tbody>
</table>
Resources & Contacts on line after the Conference
Dust Control is good for everyone!
Paying attention to details is important!
Questions?