Gravel Roads

Stabilizers

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Unpaved Road Dust Control and Stabilization Treatment Selection Guide

Acknowledgement

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Course outline and timing (Continued)

- Soil Stabilizers (Dust Palliatives) February 4,2021 (10:00 – 12:30)
  - Snow Plowing on Unpaved Roads
  - Different Families of Stabilizers
  - Installing and Maintenance of stabilized roads,

Plowing and Plows

- Know your equipment!
- Know your route, at night
- Do you know where the end of the curb, guardrail ends, the manhole that has a lip, the railroad tracks, bridge expansion joint are?
- Have you calibrated your sander?
- Have you checked your cutting edges?

In a bad winter - trees, buildings and machinery are often close to the road

Bales too close to R-O-W!

Seems Minor in the Fall

Then the problem grows!

End result!

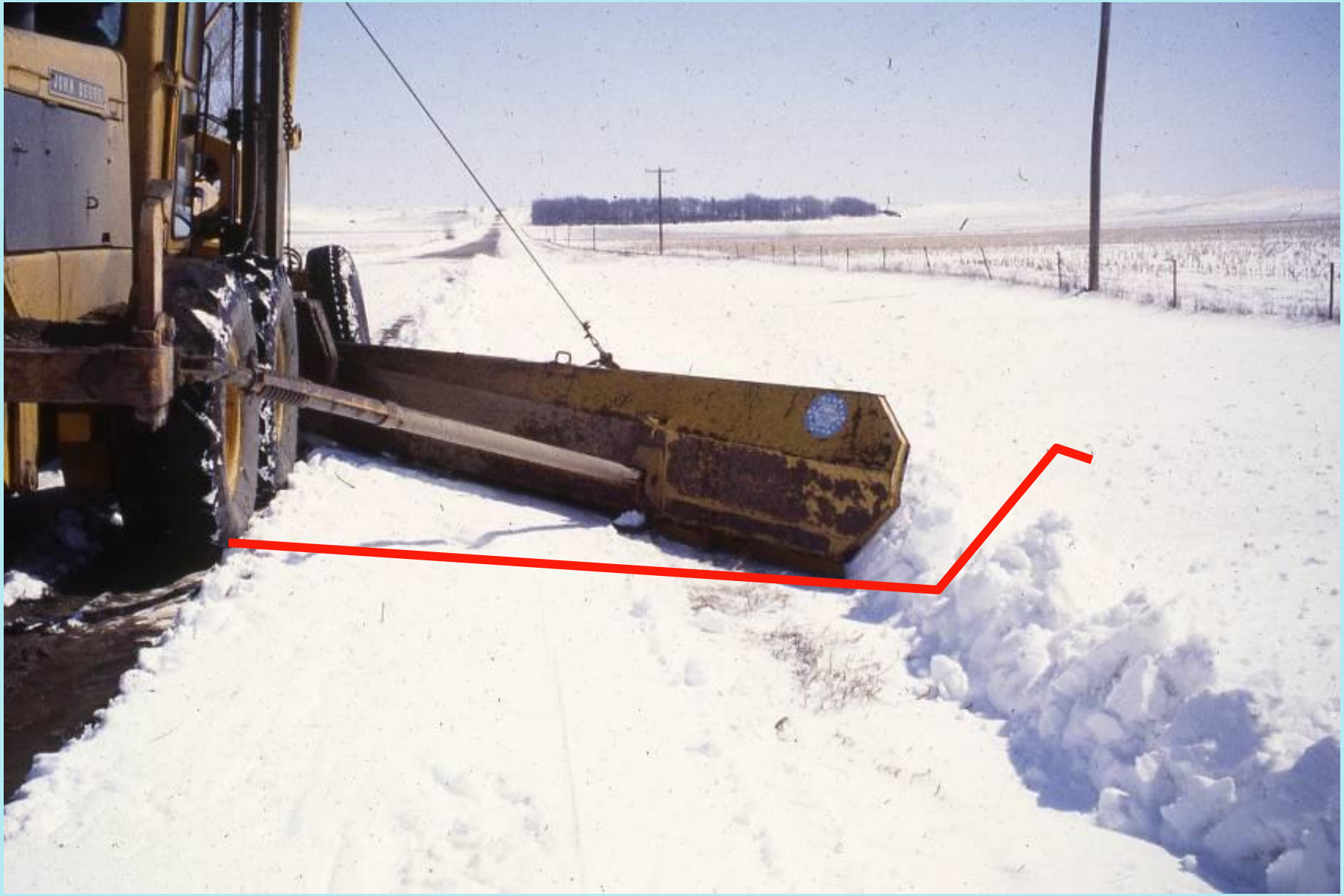
In deep snow use your plow first

First break-through

First pass is critical

Use of under blade, V-plow & wing simultaneously – requires skill!


JOHN DEERE



Idaho Unpaved Road Stabilization

Current State of Practice:

1. Most agencies have a Transportation Management Plan
2. Most agencies are doing some stabilization
3. Gravel Roads Workshop

When Consider Stabilizers or Dust Suppressants

- Define stabilization, modification, dust abatement
- Goals, Objectives, Expectations
- Economics
- Environmental
- Effective Life

What is Dust?

DUST IS:

- **Material that can pass through the #200 sieve**
- **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**
- **Different from Plasticity Index**

Dust can be controlled, managed, reduced, or eliminated.

What Contributes to or Causes Dust?

- Vehicle Speed
- Number of Vehicles
- Number of Wheels per Vehicle
- Vehicle Weight
- Gradation of the Surface Material
- Compaction, Cohesion, Bonding, Durability of the Surface Fines
- Breakdown or loosening of material
- Lack of Moisture

Dust Abatement Material Types

- 1. Water
- 2. Water Absorbing
- 3. Organic
  - Petroleum
  - Non-Petroleum
- 4. Electrochemical
- 5. Synthetic Polymer Emulsion
- 6. Clay Additives

Dust Abatement Material Types

1. WATER

- Binds material together with surface tension
- Wet material doesn't float in the air
- Easy to apply, but dries out easily

Salts

2. WATER ABSORBING

- **Calcium Chloride**
- **Magnesium Chloride**
- **Sodium Chloride**


Immediate Application

- **Absorbs moisture from the air**
- **Holds moisture longer in the material**
- **Increases the surface tension between particles**
- **Can be rewetted and reworked**


One-year later

3. ORGANIC

- Petroleum
  - Asphalt Emulsion
  - Modified Asphalt Emulsions
  - Cutbacks
  - Dust Oils
- Non-Petroleum
  - Lignosulfonates
  - Tall-Oil Emulsions
  - Molassas & Sugar Beet Oils
  - Animal Fats
  - Vegetable Oils
- **Binds particles together with adhesion**
- **Relatively insensitive to moisture**

Asphalt emulsion

Ligno is soaking into the loose gravel.

Road is dust free and ready to drive on after ligno application is complete.

4. ELECTROCHEMICAL

- Enzymes
- Ionic
- Sulfonated Oils

- Changes the characteristics of clay particles
- Relatively insensitive to climate conditions

5. SYNTHETIC POLYMER EMULSIONS

- Polyvinyl Acetate
- Vinyl Acrylic
- Polymer Combinations

PVA

Vinyl Acryli

- Binds particles together with adhesive polymer properties

6. CLAY ADDITIVES

- **Bentonite**
- **Montmorillonite**

- **Used to *add* PI to the material**
- **Agglomerates with dust**

Procuring and Specifying Chemical Treatments

- Regardless of the process followed, practitioners are encouraged to mandate that suppliers provide:
- A certificate of compliance stating that the supplied product meets a minimum category specification and that the chemical formulation is safe for humans, mammals, and plants.
- A comprehensive safety data sheet (SDS, previously known as material safety data sheet [MSDS]).
- Mix design test results showing that the required minimum strength can be achieved at the proposed application rate if the objective of the treatment is long-term stabilization (see Chapter 4).

Application Techniques

- Asphalt emulsion = spray or mix, cure
- Portland Cement = mix, add moisture, cure
- Lime = mix, cure
- Remaining liquid treatments = spray or mix, penetrate, cure
- Remaining dry treatments = mix, cure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6/6/2006

Application Techniques

- Proper Spread/Mixing Rates – quality control
- Climate & Curing
- Compaction

Gravel Road Cost Analysis

- Joe Weist, P.E.
- Highway District Engineer
- 1975 to 2011
- Lakes County Highway District
- Coeur D' Alene, Idaho