

# Dust Control or Stabilization



Presented By: Zach Clothier

# Meet The Team



**Back ground MDOT, Kalamazoo County Road  
Commission, Sales Rep Great Lakes Chloride**



**Great Lakes Chloride, Inc. has been a Liquidow™  
Calcium Chloride Distributor since 1969.**



**We provide calcium chloride throughout Michigan and  
Indian as well as parts of Illinois, Kentucky and Ohio.**



# Presentation Outline

## Dust Control

- The Problem with Dust
- Maintenance Cost
- Benefits of Dust Control
- Types of Dust Control Products
- Important Soil Characteristics

## Quality Control

## Environmental Impact

## Conclusion



# The Problem with Dust

## Dust – It's part of all unpaved surfaces

- A road / parking lot is made of a mixture of different sized materials
- The dust — “fines” — are VERY important! They help hold the rest of the material together

## Where does it come from?

As a rule, one car making one pass on one mile of untreated, unpaved road every day can generate one ton of dust in one year

# Maintenance Cost



**Next to winter maintenance,  
gravel roads are the single  
most expensive maintenance  
activity**



# Maintenance Cost

- **Grading & Shaping.**
- **How many times a season?**
  - No Treatment, 8 to 10 grading cycles.
  - Oilfield Brine Applications, 8 to 10 grading cycles.
  - Mineral Well Brine applications, 6 to 8 grading cycles
  - Calcium Chloride Applications, as few as 4 grading cycles per season.

# Maintenance Cost

What's Needed?

**Must build strong and deep today!**



# Maintenance Cost

## Challenge's



**What a change in 50 years!**





# Maintenance Cost

## Challenge's



*Michigan limits the maximum number of axles to eleven and per-axle load restrictions have resulted in a maximum gross vehicle weight of 164,000 pounds.*

*Along with agricultural equipment, truck loads add to the challenge's for gravel road maintenance*



# Maintenance Cost

## Challenge's



# Benefits of Dust Control



**Depending on the situation, treating an unpaved road with an appropriate additive generally limits fine loss typically leading to:**

- **Reduced Dust**
- **Improved Safety and driver experience**
- **Improved air and water quality**
- **Improved quality of life**
- **Extended grading cycles**
- **Reduction of maintenance cost**
- **Reduced public complaints**
- **Base Stabilization**

# Types of Dust Control



## Water Absorbing or Hydroscopic

- Magnesium Chloride
- Calcium Chloride

## Organic Non-Petroleum or Natural Polymers

- Lignosulfonates
- Tree Resins
- Tree Oils
- Vegetable Oils
- Molasses Base
- Well Head Brine

## Organic Petroleum and Petroleum Resins

- Blend of natural polymers and petro based additives

## Synthetic Polymer Emulsions

- Multiple formulas for different applications



# Types of Dust Control

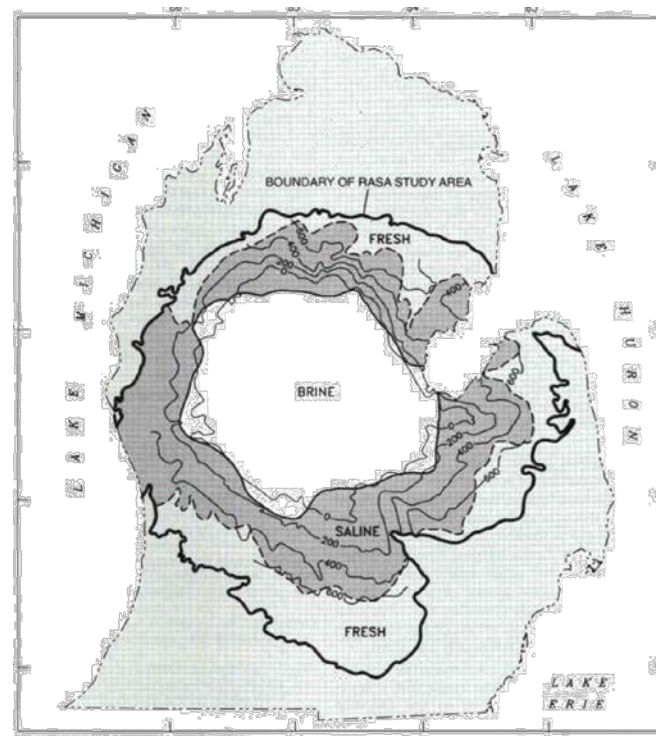
## Well Head Brine

Commonly known as mineral well brine is pumped from underground and used without any processing

Mistakenly called "natural calcium chloride"

Active ingredient concentration includes sodium, mag, and calcium chlorides. Concentration will vary day to day.

Common concentration is 26% total chlorides although this varies



# Hygroscopic Salt; What is it?

**Calcium Chloride:** a hygroscopic salt material, that tends to attract ambient moisture from the environment.

## Moisture Absorbency and Retention

- Keeps road materials damp, greatly reducing dust formation
- Improves compaction and workability
- Reduces erosion and run-off of sediment into streams and rivers

## It acts like a glue

- Positively charged calcium ions interact with negatively charged clay particles to increase the attractive forces of soil fines.

## It reduces frost heave

- By lowering the freeze point of capillary water, it is less likely that damage will result from ice formation in the soil.
- Lower maintenance costs resulting from less need for aggregate replacement and blading



# Manufacturing Process

## *Occidental Chemical Corporation (OxyChem)*



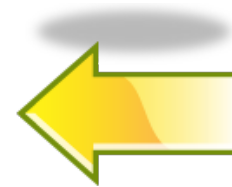
**The worlds largest producer of calcium chloride is located in Ludington, Michigan. They utilize an abundant supply of naturally occurring brine about half a mile below ground.**

**The brine is extracted then processed, purified, and manufactured into a variety of solid and liquids to produce a variety of products.**

**Technical grade liquid Calcium Chloride produced at OxyChem will have a concentration level between 28-42 percent.**

# Hydroscopic Salt Benefit

## Challenge's



Untreated Road  
Spring Thaw

Treated Road  
Spring Thaw





# Dust Treatment vs Stabilization

## Annual dust treatment

Pro: More chloride at road surface

Good for light traffic

Con: Greater long term cost

## Stabilization

Pro: Less dusting, raveling, wash boarding

Good for heavy haul roads –  
saves money

Less blading and rock  
replacement

Greater public satisfaction

Con: High initial cost.

Only suitable for good gravel  
gradations



# Quality Control



**Sampling and testing should be standard to  
Know what your paying for**

**You get what you pay for!**

**All Equipment is calibrated**

# Environmental Impact

Dust may not be your only environmental impact

## Know what is being put onto your roads

### Soil Migration

$\text{CaCl}_2$  has more vertical than lateral migration. Moves deeper into soil during rainy periods; returns to the surface during dry periods.

By remaining in liquid form during hot, dry periods, product loss by solidification followed by dust generation is avoided.

### Vegetation

- Several recent studies document beneficial impact to vegetation from reduced injury caused by dust.
- Calcium is considered one of the major plant nutrients, given that it is a structural component of cell walls. Most plants have between 1 percent and 2 percent by weight of dry matter of calcium in their leaves.

# Conclusion

**Although most dust control is paid for by townships in Michigan the cost of doing business might be on the agencies**

**Proper surface preparation and application are important for best results.**

**Thank you!**