

# NDDOT Construction Conference 2016

Full Depth Reclamation (FDR) & Cement Stabilized Base

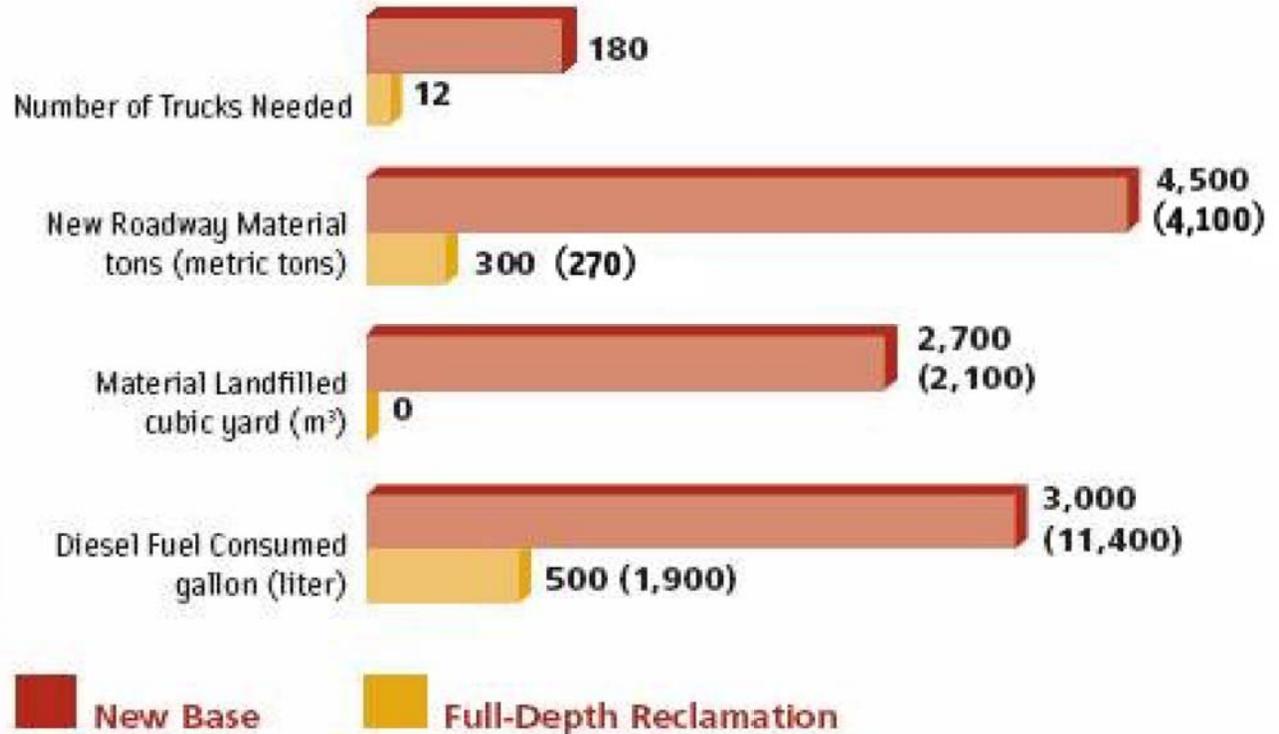
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# Recycled Materials & Energy Efficient

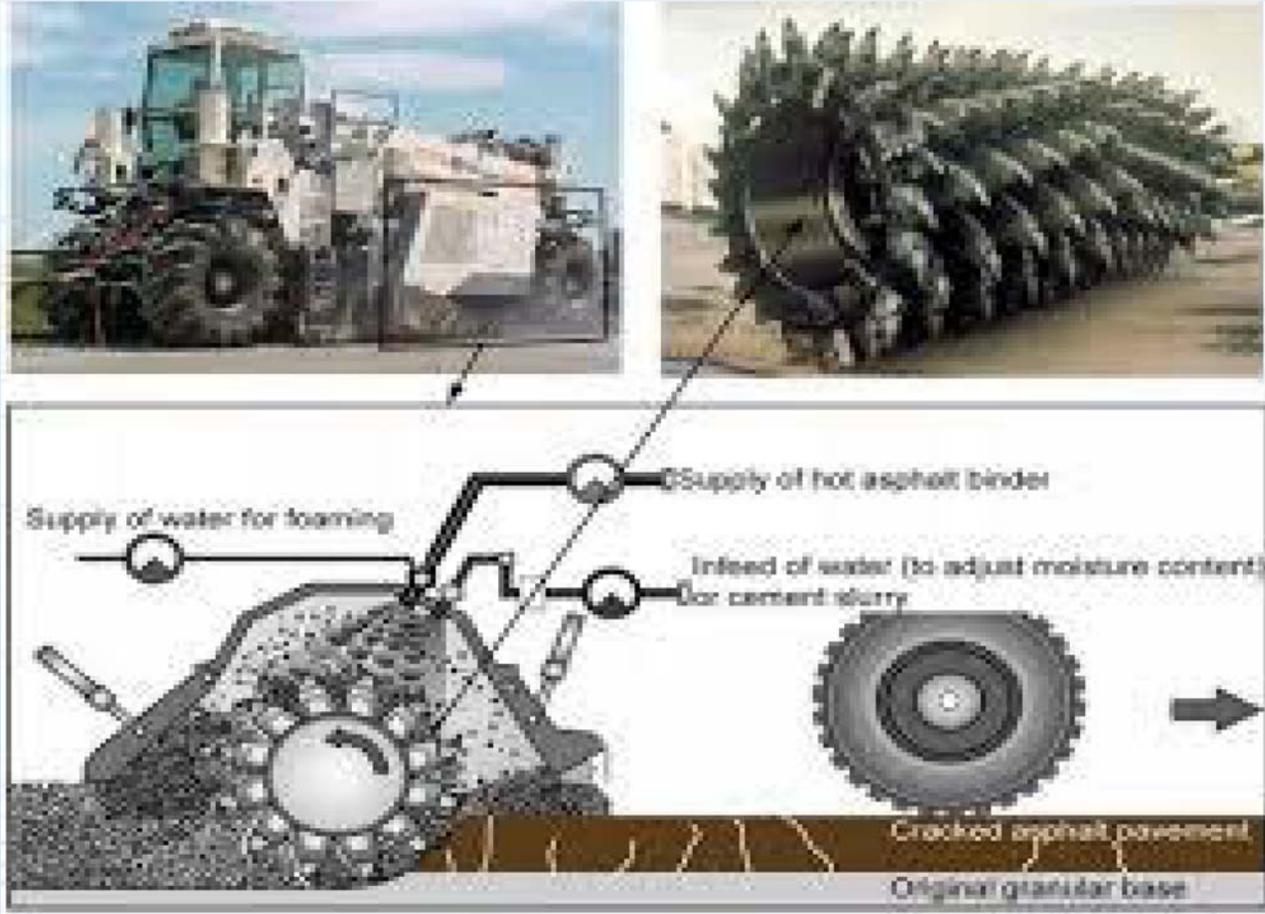
## Energy Use and Materials

### *Full-Depth Reclamation vs. New Base*



Based on 1 mile (1.6 km) of 24-foot (7.3-m)-wide 2-lane road, 6-inch (150-mm) base

# Meat & Potatoes of FDR



# Before we start treating base

- Contractor submits mix design and NDDOT verifies it.
- The contractor uses existing blended material from the project for mix design.
- Specimens are tested at 0.5% cement increments.
- Seven day cure on the test specimens.

# Quiz Question

- **What is the target psi to determine the % of cement?**

What is the target  
psi to determine the  
% of cement?

**300 psi**

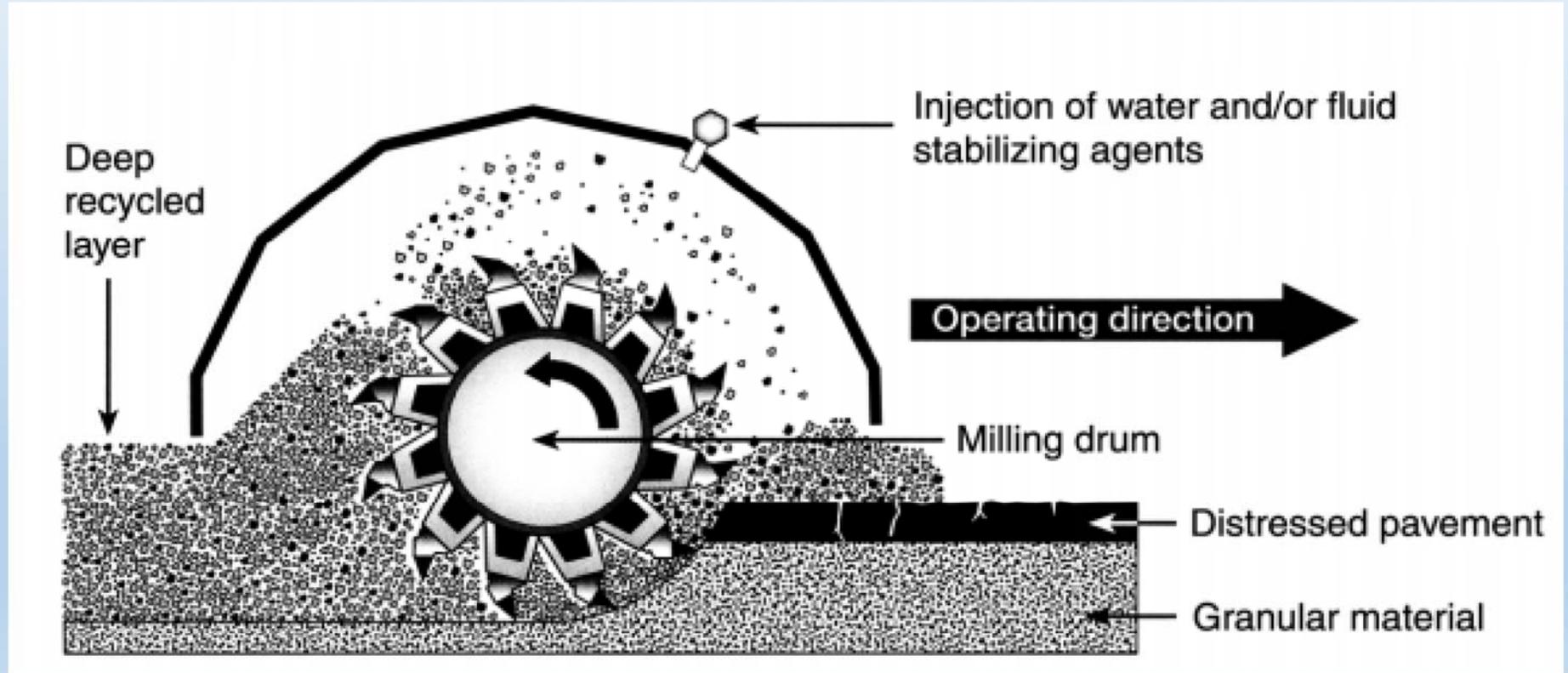


# Equipment

- Mining and Blending Machine
- Water Hauling Tanker
- Sheep's-Foot Compactor
- Steel Drum Roller
- Rubber Tire Roller

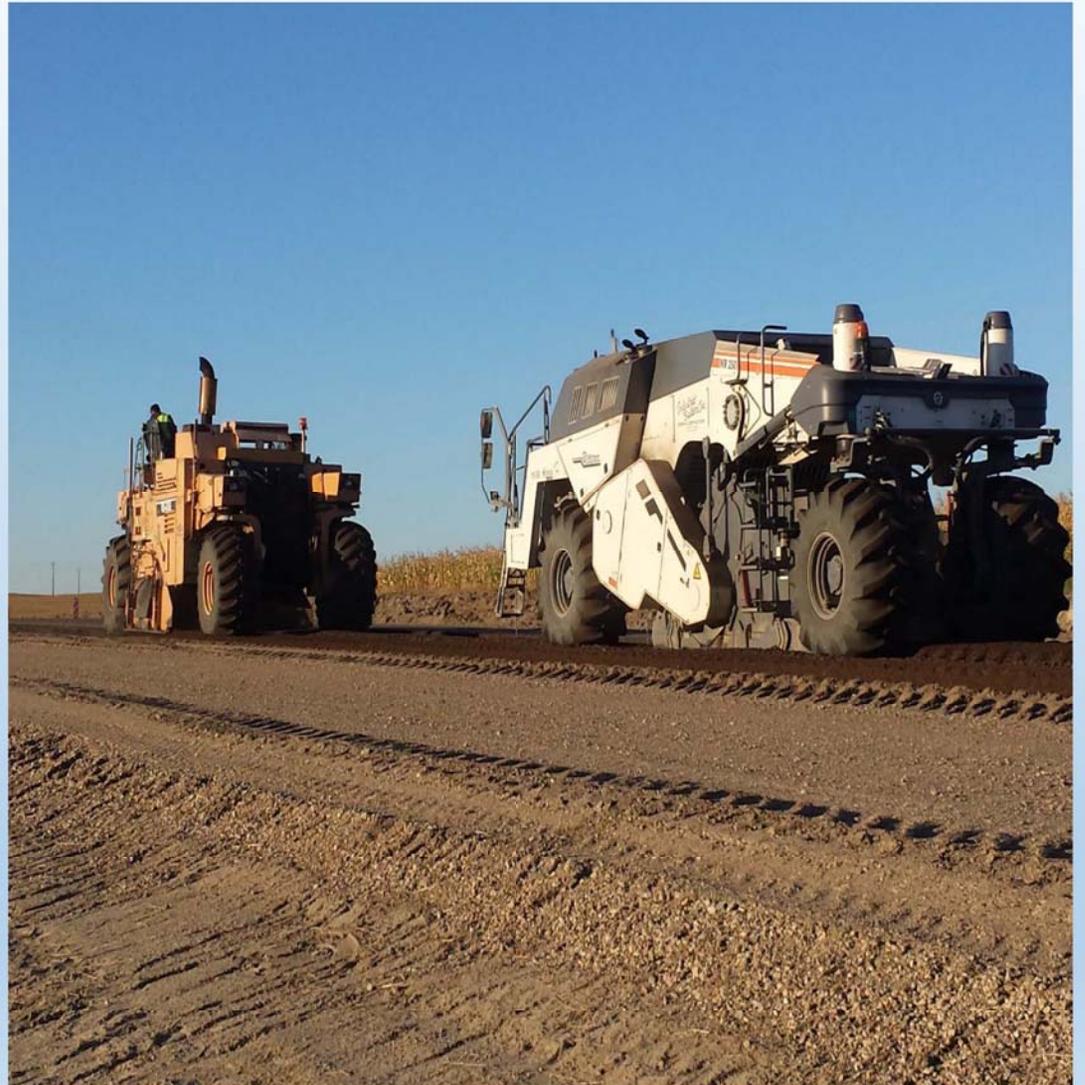


# FDR Cross-Section Diagram



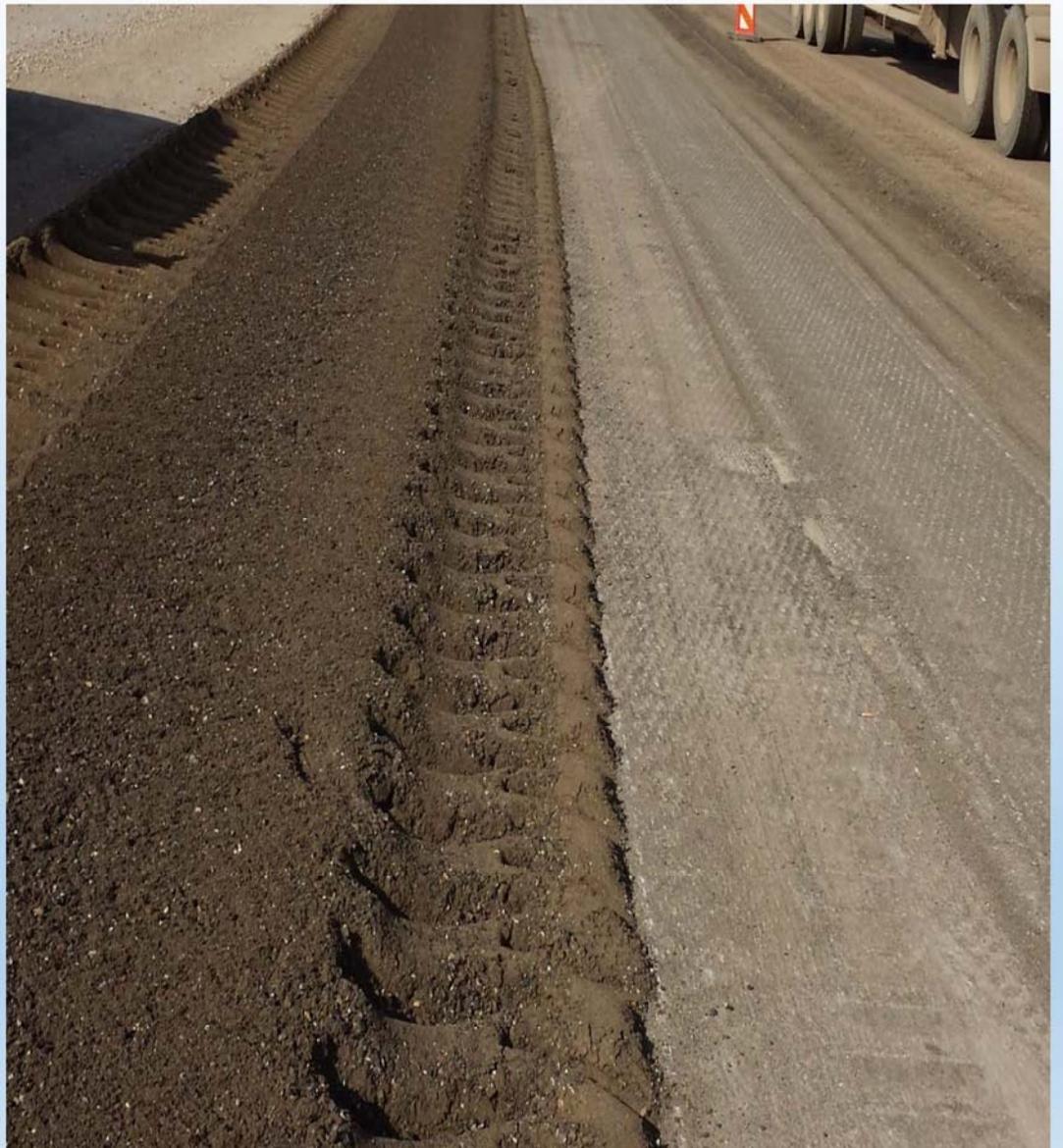
# AC Concrete Milling Machine and Blender (Wirtgen WR 250 -777HP)

SP - The control system shall be capable of fully automated operation, as well as manual operation, when injecting the liquids to be mixed. Machine functions shall include automatic nozzle cleaning, partial spray bar use, and on-the-fly changes to the quantities of material being added. Non-contact flow meters shall be capable of maintaining accurate mixing regardless of changes in the machines working speed.



## Full Depth Reclamation (FDR)

- 12" total depth, approx. 6" was RAP
- Used CL3 to supplement where needed
- Reclaimer made 2 passes.



# FDR Pay Items

- Square Yards of FDR
  - Measure to outside edge of HBP Slough
- Tons of Aggregate



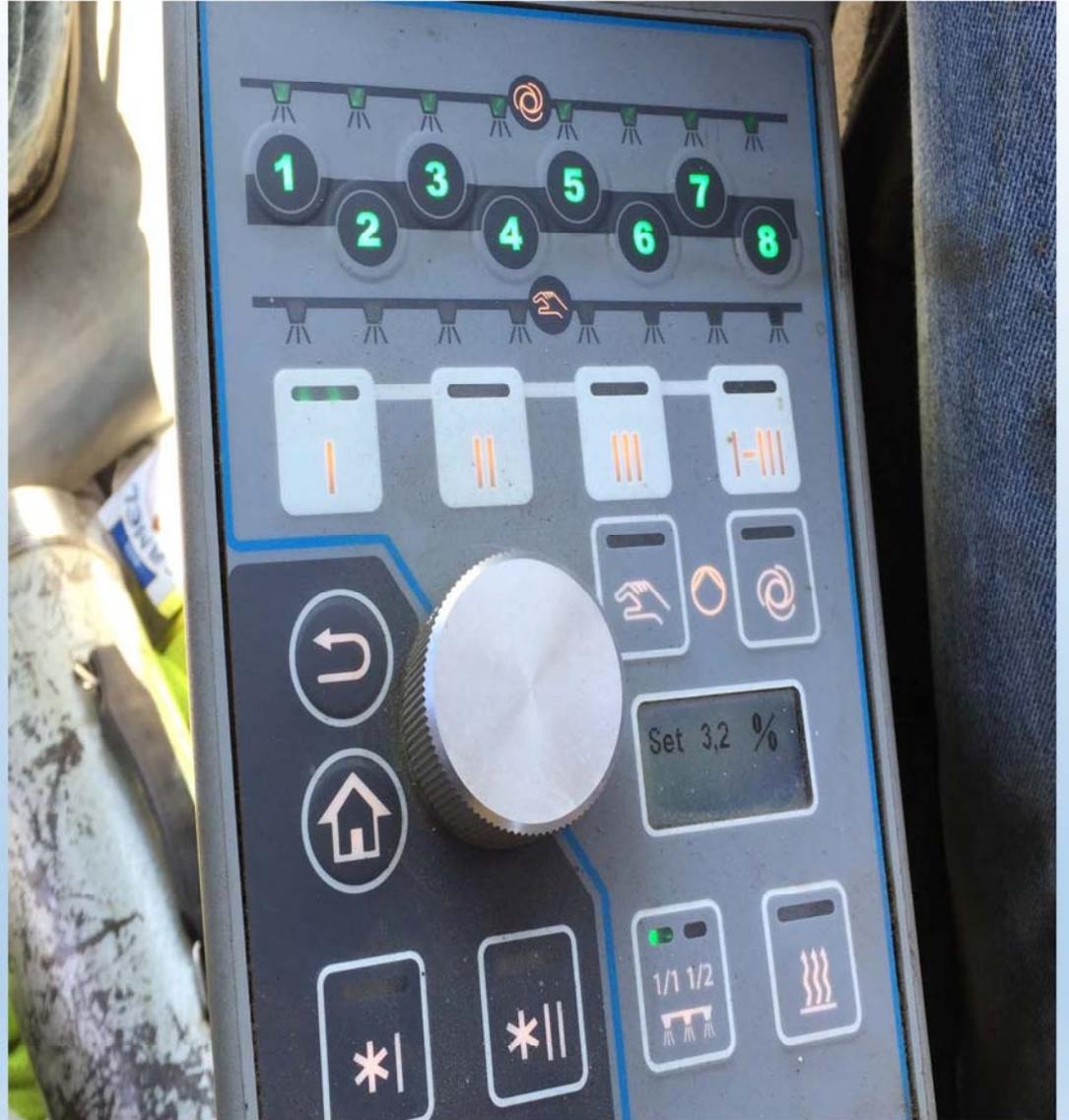
# Quiz Question

- **In regard to a variable width treatment section, what does the blending machine need to have?**

*In regard to a variable width treatment section, what does the blending machine need to have?*

### **Individually controlled spray nozzles.**

The nozzles shall be self-cleaning and the operator shall be able to switch off any number of individual nozzles for working at reduced widths.



# Cement Application and Blending

- Finished to grade
- +40 Degrees, 4/24hours
- Water added to with-in 2% of optimum of design
- Sheep's-Foot Compactor
- Rubber Tire Roller
- 97% Compaction







# Quiz Question

- **What is the maximum time allowed between cement application and finished compacted surface?**

*What is the maximum time allowed between cement application and finished compacted surface?*

**2 hours**



# Curing

- 72 hours
- Until prime coat is applied
- Kept moist with-out washing fines out
- Only prime coat, curing, or \_\_\_\_\_ - \_\_\_\_\_ equipment allowed on the surface during curing.



# Pay Items

- Square Yards of Stabilized Base (Typical Sections show a width)
- Tons of Cement
- Gallons of Water

## CTB Quantities August

Note: All widths are measured from 1'RT of CL to outside LT limit.

8-13-15

Run #1 = 5428+00/LT – 5435+00/LT = 700 LF x 20' W = 14,000 SF/9 = 1,555.55 SQYD

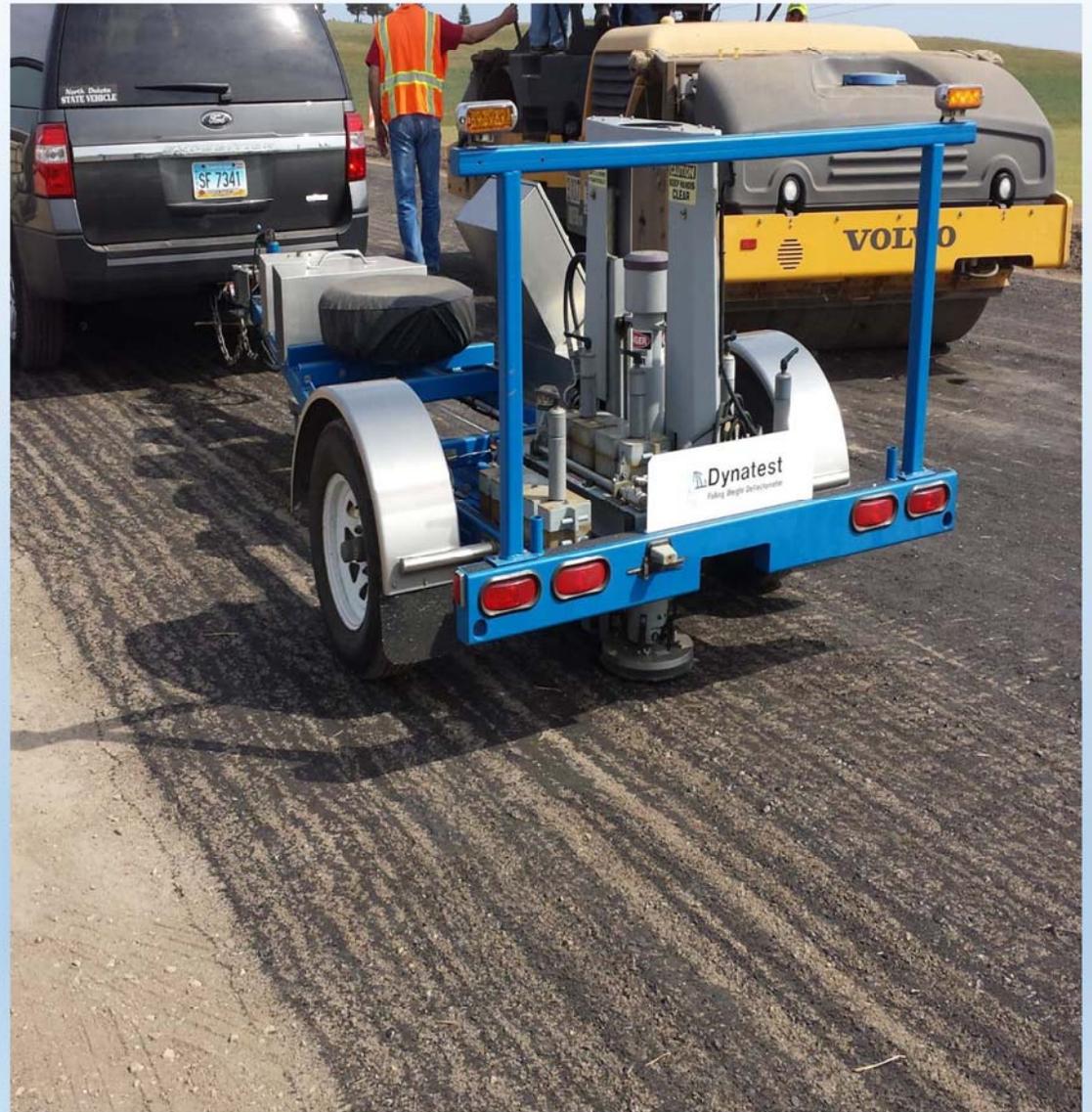
Run #2 = 5435+00/LT – 5441+50/LT = 650 LF x 21' W = 13,650 SF/9 = 1,516.66 SQYD

Run #3 = 5441+50/LT – 5448+16/LT = 666 LF x 21' W = 13,986 SF/9 = 1,554 SQYD

Daily total = 1,555.55 + 1,516.66 + 1,554 = **4,626.21 SQYD**

# Micro-Cracking

- If 60 degrees+, after 48 hours of curing
- 12 ton steel vibratory roller, 2 MPH.
- 50 to 60% reduction in stiffness
- Falling Weight Deflectometer (FWD)



Questions?

