



Nebraska Dept. of Roads Winter Maintenance Best Practices

2013 National Winter Maintenance Peer Exchange
Wednesday September 11, 2012
Vancouver, WA

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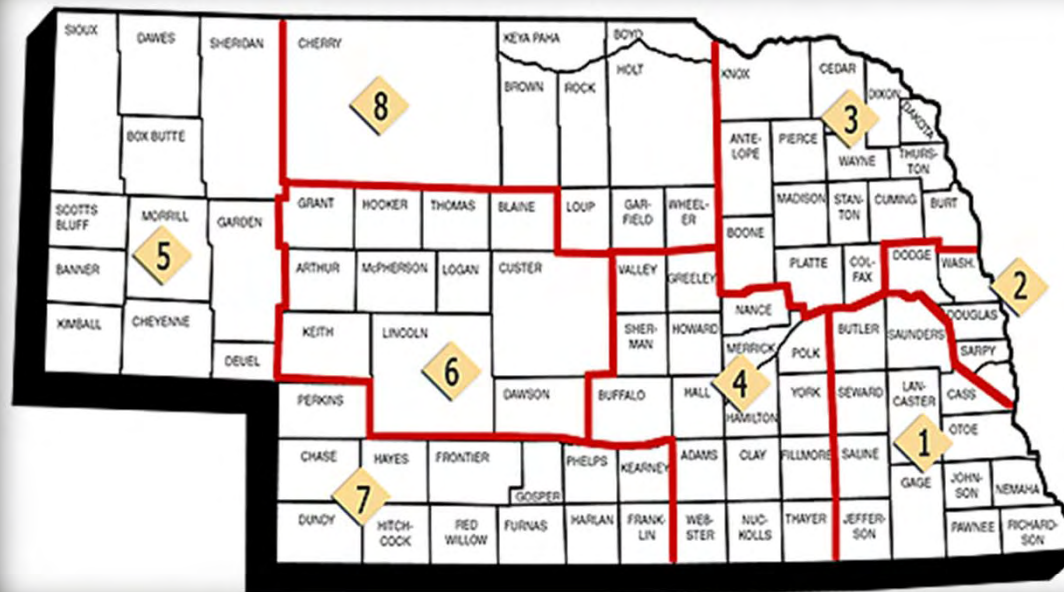
NDOR Maintenance Engineer

Nebraska Stats

- **Land Area** (sq. miles)..... 76,878
- **Population** (U.S. Census 2011 Est.) 1,842,641
- **Public Road Miles** (*highways, roads, streets*)
 - Municipal..... 8,708
 - County 78,012
 - **State** 9,945
 - Total..... 96,665
- **Bridges**
 - **State System**..... 3,517
 - County and Municipal 11,385
 - Urban..... 434
 - Total..... 15,336

NDOR Stats

- \$700 million Annual Budget
- 2,200 full time employees
 - 886 Maintenance employees



- Eight Districts
- 23,328 Lane Miles

NDOR Winter Maintenance Best Practices

- 684 Tandem Axle Plow trucks
- 18 AWD Plow Trucks
- 6 Towplow trucks (5 more on order)
- 25 Rotary Snow Blowers
- 136 Motor Graders (used for winter operations when needed)
- Direct Liquid Deicing

NDOR Winter Maintenance Personnel/Facilities

- 879 Total Snowplow Operators
 - 865 Permanent NDOR employees
 - Includes Construction employees deployed during winter as plow operators
 - 14 Temporary seasonal employees
- 105 manned maintenance shops
- 34 unmanned storage facilities
- Total Salt storage capacity = 138,000+ tons

Highlights

- Training
- Liquid Deicing and Pretreating (Anti-icing)
- Mobile Data Collection
- Shaker Test Research
- Envirotech Field Research Partnership
- RWIS contract –generic equipment
- FAST Systems (4)
- Fabric Salt Storage Buildings
- Multiple Award Liquid Deicing Contract

District 3 Liquid Deicing

- Our application criteria in terms of weather and pavement temps vary from storm to storm. Each storm acts differently our rule of the thumb is to apply 100% salt brine down to a temperature of 15 degrees which at the point we will add 10% GeoMelt 55 or 10% Apex to our salt brine. If temperature is down below 10 degrees we will bump our GeoMelt 55 to 20%.
- Salt Brine, GeoMelt 55 and Apex.
- We use boring nozzles at rates from 70 gpm up to 90 gpm on de-icing applications. During pretreating applications we use fogging nozzles at rate ranging from 50 gpm to 75 gpm.
- It all depends on the storm direct liquid applications isn't always the answer. There are times when temps get below 0 degrees that is when we use straight salt aggregate.
- As far as refreezing it happens at times but if you start treating with straight liquid we don't stop till the road is clear. That is the key if you stop treating to soon it will refreeze.

Training

- Annual Snowfighter training in the districts
- Includes Simulator training – supplied by a Nebraska Community College
- MDSS training in the fall for 3 districts that use MDSS
- Miscellaneous equipment and safety training throughout the year

Brine Truck



Brine Spraying Setup



Liquid Storage

- Tank farms in some yards consisting of 10,000 gallon poly tanks, all connected together.
- Ten 225 thousand gallon Harvester storage tanks - open top metal tanks with liners. The liners are from Ramsdel INC out of South Dakota. Locations are Niobrara, Bloomfield, Neligh-2, Norfolk-2, Plainview, Humphrey, Laurel, Dakota City.
- Reload sites at various locations in the field - typically located at a junction so more than one supervisors area can reload from them
- Pumps (both hydraulic and electric) at those sites
- Also use straight salt for heavy snow pack or heavy icing.
- Treat the salt after it's applied or pre-wet if we have the capability.

225,000 gallon brine tank



Access to top of brine tank



Truck Brine Tanks outside 8,000 ton salt storage building



Mobile Data Collector (MDC) Intelligent Devices, Inc. Model MDC003













Mobile Data Collector (MDC)

Intelligent Devices, Inc. Model MDC003

- Windows XP Embedded OS
- Automatic wireless software updates
- Remote troubleshooting and updating capability
- Touch Screen Operator Interface
- Provides information to truck operator

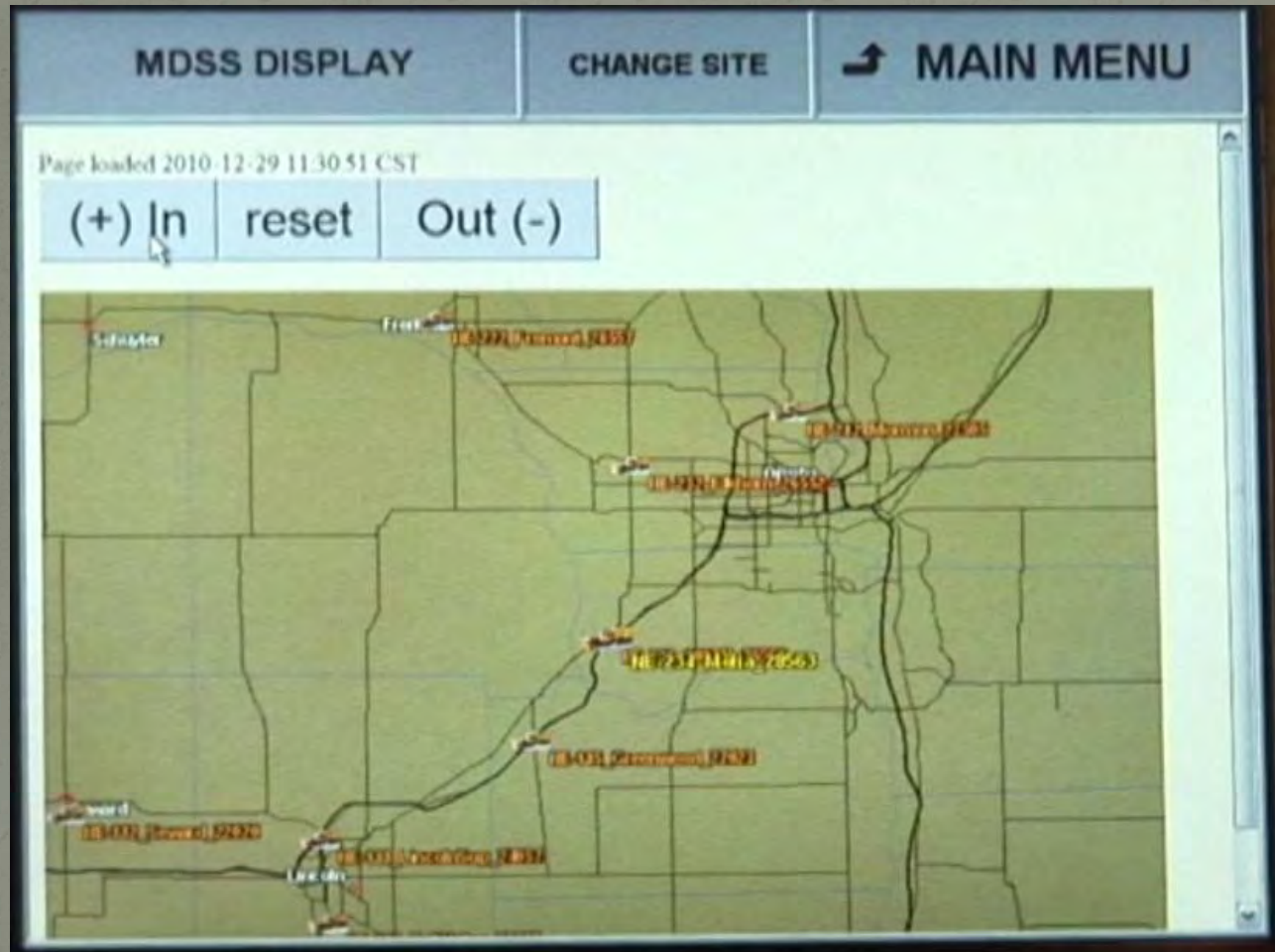
Mobile Data Collector (MDC) Main Screen

NDOR New Jersey Department of Transportation		MDC	Dim	Settings	12/29/10 11:18:19 MAIN MENU v3.07
234_Melia_28563 TRUCK FRONT:  NO ERROR	NaCl Solid Rate: OFF MATERIAL ERROR Prewet Rate: OFF Direct Rate: OFF	DIRECTION: EAST Plow:     Treat:      HIGHWAY Speed: 0 mph GPS: 41.084273°N 96.277563°W			
UNKNOWN Unknown WEATHER 62°F 56°F	ROAD Other	MDSS			
		DIAGNOSTICS			

Mobile Data Collector (MDC) MDSS View Selection Screen

SELECT WEBSITE		BACK
Local Radar		
Regional Radar		
Forecast		
Recommendation		
Loop Radar		

Mobile Data Collector (MDC) Truck Centered Radar Screen



Logitech C600 WebCam



Camera Images

```
Total (Recv): 364.11 MB
Files Sync'd: 312/7751 (4%)
Server (Recv): 364.11 MB
Peers (Recv): ---
Peers (Sent): ---
Peer Count: ---
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Peer Count: ---

[illegible]

Current Time: Fri Feb 25, 2011 6:10PM CST Selected Time: 6:00PM Fri Feb 25, 2011

6PM 10PM 2AM 6AM 10AM 2PM 6PM 10PM 2AM 6AM 10AM 2PM 6PM

Speed: 1.0x 10 Min. 20 Min. 30 Min. 60 Min. ☒ Loop

Meridian Environmental Technology

9:17 PM

Sensors

- Plow up/down
- Plow in place (evaluation winter 2013-14)
- Material verification – optical sensor (evaluation winter 2013-14)

Shaker Test (Ice melting capacity for liquid deicing chemicals)

- A measured quantity of ice cubes are shaken for a specific amount of time in a measured quantity of liquid deicing chemical at a specified temperature in an insulated container.
- University of Nebraska is refining the shaker test.
- This test can be done with a modest investment in equipment.
- Freezer, shaker, precision scale, standard laboratory measuring containers, insulated container
- Evaluating sources of error and developing a standard specification for the test
- The test may be useful for comparison of chemicals and quality assurance testing.
- They will also be using MDSS data to compare the effectiveness of different maintenance actions.

Envirotech Field Research Partnership

- Envirotech and NDOR want to evaluate the effectiveness of Ice Slicer compared with other treatment options.
- Envirotech has installed Vaisala non-contact sensors for surface condition, temperature, wind, and video on Interstate-80 on opposite sides of an interchange.
- NDOR will manage the treatment options for the two different maintenance shops involved to ensure appropriate comparisons.
- NDOR and Envirotech will have access to real-time and archived data
- Maintenance will be with AVL Equipped Trucks

RWIS Contract –Generic Equipment

- RWIS maintenance contract was awarded to Olsson and Associates in July 2012.
- They have replaced proprietary Zydac controllers with Allen Bradley Industrial PLCs.
- Sensors and other equipment will also be widely available from multiple sources.

FAST

Fixed Anti-icing Spray Technology

- FAST Systems planned for several bridges with high accident rates.
- Systems Engineering is in progress.
- Probably next spring/summer before installations begin.
- Currently have three Boschung and one SSI system in operation.
- Potassium Acetate is used in all systems.

Liquid Deicing Chemical Contract

- Differences in geography, climate, equipment, pavements, and traffic conditions respond differently to different chemicals.
- Vendors claim proprietary additives that are trade secrets.
- Product Test and Evaluation – Product must be field tested and found to have useful performance characteristics in a winter season prior to the contract year – it is then an approved product.

Liquid Deicing Chemical Contract

- Vendors must supply specifications for the product
- PNS requirements for contaminants are applied to all products
- Vendors must supply current (less than 12 months old) independent lab analysis to verify the product meets the specification
- All products that meet the specification are awarded
- A justification letter is included with the request each year.
- Products are sampled and tested throughout the season. Failure to meet specifications requires quality control measures to be documented. Repeated failure may result in removal from approved products list.

Thank You!

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