2013 National Peer Exchange

- Snow Operations in Colorado DOT
Prior to July 1, 2013, R4 at a glance

- How many maintenance people report to work orders? 224 people report to work orders
- How many patrols do we have? 40 Patrols, 36 Maintenance and 4 Rest areas
- How many lane miles are we responsible for? 7212.15 lane miles and 368.47 lane miles under city contracts
- How many plow trucks do we have? 171= 80 - midranges / 77 - tandems / 6 - 6X6 tandems/ 4 - 4X4 2 to 3 ton/ and 4 - 5 to 7 ton
- How many loaders do we have? 45= 7 - 1 to 2 yard / 28 - 2 to 3 yard/ 6 - over 3 yard/ and 4 - under 1 yard
- How many graders do we have? 16= 8 under 31,000 LB / 8 over 31,000 LB
Non invasive sensors

Sensor use in Colorado
Today we will discuss

- What R-4 CDOT uses
- Where R-4 CDOT uses it and
- How R-4 CDOT uses it
DSC111 Spectro and DST111 Cyclo
What information is available?

- Road Condition (Dry, Moist, Wet, Snow, Ice)
- Surface Temperature
- Grip (Slipperiness)
- Dew Point Temperature
- Air Temperature
- Humidity
- Layer Thicknesses
  - Water
  - Ice
  - Slush
  - Snow or Frost
Weather stations

2005 upgrade

2009 replacement
Upgrading I-25 sites for research on LOS

ITD-RuralITS-Award-video.mp4 (1).mp4
Bridge deicing trigger installed 2005
Configuration

- 35 degree lock out
- Friction at or below .5
- and/or .3 mm of snow or ice layer build up on the surface of the road
- 20 minute interval before it fires again if the same condition exists

- At Victorville we have this cycle 5 times before going to sleep and resetting after normal conditions return.
## Site Information

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>CDOT NORTH SYSTEMS</td>
</tr>
</tbody>
</table>

## Site Controller

<table>
<thead>
<tr>
<th>Internet Address</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>166.140.209.216</td>
<td>4b000656ddc8401</td>
</tr>
</tbody>
</table>

### Atmospheric Sensors
- Air Temp.
- Humidity
- Wind Speed
- Wind Direction
- Barometer
- Precipitation
- Visibility
- Dew Point

### Road Sensors
- Road City
- Road State
- Ground Temp.
- Snow Level
- Ice Level
- Water Level
- Surface Status

### Pump Sensors
- Pump Status
- Flooding Alarm
- Tank Empty
- Tank Level
- Pressure
- Flow

[Update Site Controller] [Add Tank Controller] [Add Camera]
I-25 over St. Vrain River

I25 NB MM241
SOUTH

Mainline I-25

Frontage road
State Highway 66 over I-25

Vault - below ground

Electronics - above ground
Sleepy Hollow Bridge-US 34 Big Thompson Canyon over the river
119 Crossing the Saint Vrain River
Mobile applications
Tank farm Monitoring
TowPlows and 14’ plows (1 pass plowing)

3 units so far consisting of 2 combo units and one all liquid unit.
Materials use in R4

- Mag Chloride- $0.64 per gallon
- Cold Temp Mag Chloride- $0.73 per gallon
- Ice Slicer/Sand mix 7%- up to $32.00 per ton
- Wet sand at 4 gallons of thick cold temp mag per ton- as low as $10.37 per ton
- Ice Slicer- up to $119.75 per ton
MDSS saves money and materials

- F:\Before and After MDSS (1).xlsx
- 3 year average before MDSS $5,321,000
- 3 year average after MDSS $4,300,000
- 3 year average before MDSS on materials $259,000
- 3 year average after MDSS on materials $233,000
- 3 year average before MDSS for equipment $1,046,000
- 3 year average after MDSS for equipment $938,000
Research Projects

- Thermal mapping
- Route Optimization
- Traffic patterns related to snow removal efforts
- Friction as a Levels of Service measurement (ITD)
- Product comparison using friction readings
- Living snow fence

Cost benefit on FAST sites
  - For completed research findings, visit:
    - http://www.coloradodot.info/programs/research
+2,115 lane miles
9,677 R4 total &
1,000 bridges
Statewide numbers

- Center-line miles 9,161
- Lane-miles 23,106
- 3,775 Bridges
- Vehicle-miles traveled 28.6 billion
- Vehicle miles traveled (VMT) on all Colorado roads were 48.6 billion; VMT on state highways accounts for 59% of this total.
- The interstate system accounts for 10% of the total state system mileage, yet 40% of all VMT takes place on the interstate system.
- 1,800 maintenance workers statewide
- CDOT has approximately 950 snowplows statewide. We also use Loaders, Motor graders, Dozers, Helicopters and snow blowers to help combat snow.
Questions?

Phillip Anderle
Deputy Superintendent
CDOT, Greeley, Region 4
970-350-2100
Phillip.anderle@state.co.us