Technology Helping with Sustainability

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Supervisor
Road Weather Technology

• Four Major components to Road Weather Technology
  • Road Weather Information System (RWIS)
  • Automated Vehicle Location (AVL)
  • Maintenance Decision Support System (MDSS)
  • Salt Sustainability
  • Pathfinder
Road Weather Information System (RWIS)

Collects real-time information on atmospheric and surface conditions.

Integrates this info with FHWA, NWS, and MnDOT Private forecasters.

Displays on 511.
Automated Vehicle Location (AVL)

- 750 plow trucks equipped with Automated Vehicle Location (AVL)
- Mobile data collected
  - Air Temperature/Surface Temperature
  - Spreader controller information
  - Camera Images (250 plow cams)
    - 511 feed
  - Road/Weather conditions
  - Surface condition/Friction (mobile RWIS integration)
Collected Data

AmeriTrak

Please select an option...

- Vehicle History Report
- Vehicle Mileage Report
- Vehicle Stop Report
- Find Vehicles Report
- Vehicle Speed Report
- Vehicle Status Report
- Snow Plow Report
- Vanguard Map
- Force America Report
- DICKEY-john Report
- AT500/AT200 Tracking
- Snapshot Viewer
- Idle Report
- Vaisala Conditions Report
- CAN Bus Report
- ObdII Report
- CANBus Hrs/Miles Report
- Vehicle Management

There are a total of 424065625 rows in your database.
Maintenance Decision Support System (MDSS)

- WebMDSS
  - Maintenance Decision Support System
  - Provides detailed, hour by hour weather and pavement forecasts at the maintenance route level
  - Provides live, near real time map of current operations in the network
  - User interface provides truck, route, forecast, recommendation, images, and long range forecast data, to name a few
  - MnDOT’s Reports interface
Maintenance Decision Support System (MDSS)
WebMDSS/Reports

- **Salt Usage vs. MDSS Recommended**
  
  Salt usage reported by operators vs. recommended by MDSS

- **Vehicle Speed While Applying Chemical**
  
  Puts data points in bins based on speed while spreader is running

- **Average Precipitation**
  
  Average precipitation by route and also sort by Sub Area/district

- **End of Shift Report**
  
  Provides same end of shift data received in truck in reports application

- **Material Usage By Route**
  
  Details of all winter materials based on route as reported by RCA

- **AVL Status Report**
  
  Reports AVL status for quick reference for supervisors

- **Sander Status**
  
  Reports quick reference of sander, Auto, manual, conveyer, etc.
### Vehicle Speed While Applying Chemical

**12/4/2017, 7:00:00 AM - 12/4/2017, 9:00:00 AM**

<table>
<thead>
<tr>
<th>Truck ID</th>
<th>0-4 MPH</th>
<th>5-9 MPH</th>
<th>10-14 MPH</th>
<th>15-19 MPH</th>
<th>20-24 MPH</th>
<th>25-29 MPH</th>
<th>30-34 MPH</th>
<th>&gt; 35 MPH</th>
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</thead>
<tbody>
<tr>
<td>MN-204558</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>23</td>
<td>20</td>
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<tr>
<td>MN-204570</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>MN-205566</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>6</td>
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<tr>
<td>MN-205574</td>
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<td>5</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>39</td>
<td>104</td>
</tr>
</tbody>
</table>

**Graph:**

- X-axis: 12/04/17 7:40 am to 12/04/17 8:50 am
- Y-axis: 25 to 45
End of Shift Report

Select Area: 2a

Start: 12-03-2017 9:00pm
End: 12-04-2017 9:00am

Generate Report

Export to CSV

MN-214554  MN-214555  MN-215562  MN-215563  MN-215564  MN-216562  MN-216563  MN-216564

MN-215563

Requested Timeframe
2017-12-03 9:00 pm CST to 2017-12-04 9:00 am CST

<table>
<thead>
<tr>
<th>Route</th>
<th>Miles</th>
<th>Hours</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>50.5</td>
<td>2</td>
<td>1791 lbs (0.90 tons) Salt</td>
</tr>
<tr>
<td>TP2H0112: MN11, E Jct. TH 89 at Roseau to CSAH 74 at W</td>
<td>44.9</td>
<td>1.2</td>
<td>1430 lbs (0.71 tons) Salt</td>
</tr>
<tr>
<td>TP2H3131: MN313, Jct. TH 313 at Warroad to Canadian Bor</td>
<td>1.5</td>
<td>0.1</td>
<td>146 lbs (0.07 tons) Salt</td>
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<tr>
<td>TP2H0113: MN11, Baudette Truck Station to CSAH 74 at W</td>
<td>1.2</td>
<td>0.1</td>
<td>150 lbs (0.08 tons) Salt</td>
</tr>
<tr>
<td>TP2H0111: MN11, E Jct. TH 89 at Roseau to Jct. TH 32 a</td>
<td>1.3</td>
<td>0.4</td>
<td>None</td>
</tr>
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</table>
MnDOT Results

• Reduced speeds while applying chemical
  • Operators understanding the benefits

• Better data reporting by using “End of Shift Report”

• Recommendations are becoming a trusted source of information to operators

• Salt usage vs. recommended is a key performance measure for our Salt Sustainability Effort
Sustainability Tools

- RWIS
- AVL
- MDSS
- Post storm/post season Meetings
- Training Outreach
- Reports Interface

Salt Sustainability
Salt Sustainability/Reduction

• Goal
  • MnDOT’s immediate target is to reduce or mitigate chloride use based on calculated levels from its Maintenance Decision Support System, which is driven by winter weather data
  • Actual/reported usage by route to be not more than 10% over what is recommended by MDSS
  • Data integrity is critical for accurate measure
  • Equipment calibration is critical
  • Proper reporting of material is critical
  • MDSS enhancements
Thank you!

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