Road Weather Management Strategies

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MnDOT Overview

• MnDOT has been a part of IMO 1-2-3

• To date MnDOT has 750+ plow trucks, 25 light duty vehicles and 35 mower tractors deployed with AVL systems

• Mobile data collected
  • Air Temperature
  • Surface Temperature/Surface condition/Friction
  • Spreader controller information
  • CAN BUS data
  • Camera Images
Goals

• Provide a robust system with built in interfaces providing real time mobile data to enhance MnDOT Operations
  • Fleet Management/Vehicle Maintenance information
  • Traveler Information Systems (511)
  • Web MDSS
  • Managers/Supervisors (MDSS Reports Interface)
  • Internal reporting system (RCA) Through TAMS (not developed)
<table>
<thead>
<tr>
<th>ID</th>
<th>Date of Scan</th>
<th>Tool</th>
<th>VIN</th>
<th>Dealer Acct</th>
<th>Mileage</th>
<th>Hours</th>
<th>Engine Cal</th>
<th>All DTCs</th>
<th>Create Case</th>
<th>Customer Check-in</th>
<th>Reset Health Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>3146525</td>
<td>12/3/2017 12:05:02 PM</td>
<td>Ameritrak</td>
<td>2FZAWBS28AAK1507</td>
<td>Telematic</td>
<td>62266 M</td>
<td>4882.00</td>
<td></td>
<td>Active DTC: 0, Inactive DTC: 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3072224</td>
<td>11/21/2017 7:02:36 PM</td>
<td>Ameritrak</td>
<td>2FZAWBS28AAK1507</td>
<td>Telematic</td>
<td>65036 M</td>
<td>4841.00</td>
<td></td>
<td>Active DTC: 1, Inactive DTC: 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30387857</td>
<td>11/15/2017 3:34:54 PM</td>
<td>Ameritrak</td>
<td>2FZAWBS28AAK1507</td>
<td>Telematic</td>
<td>67988 M</td>
<td>4829.00</td>
<td></td>
<td>Active DTC: 1, Inactive DTC: 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30032951</td>
<td>11/4/2017 2:02:27 PM</td>
<td>Ameritrak</td>
<td>2FZAWBS28AAK1507</td>
<td>Telematic</td>
<td>67577 M</td>
<td>4804.00</td>
<td></td>
<td>Active DTC: 0, Inactive DTC: 1</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>29722332</td>
<td>11/1/2017 5:03:29 PM</td>
<td>Ameritrak</td>
<td>2FZAWBS28AAK1507</td>
<td>Telematic</td>
<td>67491 M</td>
<td>4790.00</td>
<td></td>
<td>Active DTC: 0, Inactive DTC: 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Some of these reports came from other dealers. You may only open cases from reports that were created at your dealer locations.

Note: The date range for this report defaults to the previous 60 days. To report on a custom date range, enter the dates below.

Show scans from Start Date to End Date or show all scans [ ] Apply Filters

Show ▼ Records: 5 record(s) found.
Plow Cams
MnDOT WRMS

• 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
  • MnDOT’s Reports interface
WebMDSS/Reports

Salt usage reported by operators vs. recommended by MDSS

Puts data points in bins based on speed while spreader is running

Average precipitation by route and also sort by Sub Area/district

Provides same end of shift data received in truck in reports application

Details of all winter materials based on route as reported by RCA

Reports AVL status for quick reference for supervisors

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>
</tr>
</thead>
<tbody>
<tr>
<td>MN-2D4538</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>
</tr>
<tr>
<td>MN-2D4570</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>MN-2D5566</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>
</tr>
<tr>
<td>MN-2D5574</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>39</td>
<td>184</td>
</tr>
</tbody>
</table>

**Graph showing vehicle speed distribution over time.**
## End of Shift Report

### Select Area:
- **2a**

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

### Generate Report

### Export to CSV

### Route Summary

<table>
<thead>
<tr>
<th>Route Details</th>
<th>Miles</th>
<th>Hours</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP2H0112: MN11, E Jct. TH 89 at Roseau to CSAH 74 at W</td>
<td>50.5</td>
<td>2</td>
<td>1791 lbs (0.90 tons) Salt</td>
</tr>
<tr>
<td>TP2H3131: MN313, Jct. TH 313 at Warroad to Canadian Bor</td>
<td>44.9</td>
<td>1.2</td>
<td>1430 lbs (0.71 tons) Salt</td>
</tr>
<tr>
<td>TP2H0113: MN11, Baudette Truck Station to CSAH 74 at W</td>
<td>1.5</td>
<td>0.1</td>
<td>46 lbs (0.07 tons) Salt</td>
</tr>
<tr>
<td>TP2H0111: MN11, E Jct. TH 89 at Roseau to Jct. TH 32 a</td>
<td>1.2</td>
<td>0.1</td>
<td>159 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>
</tbody>
</table>

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

[More Details]
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
Results

• Some areas report reduced speeds while applying chemical

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

• Recommendations are becoming a trusted source of information to operators

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

• We have peoples attention!
Ongoing and Future Implementation

• MDSS routes automatically reporting conditions to 511
• Fuel Savings/Route Optimization strategies using Can Bus Data
• Use of Mobile RWIS data feeds to MDSS Pavement Model
  • Experimenting with different vendors to determine right application for MnDOT
• Automated work order creation through AVL system to communicate with TAMS and RCA
• LOS study/Automated Bare Lane/Automated Route configurations
Thank you!

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