THE FIRST OPERATIONAL STATEWIDE DEPLOYMENT OF THE POOLED-FUND STUDY MAINTENANCE DECISION SUPPORT SYSTEM (PFS-MDSS)

Ben Hershey
Director of Road Weather Services
Meridian Environmental Technology, Inc.
Grand Forks, North Dakota

Rural ITS
Huntington, WV
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Outline

- PFS MDSS and Indiana DOT’s Involvement
- INDOT’s MDSS deployment Strategy
- INDOT results from 2008-2009 winter deployment
- Future plans
PFS MDSS

- Pooled Fund Study – Maintenance Decision Support System
- Indiana was a charter member of the PFS MDSS in 2002
- INDOT has ...
  - Provided numerous suggestions on MDSS concepts and design
  - Provided important direction to the PFS MDSS Operation and Research objectives

- South Dakota DOT is the lead state
- Currently 15 states in the PFS MDSS
Indiana’s Maintenance Districts

Maintenance Facts

❄ One load of salt is approximately $600 (in Indiana for FY 10) in materials.
❄ There are over 1100 Snow Trucks in the INDOT fleet.
❄ One extra trip per event is over $600,000 in material. One trip saved could result in significant reductions in salt usage.
Change is Inevitable

Change Curve

Competence vs. Time

- Shock & Denial
  - Avoidance
  - Confusion
  - Fear
  - Numbness
  - Blame

- Anger
  - Frustration
  - Anxiety
  - Irritation
  - Embarrassment
  - Shame

- Depression & Detachment
  - Overwhelmed
  - Lack of Energy
  - Helplessness

- Acceptance
  - Exploring options
  - A new plan in place

- Dialogue & Bargaining
  - Reaching out to others
  - Desire to tell one’s story
  - Struggling to find meaning for what has happened

- Return to meaningful life
  - Empowerment
  - Security
  - Self-esteem
  - Meaning
Implementation Plan

- Equipment Purchasing
- Defining and Naming Support Staff
- Training
- Implementation and Follow-Up
  - Training
  - QA/QC Accountability Program
Training

Six Major Areas

- Introductory
- MDSS GUI (Graphical User Interface)
- Driver
- Mechanics
- QA/QC Accountability Introductory
- Refresher and Follow Up – Very Important
Determining Support Staff

- District Champion – Main Point of Contact
- District IT Champion
- Sub District Champion
- AVL / MDC Expert
- District and Sub District Graphical User Interface (GUI) Expert
- District Quality Assurance
- Sub-District Quality Control
How did INDOT Regarding the Implementation Plan

- Equipment Purchasing – Went Well
- Defining and Naming Support Staff – Went Well in Most Cases
- Training – Went Well
- Implementation and Follow-Up – Some Resistance in Middle of Winter
  - Refresher Training – Helped
  - QA/QC Accountability Program – This part of the program received heavy resistance.
The implementation went well... did INDOT save any money, salt, or other resources???
## Salt Usage (Nov - Apr)

<table>
<thead>
<tr>
<th>Location</th>
<th>3 Year Ave.</th>
<th>5 Year Ave.</th>
<th>10 Year Ave.</th>
<th>FY 08</th>
<th>FY 09</th>
<th>Variation 3 yr ave to 09</th>
<th>Variation 10 yr ave to 09</th>
<th>Variation from 08 to 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawfordsville</td>
<td>58,313</td>
<td>58,324</td>
<td>51,484</td>
<td>95,318</td>
<td>41,402</td>
<td>-29.0%</td>
<td>-19.6%</td>
<td>-56.6%</td>
</tr>
<tr>
<td>Fort Wayne</td>
<td>70,389</td>
<td>71,946</td>
<td>66,993</td>
<td>100,762</td>
<td>71,674</td>
<td>1.8%</td>
<td>7.0%</td>
<td>-28.9%</td>
</tr>
<tr>
<td>Greenfield</td>
<td>74,067</td>
<td>74,886</td>
<td>78,863</td>
<td>110,670</td>
<td>60,686</td>
<td>-18.1%</td>
<td>-23.0%</td>
<td>-45.2%</td>
</tr>
<tr>
<td>LaPorte</td>
<td>86,387</td>
<td>98,830</td>
<td>103,021</td>
<td>132,039</td>
<td>89,546</td>
<td>3.7%</td>
<td>-13.1%</td>
<td>-32.2%</td>
</tr>
<tr>
<td>Seymour</td>
<td>62,212</td>
<td>53,174</td>
<td>45,398</td>
<td>66,726</td>
<td>40,250</td>
<td>-35.3%</td>
<td>-11.3%</td>
<td>-39.7%</td>
</tr>
<tr>
<td>Vincennes</td>
<td>35,355</td>
<td>32,997</td>
<td>29,059</td>
<td>52,759</td>
<td>26,246</td>
<td>-25.8%</td>
<td>-9.7%</td>
<td>-50.3%</td>
</tr>
<tr>
<td><strong>All Districts</strong></td>
<td><strong>386,723</strong></td>
<td><strong>390,157</strong></td>
<td><strong>374,818</strong></td>
<td><strong>558,274</strong></td>
<td><strong>329,804</strong></td>
<td><strong>-14.7%</strong></td>
<td><strong>-12.0%</strong></td>
<td><strong>-40.9%</strong></td>
</tr>
</tbody>
</table>
## Diesel Fuel Usage

<table>
<thead>
<tr>
<th></th>
<th>Diesel Fuel Usage (Nov - Apr)</th>
<th></th>
<th></th>
<th>Variation from 08 to 09</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FY 08</td>
<td>FY 09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crawfordsville</td>
<td>348,252</td>
<td>257,265</td>
<td></td>
<td>-26.1%</td>
</tr>
<tr>
<td>Fort Wayne</td>
<td>374,262</td>
<td>325,324</td>
<td></td>
<td>-13.1%</td>
</tr>
<tr>
<td>Greenfield</td>
<td>441,017</td>
<td>338,783</td>
<td></td>
<td>-23.2%</td>
</tr>
<tr>
<td>LaPorte</td>
<td>422,230</td>
<td>388,931</td>
<td></td>
<td>-7.9%</td>
</tr>
<tr>
<td>Seymour</td>
<td>248,040</td>
<td>237,950</td>
<td></td>
<td>-4.1%</td>
</tr>
<tr>
<td>Vincennes</td>
<td>156,679</td>
<td>170,089</td>
<td></td>
<td>8.6%</td>
</tr>
<tr>
<td><strong>All Districts</strong></td>
<td><strong>1,990,480</strong></td>
<td><strong>1,718,342</strong></td>
<td></td>
<td><strong>-13.7%</strong></td>
</tr>
</tbody>
</table>
# Overtime Hours – Snow & Ice

<table>
<thead>
<tr>
<th></th>
<th>OVT Hours - Snow and Ice (Nov - Apr)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FY 08</td>
<td>FY 09</td>
<td>Variation from 08 to 09</td>
<td></td>
</tr>
<tr>
<td>Crawfordsville</td>
<td>38,240</td>
<td>17,971</td>
<td>-53.0%</td>
<td></td>
</tr>
<tr>
<td>Fort Wayne</td>
<td>44,896</td>
<td>35,603</td>
<td>-20.7%</td>
<td></td>
</tr>
<tr>
<td>Greenfield</td>
<td>36,614</td>
<td>32,074</td>
<td>-12.4%</td>
<td></td>
</tr>
<tr>
<td>LaPorte</td>
<td>50,961</td>
<td>51,743</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Seymour</td>
<td>33,240</td>
<td>19,027</td>
<td>-42.8%</td>
<td></td>
</tr>
<tr>
<td>Vincennes</td>
<td>22,533</td>
<td>11,792</td>
<td>-47.7%</td>
<td></td>
</tr>
<tr>
<td><strong>All Districts</strong></td>
<td><strong>226,484</strong></td>
<td><strong>168,210</strong></td>
<td><strong>-25.7%</strong></td>
<td></td>
</tr>
</tbody>
</table>

01/24/2006 09:04
## Tons of Salt per Snow/Fz Rain Hour

<table>
<thead>
<tr>
<th>Location</th>
<th>Tons/Sn Hour 3 Year Ave</th>
<th>Tons/Sn Hour 08</th>
<th>Ton/SnHr 09</th>
<th>Diff from 3 Yr Ave</th>
<th>Diff from 08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawfordsville</td>
<td>192</td>
<td>244</td>
<td>124</td>
<td>-35.4%</td>
<td>-49.3%</td>
</tr>
<tr>
<td>Fort Wayne</td>
<td>168</td>
<td>201</td>
<td>145</td>
<td>-13.8%</td>
<td>-28.2%</td>
</tr>
<tr>
<td>Greenfield</td>
<td>244</td>
<td>284</td>
<td>182</td>
<td>-25.4%</td>
<td>-36.0%</td>
</tr>
<tr>
<td>LaPorte</td>
<td>328</td>
<td>401</td>
<td>226</td>
<td>-31.2%</td>
<td>-43.7%</td>
</tr>
<tr>
<td>Seymour</td>
<td>523</td>
<td>412</td>
<td>314</td>
<td>-39.9%</td>
<td>-23.7%</td>
</tr>
<tr>
<td>Vincennes</td>
<td>453</td>
<td>436</td>
<td>380</td>
<td>-16.1%</td>
<td>-12.8%</td>
</tr>
<tr>
<td><strong>All Districts</strong></td>
<td><strong>260</strong></td>
<td><strong>295</strong></td>
<td><strong>188</strong></td>
<td><strong>-27.8%</strong></td>
<td><strong>-36.4%</strong></td>
</tr>
</tbody>
</table>
$saving$ - Overtime

An effort has been made to try to normalize the data using the observed hours of snow and freezing rain. In order to compare savings to FY 08, which had 7.2% more observed hours of snow and freezing rain than FY 09, the FY 08 salt usage and overtime hours have been reduced by 7.2%. This reduction normalizes the winters.

<table>
<thead>
<tr>
<th>Overtime Hours</th>
<th>FY 08 (Reduced by 7.2%)</th>
<th>FY 09</th>
<th>Difference (Hours)</th>
<th>Savings @ $23.33/hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Districts</td>
<td>210,177</td>
<td>168,210</td>
<td>41,967</td>
<td>$979,136</td>
</tr>
</tbody>
</table>
An effort has been made to try to normalize the data using the observed hours of snow and freezing rain. In order to compare savings to FY 08, which had 7.2% more observed hours of snow and freezing rain than FY 09, the FY 08 salt usage and overtime hours have been reduced by 7.2%. This reduction normalizes the winters.

<table>
<thead>
<tr>
<th>Salt Usage (Tons)</th>
<th>FY 08 (Reduced by 7.2%)</th>
<th>FY 09</th>
<th>Difference (Tons)</th>
<th>Savings @ $53/Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Districts</td>
<td>518,078</td>
<td>329,804</td>
<td>188,274</td>
<td>$9,978,536</td>
</tr>
</tbody>
</table>
Overall Benefits from MDSS Deployment

- Cost savings in many areas of Winter Operations
- Improved communication from unit to unit (garage to garage)
- Accountability of resources expended during snow and ice operations
- Transparency across INDOT as all maintenance personal could see what everyone was doing
- Consistent road conditions across INDOT political boundaries
Future Direction

- MDSS will need continued executive support
- Training Plan will need to be developed
- Experts will need to be created in the off season by using past saved storms for training
- Communications plan should be developed for next year
For Copy of INDOT Report:
Go to:  
http://www.in.gov/indot/  
Click on: Publications  
Click on: Other Publications  
Scroll Down to: Maintenance Decision Support System  
Click on: Winter of 2008/2009

Maintenance Decision Support System (MDSS):
Indiana Department of Transportation (INDOT)  
Statewide Implementation

Prepared by:
Tony McClellan, P.E., Project Manager  
Paul Boone, P.E.  
Melody A. Coleman
Contact Information

❄ Ben Hershey
  - Meridian Environmental Technology
  - Road Weather Services, Director
  - Grand Forks, ND
  - Email: bhershey@meridian-enviro.com
  - Phone: (701) 792-1800

QUESTIONS?