Fighting snow and ice with technology

Knowing when to treat the roads before a snowstorm used to be purely guesswork—sometimes a futile forecasting process aimed at avoiding a snowplow jam. But this winter the Colorado Department of Transportation is using a new system that uses battlefield technology to predict when a snowstorm will arrive. The key to the Maintenance Decision Support System is a computer program that sorts through weather forecasts, radar, and temperature readings and combines them with real-time observations from snowplow drivers and maintenance shops. Ultimately, this leads to a plan of action.

Key pieces of system

- **Weather stations**: Hundreds of sites across the state send readings for temperature, wind, snow depth, and precipitation, all fed into a central computer. This information is combined with forecasts, radar, and satellite data to provide the most accurate weather predictions.
- **High-tech tracks**: Snowplows are equipped with advanced sensors that detect the temperature of the road. They also have sensors on the tracks that monitor snow depth, temperature, and speed. This data is sent to a central computer, which then sends it to a snowplow driver's display.

Road surface

Weather stations along roadsides are connected to sensors embedded in the road surface. These sensors detect road surface conditions and send data to a central computer, which then sends it to a snowplow driver's display.

Melting snow and ice

Before a storm hits, snowplows are deployed to treat roads ahead of time. Salt, sand, and other de-icing agents are spread over the road to prevent ice from forming.
### Forecast:

<table>
<thead>
<tr>
<th>Time</th>
<th>Wind speed (mi/h)</th>
<th>Wind Direction</th>
<th>Precip Type</th>
<th>Precip Prob (%)</th>
<th>Snow Rate (in/hour)</th>
<th>Cloud Cover (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue 14:00 MDT</td>
<td>2</td>
<td>WNW</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Tue 15:00 MDT</td>
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<td>W</td>
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<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Tue 16:00 MDT</td>
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<td>-</td>
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<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Tue 17:00 MDT</td>
<td>3</td>
<td>W</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

### Recommended Actions:

- **For demo segment 1:**
  - Sun 04:40 MST: Prewet NaCl 200lbs
  - Sun 15:46 MST: Prewet NaCl 100lbs
  - Sun 15:48 MST: Plow & Patrol

- **For demo segment 2:**
  - Sun 04:40 MST: Prewet NaCl 200lbs
  - Sun 15:46 MST: Prewet NaCl 100lbs
  - Sun 15:48 MST: Plow & Patrol
<table>
<thead>
<tr>
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<th>Wind Direction</th>
<th>Precip Type</th>
<th>Precip Prob (%)</th>
<th>Snow Rate (in/hour)</th>
<th>Cloud Cover (%)</th>
<th>Start Time</th>
<th>Practice</th>
<th>Rate</th>
</tr>
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<td>Tue 14:00 MDT</td>
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<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>Sun 04:40 MST</td>
<td>Prewet</td>
<td>NaCl</td>
</tr>
<tr>
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<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
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<td>WNW</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>Sun 15:48 MST &amp; Patrol</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>3</td>
<td>W</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
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</tbody>
</table>

### Recommended Actions:

#### For demo segment 1:
- **Sun 04:40 MST**: Prewet NaCl, 200lbs
- **Sun 15:46 MST**: Prewet NaCl, 100lbs
- **Sun 15:48 MST** & Patrol

#### For demo segment 2:
- **Sun 04:40 MST**: Prewet NaCl, 200lbs
- **Sun 15:46 MST**: Prewet NaCl, 100lbs
- **Sun 15:48 MST** & Patrol

### BLADE DOWN

**SALT/SAND .500, SLUSH, SNOW**