USING RWIS DATA FOR WINTER MAINTENANCE DECISIONS
Today’s Presenters

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TODAY'S FORMAT

WHAT IS RWIS DATA?

HOW CAN THE DATA BE USED?

HOW DO WE USE IT IN WINTER MAINTENANCE?

LET'S CHECK IT OUT
WHAT IS DATA?

Def: facts and statistics collected together for reference or analysis

Perhaps a more practical definition is:

Data is information that has been translated into a form that is more convenient to move or process

We need data that is useful information!
So how can we use RWIS data to help us in winter operations?

It can help plan our operations – help us make decisions

It can help us (and others) during operations – make adjustments

It can help us evaluate our performance
RWIS Hardware

ROADSIDE TOWER

Sensors Measure:
- Wind Speed, Gusts & Direction
- Precipitation
- Temperature & Humidity

Cabinet Contains:
- Processing Unit
- Telecommunications & Power Connections
- Digital Barometer – Pressure

Optional Equipment:
- Visibility, Cameras, Traffic Counters, Precipitation Type and Amounts
Fixed RWIS: Why?

• Provide road conditions 24/7
• Most accurate way to obtain road conditions and be alerted on them
• Improves a road weather forecast

Timing of freezing/thawing
Aids in chemical decisions
Improves a weather forecast

Non-invasive sensors are what is trending and offer a friction reading

REAL TIME INFORMATION IS NOT JUST TO CREATE THE FORECAST, IT CAN HELP YOU
PRIOR TO EVENTS
What do we need?

Weather information – forecasting and current conditions, why?

- What is the event
- Can we pre-treat
- When will it begin
- What will it begin as
- What type of conditions will prevail (precip type, winds temps etc.)
- When will it end
- What will pavement temperatures do
- What will winds do
- When is the next event
Forecasting

• Everyone relies on forecasting

• Where do you get your forecast?

• How and when are they made?

• Is it really what you need?
Where do you get your forecast?

TV and Radio have gotten better but are always looking at the bigger picture and ratings.

Ask yourself, when was that forecast made and where did it come from?
Is this **really** relevant to your job?

None of them focus on Road Conditions
These are good source but do you get what you need?
Value Added Forecast

Specific to your needs and help in planning
What should you focus on?

• Conditions at the ground
  • Pavement temperatures (you and around you)
  • Winds (direction and speed)
  • Precipitation type and rate
  • Any significant changes (front, storm changes)

Many of you have access to MDSS (Maintenance Decision Support System)
All forecasts begin with data

• All forecast models begin with balloon data

• Sent up twice a day all around the globe
Real time Observations are used as well
States, Counties and Cities that have RWIS all contribute to forecasting. Every airport does as well.
We need data that includes what the road conditions and pavement temperatures are predicated to be.

Getting a pavement temperature forecast is key to making decisions.
PRIOR TO EVENTS
FROST

Frost will form when the dew point falls below the pavement temperature and if the temperatures are below 32 F. Pavement forecasts can help us make decisions prior to it occurring. When dew point and surface temperature get close we can be alerted if we have a value added service so we can take measures before the event happens.

Subsurface temperatures play a key role in what happens on the pavement
When the surface temperature falls below the dew point and the temperature is below freezing, frost will form.

If this happens and we have not pre-treated, we are too late. The next set of data we may be looking at is crash data!
Pre-Treating Roadways using Anti-icing

Here we need real time data to make decisions prior to beginning the operation.
REAL TIME OBSERVATIONS

The data you need may come from a value added service but all real time observations are measured by systems along roads and at airports.

Today’s systems are for any size and type of agency and real value is having a system that measures pavement on your roadways.
So snow is predicted can we pre-treat the roads?
ANTI-ICING

PRO-ACTIVE TREATMENT PRIOR TO AN EVENT

CONDITIONS MUST BE CORRECT TO ANTI-ICE
<table>
<thead>
<tr>
<th>Step Description</th>
<th>Decision</th>
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<tbody>
<tr>
<td>Review/monitor weather forecast.</td>
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<tr>
<td>Is snow or frost predicted within the next three days?</td>
<td>No</td>
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<td>Is rain predicted before the snow?</td>
<td>Yes</td>
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<td>Is the pavement temperature 15 degrees or greater?</td>
<td>No</td>
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<td>Is the dewpoint at least 3 degrees below the air temperature?</td>
<td>No</td>
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<td>Is the relative humidity level 70% or less?</td>
<td>No</td>
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<td>Is the pavement dry?</td>
<td>No</td>
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<td>Are winds less than 15 miles per hour if loose snow is present?</td>
<td>No</td>
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<td>Has a visual inspection or RWIS confirmed sufficient anti-icing material residue does not exist on the pavement?</td>
<td>No</td>
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<tr>
<td>Apply anti-icing material (brine or brine blend) at 30-50 gallons per lane mile or follow agency policy.</td>
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All the data you need can be found in one place
IT TAKES 4 TIMES MORE SALT TO REMOVE ICE THAN PREVENT IT!

ANTI-ICING IS A VALUABLE TOOL WHEN DONE CORRECTLY
Treated vs. Untreated

THE SAME EVENT, ONE ROADWAY ANTI-ICED, ONE NOT TREATED.
WHEN YOU MAY NOT WANT TO ANTI-ICE
RAIN

FOG/HUMID

BLOWING SNOW
DURING A STORM
WHEN DO WE DEPLOY

Knowing not just when the storm will hit but when it will actually affect the pavement is vital.

Go sit out there and wait?
The storm started at 5:30pm and did not have an effect on the pavement till 6:54 pm
WHAT SHOULD DICTATE HOW MUCH MATERIAL WE APPLY?

Pavement temperature
Weather Condition
Type of De-Icer

Follow De-Icing Application Rate Guidelines
100 to 300 lbs/ln mile of pre-wetted salt
in most situations

THE PRICE OF SALT SHOULD NOT DICTATE HOW MUCH WE APPLY!!!
**A GUIDE FOR OPERATORS IN THEIR VEHICLES**

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<tr>
<td>Prewetted salt @ 12’ side lane (assume 2-hr route)</td>
<td>lbs of salt to be applied per lane mile</td>
<td>Heavy Frost, Mist, Light Snow</td>
<td>50</td>
<td>75</td>
<td>95</td>
<td>120</td>
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<td></td>
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<td>Drizzle, Medium Snow ½” per hour</td>
<td>75</td>
<td>100</td>
<td>120</td>
<td>145</td>
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<td>Light Rain, Heavy Snow 1” per hour</td>
<td>100</td>
<td>140</td>
<td>182</td>
<td>250</td>
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<td>Prewetted salt @ 12’ wide lane (assume 3-hr route)</td>
<td>lbs of salt to be applied per lane mile</td>
<td>Heavy Frost, Mist, Light Snow</td>
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<td>115</td>
<td>145</td>
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<td>Light Rain, Heavy Snow 1” per hour</td>
<td>150</td>
<td>210</td>
<td>275</td>
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You have an MDSS system to guide you
Sensible Salting Thoughts

• Putting down only what is needed.

• Level of service – what are we striving to achieve

• When will we achieve it? During the storm, following the storm, how long after the storm?

*But sensible salting also means -*
Placing materials at the optimum time, especially in extremely cold situations
AFTER THE STORM
Reviewing data
Would anti-icing have had an impact here?
Storm Performance Index

- The input parameters are run through an algorithm that produces an index.
LET’S TAKE A LOOK
ACCESS MDOT RWIS

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MDOT RWIS

• Approximately 105 Stations
• Various Models and Sensors
• Upcoming Projects
RWIS DATA

- Air Temp
- Dew Point
- Relative Humidity
- Winds
- Precipitation Type
- Road Temp
- Road Condition
- Road Friction
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