

NDOR's Fixed Automated Anti-Icing Program

Using Technology to Improve Traveler Safety



Presented at ITS Heartland 2015

Session 3

Presenters and Supporters

Eric Cottone

Business Development Manager

Boschung America, LLC

Tim Callahan

IT Analyst

Nebraska Department of Roads

Supporters

Dan Waddle – Nebraska Department of Roads

Roger Klasna – Nebraska Department of Roads

Ronda Lewis – Nebraska Department of Roads

Sarah Tracy – Nebraska Department of Roads

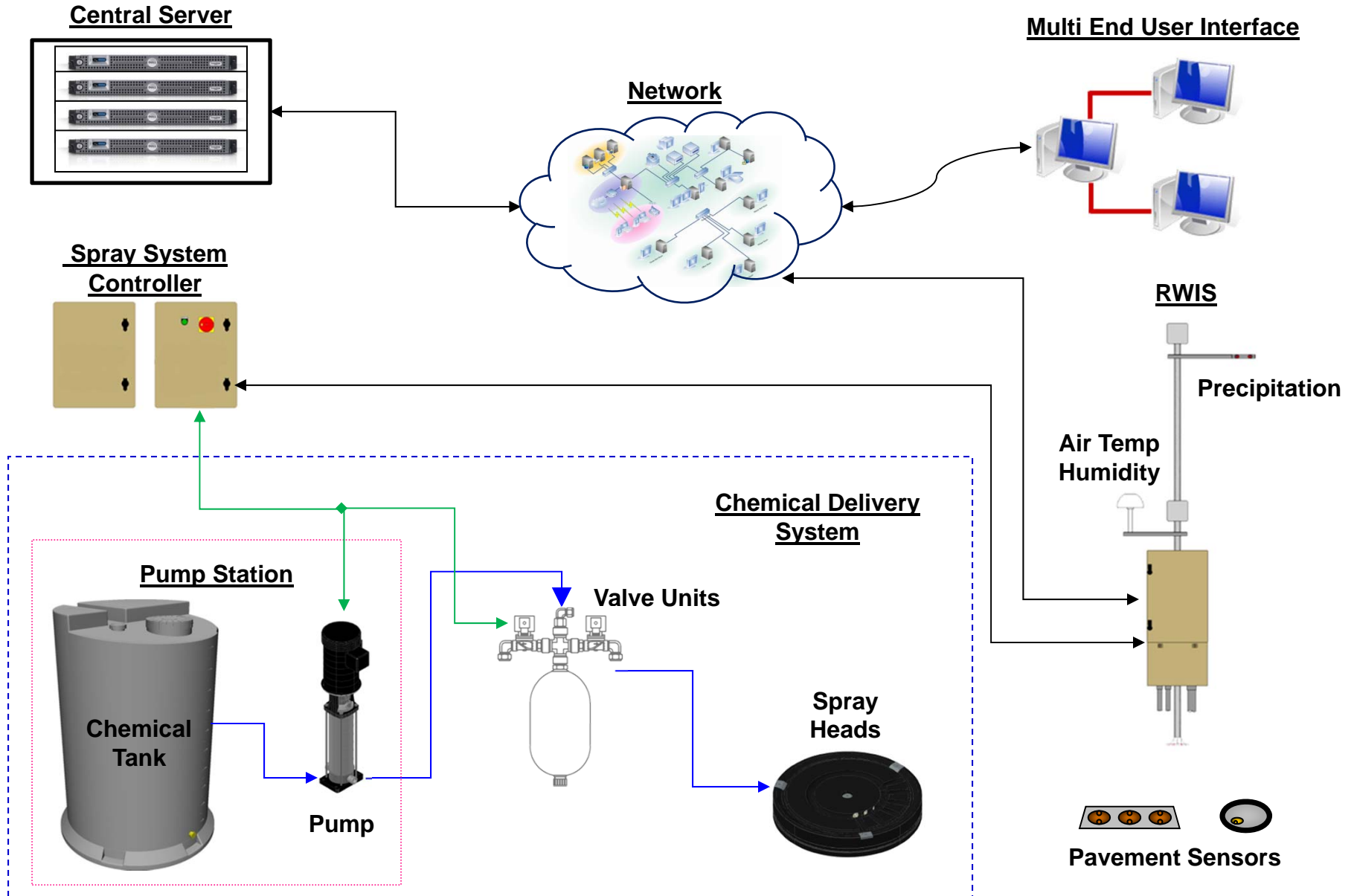
Kenny Day – Boschung America, LLC

Anti-Icing Concept

FHWA Definition of Anti-Icing

- Anti-icing is the snow and ice control practice of ***preventing*** the formation or development of bonded snow and ice by timely applications of a chemical freezing-point depressant .

Automated Anti-Icing System Schema



Chemical Delivery Methods

Embedded spray disk



Micro Mist Spray Nozzle



Prioritization Process

➤ Selection Analysis

- “Guidelines For Prioritizing Bridge Deck Anti-icing System Installations”
 - Aemal J. Khattak, Geza Pesti, Vijay Kannan, and Patrick T. McCoy
 - Study Commissioned by NDOR in 2002
 - Established an objective method for prioritizing system installations
 - 26 Bridges prioritized using multiple selection criteria
 - NDOR Safety Committee and Operations Divisions reviewed results and selected bridge installations as funding allowed

➤ Ensures:

- The balance of conflicting objectives
- We’re putting the systems in right place
- Best use of tax payer dollars
- Justification for use of Funds (State Safety Committee, FHWA)

Selection Criteria

➤ **Social & Economic Impact**

- Accident Frequency
- Accident rate
- Accident loss (\$2,600,000/Fatality)

➤ **DOT Responsiveness & Efficiency (Level of Service)**

- Distance to site from yard
- Travel time to site from yard
- Response time

➤ **Maximization of Impact**

- Roadway functional class
- Roadway ADT
- Roadway truck percentage

➤ **Road Geometry & Weather**

- Roadway Geometry (Bridge, Super, Etc)
- Alignment & Surface type
- Presence of water nearby
- Number of day with min and max temps < 32°F

➤ **Environmental**

- Watershed salinity concentrations

NDOR's Fixed Anti-Icing System Inventory

- **1998 – Odin System – Single Bridge**
- **2002 – MP 201 – 2 Bridges, 32 Spray Disks**
 - 1740 Linear Feet, DMS Signs
- **2007 – MP 181 – 2 Bridges, 20 Spray Disks**
 - 830 Linear Feet
- **2009 – MP 291 – 2 Bridges, 5 Spray Strips**
 - 1640 Linear Feet, First Micro FAST
- **2014 – MP 328 – 4 Bridges, 3 Spray Strips**
 - 1312 Linear Feet
- **2014 – MP 382 – 4 Bridges, 4.5 Spray Strips**
 - 1476 Linear Feet
- **2015 Exp. – MP 184 – 2 Bridges, 4 Spray Strips**
 - 1312 Linear Feet



Overall Benefits

➤ **Social & Economic Impact**

- Eliminates crashes – improves traveler safety
- Keeps the roadway open and reliable.

➤ **DOT Responsiveness & Efficiency (Level of Service)**

- Real time application of de-icing chemicals. Proactive treatment of ice and slick roadways for traveler safety.
- Decreased response time always monitoring
- NDOR plows can service the entire segment instead of treating one specific area. Eliminates the notification and response time to reach the structure. Better utilization of NDOR fleet.

➤ **Maximization of Impact**

- Targeting largest exposure (most people impacted/system)

➤ **Weather**

- Active sensors accurately monitor the real time conditions and applies chemical as necessary and adjust to the changing road conditions.

➤ **Environmental**

- Chemicals used are environmentally friendly and water soluble.

The Good & Bad of FAST

➤ The Good

- System eliminates emergency response for roads, emergency, law enforcement, and towing services due to a crash. Less exposure of personnel to traffic in inclement conditions
- With the built in redundancy, neither of our systems have ever been inoperable, we have lost the comm. side, but not the de-icing portion.
- Our systems are easy to troubleshoot.
- Chemical is environmentally friendly.
- They save lives

➤ The Bad

- Part availability due to low volume of systems and standardization
- Chemical tracking – down stream chemical thinning/freezing
- Deference of necessary maintenance due to cost and lack of funding
- System complexities – multiple skills necessary to operate and maintain
- No Federal Guidelines – State and local agencies need to create own

Making the Most of Automated Anti-Icing Systems

- Develop a set of selection criteria and follow your prioritization method
- Incorporate with bridge reconstruction/construction to reduce cost
- Due to the effects of wind and grade, nozzle placement is critical
- In areas of low traffic, pre-storm spraying is helpful with tracking
- Reduce electronic equipment if possible – Use new technology
- Life cycle costs (what happens after the first spray)
- Be prepared for software hosting & service costs
- Maximize the benefits of the system by sharing RWIS data
- Integrate RWIS and FAST data into other traffic and safety system
 - 511
 - DMS/VMS
- Follow Systems Engineering Process

THANK YOU!

Eric Cottone

eac@boschungameria.com

Tim Callahan

tim.callahn@nebraska.gov