Known for cold temperatures and snow and ice that can last from November through April, winter is the signature season of Minnesota. Ice on roadways is a significant concern for a state that experiences such a long, hard winter. Even the most experienced drivers can be caught off-guard when traveling over black ice, through freezing rain, and on snow-packed roadways.

MnDOT District 8 maintenance staff identified a small section of US Highway 12 near the City of Cokato, about 40 minutes from the Twin Cities, as an area which commonly experiences a condition locally known as “blow ice”. Due to the rural nature and roadway elevation of the area, ice forms when snow blows across the highway, creating an unexpected sheet of ice for travelers. Over the years, this “blow ice” phenomena has caused numerous accidents, many of which involve high school students traveling to and from Dassel/Cokato High School. MnDOT District 8 had previously implemented other solutions including living and traditional snow fences with marginal success.

With the assistance of MnDOT’s Office of Traffic, Safety and Technology ITS staff a project was initiated to develop an innovative technology based solution to this problem. SRF Consulting Group, Inc. was selected to develop a Concept of Operations and System Requirements document that reflected stakeholder input for the proposed ITS solution. Based on these documents, Boschung America designed an ice detection and warning system featuring . . .

- three in-pavement IT-SENS® pavement sensors from Boschung America
- PTZ camera
- active warning signs with flashing beacons upstream of the area where the ice develops to warn travelers

Application  – Using Pavement Sensors to Automate Ice Warning Systems
System Owner  – Minnesota DOT District 8
Sensors Used  – IT-Sens WSS Basic Passive Pavement Sensor
Project Collaborators  – Dan Rowe - MNDOT District 8, Scott Petersen - SRF Consulting Group, John Markham - Campbell Scientific, Eric Cottone - Boschung America
SRF prepared the plans, special provisions and estimate, and assisted Boschung with integration of the electronic Ice Detection and Warning system.

“The Boschung IT-Sens pavement sensors were easily integrated with a low cost data logger,” said Scott Petersen, PE, an engineer from SRF Consulting Group. “This compatibility helped keep the cost of the project down.”

To address a stakeholder requirement, the system also sends an alert to district maintenance staff with a link to a closed-circuit TV camera for visual verification that can be viewed from an on-line computer or smartphone. This allows district maintenance staff to determine the proper course of action to address the icy condition without having to travel to the affected area.

The Ice Detection and Warning System was installed in fall 2014 and an evaluation of system performance and effectiveness was conducted during the winter of 2014 – 2015.


RESOURCES
IT-Sens Information
http://boschungamerica.com/products/pavement-sensors/it-sens

MNDOT Blow Ice Warning System