

# The Road to Efficient and Cost-effective Winter Road Maintenance

How Idaho's non-Invasive RWIS network is paying for itself while helping to set new standards for improved service and operations

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In 2008, some of the heaviest snowfalls in 40 years punished road maintenance operations across North America. Faced with limited budgets in an economic crisis, today's winter road maintainers are being tasked with providing higher levels of service and road safety for the same or less cost. In this challenging operational landscape, the Idaho Transportation Department (ITD) has emerged as a prime example of how to accomplish that goal using a cost-effective, non-invasive Road Weather Information System (RWIS).



Charged with maintaining more than 4,940 centerline miles of highway, ITD has invested approximately \$5 million in a statewide RWIS network consisting of 27 upgraded existing stations and 48 new RWIS sites that include 39 new Vaisala non-invasive solutions. To understand the resulting benefits from an operational perspective, one needs to look no further than ITD's District 4.

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District 4 covers south central Idaho and includes 930 centerline miles of road over terrain that ranges from desert to mountain summits over 8,000 ft. The region experiences all kinds of winter weather: from mild frost and black ice to high winds, fast-changing temperatures and severe storms that can drop a couple of feet of snow overnight.

"The biggest advantage of our RWIS network is that now we can solve problems before they happen," offers District 4 Maintenance Foreman, Dennis Jensen, who joined ITD 26 years ago. "Vaisala's non-invasive sensor data eliminates the guesswork and lets us deal with knowns instead of unknowns. We know how much grip our roads are providing to drivers at any time. We monitor real-time pavement temperature and moisture and know when black ice is going to form. And we can see the effect of each treatment and how long it takes to work. That has helped us to identify the best actions, material mix ratios and application timing for various types of road weather conditions."

Other tangible RWIS benefits observed first-hand by Jensen include:

**A shift from reactive to proactive operations:** "A few years back, we used to depend on the reliability of forecasts, react only when there was at least an inch of snow on the road and aim to have trucks out within an hour of a storm's arrival. Now we act as soon as we anticipate a loss of traction - often before a storm even hits. The sensor data gives us plenty of lead time."

**A 40% savings on treatment materials:** In 2005-2006, Jensen's jurisdiction experienced 54 storm events. The next year, his team started using Vaisala's RWIS data to change how and when they treated roads. "Despite rising product costs and an almost equal number of snow events, we decreased our material costs by 10%," recalls Jensen. "In 2007-2008, we had 73 storm events (35% more) and certain product suppliers raised their prices by about 50%. But we were still able to reduce our material costs by another 30% by using our RWIS data to optimize our de-icing processes and be proactive in our treatments. In our line of work, a 40% reduction in material costs is significant. What we've essentially done is create safer roads using less product. A big part of that is having data that tells us when the job is done so we can avoid overapplying materials."

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**Increased efficiency & resource allocation:** "Black ice can form just from heavy dew and frost, so we used to have to patrol the roads regularly to see how slippery they were. Once we started comparing our personal observations with our RWIS readings, we found that Vaisala's non-invasive sensors gave us a much better assessment of grip and pending ice formation. Since our remote observation proved to be better than actually being at the site, we were able to eliminate some storm patrols, save fuel and better allocate that manpower elsewhere."

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**Safer roads:** "With real-time monitoring of surface state and improved application timing, we are better at maintaining the road in a wet state that provides more grip to drivers. Vaisala's sensors play a huge role in that because they are the only non-invasive sensors that measure grip - the number one reading we use to anticipate problems and see how effective our actions are. The ability of the sensors to independently monitor frost, rain, snow, slush and black ice has made it easier for us to plan the right treatments. Being able to measure grip in real-time and time operations to maintain it has helped us to decrease accidents in some key traffic areas."

**Improved ability to forecast and plan:** "ITD subscribes to several forecasting services. We recently compared our historical RWIS data to forecasted weather reports to see which service providers were the most reliable. Our data showed that the predictions of our most reliable forecast provider were consistently off by two degrees. We notified them, shared our results and they modified their weather model to improve its accuracy."

Based on his experience with embedded pavement sensors, ITD's maintenance foreman did not expect the non-invasive network to have such a positive impact. "When ITD first opted for RWIS, embedded sensors were the only technology available," recalls Jensen. "So we went with what was considered a quality system at that time. But the in-pavement sensors proved to be unreliable. Maintenance, service and data quality issues were so common that eventually most of us wanted nothing to do with them. When some of the pucks stopped working altogether, we opted to replace them with Vaisala's new non-contact solution<sup>1</sup>. To be honest, we were happy just to be moving away from the pucks and hoped we could get some good pavement temperature readings. We had no idea the non-invasive sites would work so well. Their range of data, accuracy and reliability, along with a Vaisala's intuitive Web display, have helped us to really improve how we do things. The non-invasive sensors are far superior to embedded pucks. And they have helped ITD to meet three core objectives: giving our customers as much information as possible<sup>2</sup>, keeping them safe and saving them time."

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Can other road maintenance operators expect the same kinds of benefits with non-invasive RWIS? "Absolutely," advises Jensen. "As long as you work with a manufacturer who is a partner instead of just a supplier. Vaisala was able to integrate the data from two other suppliers and build a reliable, accurate and easy-to-use RWIS network that is quickly paying for itself. And they are proactive in making sure we get the most out of it. In the few times we had a minor issue, they helped us correct it in about 15 minutes. It's been a positive experience all around - and it's made my job more interesting."

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<sup>1</sup> Vaisala's non-invasive Guardian RWIS package includes surface and temperature sensors, traffic camera, Web-based display and data management services. For more information, visit [www.vaisala.com/guardian](http://www.vaisala.com/guardian)

<sup>2</sup> ITD's RWIS data and camera images provide real-time content for its popular 511 Traveler Service. Users can access up-to-date information on highway conditions, weather, detours and lane closures simply by calling 511 or visiting [511.idaho.gov](http://511.idaho.gov).