

Facing the Winter

Using connectivity solutions by Turck, Cirus Controls creates deicing systems that clear snow and ice from roads and lessen the environmental impact of sodium chloride

As the people in Minnesota know, winters can be cruel. Residents there are all too familiar with subzero temperatures that leave ice and snow covered roadways for months on end. Snowplows that clear the road and spread the ice-melting products that make traveling less treacherous are a necessity for people living in many northern climates. Even so, most drivers don't think about what happens to the deicing material – usually sodium chloride (salt) – until they are washing it off of their vehicles.

Though the salt effectively melts ice and snow off the roadway, it also winds up in the ditches, marshes, lakes and streams that surround the area of application. Numerous studies have shown an increase in sodium chloride levels in waterways that has been attributed to the application of salt as a deicing material, which has led many industry professionals to investigate ways to reduce the salt on the road.

Paul Mortell, President of Cirus Controls in Brooklyn Park, Minnesota, and his team have been working to design control systems used on the snowplows to regulate the amount of salt being applied to roadways since 2001. According to Mortell, without the use of control systems, snowplow operators are relied upon to use their best judgment about how much salt to apply

to the roadway, and in an abundance of caution, are oftentimes using too much.

How much is enough?

Imagine how difficult it would be to see the salt coming off of the rear of a snowplow during blowing snow conditions using only your rearview mirrors. "When our calibrated systems are used for the first time by an experienced snowplow driver, they sometimes think that there is very little salt coming off of the spreader. This is because Cirus Controls' systems are configured to only apply as much salt as is needed to melt the ice, which is usually far less than what is applied without a calibrated system and is hard to see in the rearview mirror," explains Mortell. "Calibrated controls reduce the driver's requirement to constantly watch how much salt is being spread and lessens the amount of salt that ultimately winds up in the watershed. In addition, it frees the operator's attention to be more focused on what is in front of him instead of the spreading going on behind."

The incentive for keeping salt on roadways to a minimum is obvious: it's better for the environment and it helps reduce the deterioration of guard rails

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Cirus customers can reduce cost of materials by 30 to 80 percent



The junction boxes and cordsets from Turck are well prepared for the tough winter conditions



and vehicles. However, using control systems to manage salt application did not immediately become a standard practice. Says Mortell, "The implementation of electronics in the control system was slowed by the lack of durable electrical connections for the environment that they must operate in. The revolution in molded, shielded cables accelerated the introduction and adoption of calibrated electronic controls."

Electronic control systems

Where traditional systems rely on user expertise, electronic control systems are used to measure system features that help regulate salt usage. Some of these features include the ground speed of the truck used to apply the salt, the temperature of the road, the pressure of hydraulic system fluid, remaining amount of liquid and granular de-icing material, and the GPS position of the vehicle. This data is available to snowplow drivers so that they can accurately gauge system performance.

In Cirus Controls' electronic control systems, a valve bank is mounted onto the truck frame and is connected to the controllers in the cab of the snowplow. Finding a cable supplier with connectors that can hold up in the cold, wet and abrasive conditions found on a snowplow led Cirus to Turck. Depending upon the configuration, Cirus uses Turck 4 and 8 port junction boxes with either M8, M12, M23 or 1-1/8 inch molded connectors to connect the devices in the valve bank. Turck's connector's large size makes it easier for operators to connect the devices in the field, and integrated LEDs improves field diagnostics by allowing the user to visually see if the connection is operational.

"Outside the cab, electrical connections are exposed to water, ice, salt, hydraulic fluid and other

materials so the connections must be IP68 rated or better," says Mortell. "It's also important that the connectors can be easily applied in the field. Both of these requirements were met by Turck junction boxes and cordsets."

Since Cirus Controls makes custom valve banks per their customer's requests, another benefit of using Turck connectors is the company's ability to customize terminated valve connections for specific valve manufacturers. In this way, Cirus customers are ensured the right connection for the valve bank system they've chosen to use.

Less salt equals less expense

Using Cirus systems has numerous benefits to the user aside from the environmental impact, including having to purchase less salt. A Cirus customer that retrofitted 25 snowplow systems was able to save over 30 percent in material costs for a full season by using the control system. Even more savings can be experienced when using a closed loop system, where event and performance data is recorded and downloaded to provide performance feedback to operators.

Among other features, this data allows users to see exactly where the salt has been applied via a GPS system so that cities are better able to manage the de-icing process. According to Mortell, users that move to a closed loop system can experience a savings of up to 80 percent. In an example of true partnership, a city and a watershed district authority partnered to purchase and install this equipment and to share the de-icing performance data, as well as the data regarding the amount of chloride going into the watershed surrounding the city, to accurately gauge the outcome. ■



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**Paul Mortell,
Cirius Controls**

Quick read

Cirius Controls develops and produces deicing system for new snowplows or to those that are already in service. In order to connect valve banks, sensors and controls reliably, the company, based in Brooklyn Park, Minnesota, decided to apply Turck's junction boxes and cordsets, which are withstanding water, ice, salt, hydraulic fluid and other materials.