SNOW PATRIOTS

New England fights winter's wrath by staying loyal to anti-icing techniques

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Contributing Author

Anti-icing was developed in Europe and has been used successfully in the U.S. for nearly 10 years. While the benefits include safer winter roads, fewer accidents and potentially lower winter maintenance costs, anti-icing is not as widely practiced as it could be. Many state DOTs and larger county organizations have implemented anti-icing programs, but fewer cities and smaller counties have been able to follow suit. Many of these smaller agencies would like to try anti-icing, but they have limited resources or budgets to make the initial equipment investment. Others simply aren't sure how to begin.

Two New England communities—Tolland, Conn., and Marlborough, Mass.—are in the process of implementing anti-icing programs. These municipalities are showing how smaller road maintenance organizations with limited budgets can still take advantage of the benefits that anti-icing offers.

The three T's of anti-icing

To successfully implement an anti-icing program, three key elements must be addressed: timing, technology and training.

Timing is critical in anti-icing because it is a preventive strategy. Anti-icing requires the application of liquid or prewetted material to the road surface several hours before or immediately at the start of a winter storm. Road crews need timely, accurate forecast information to be successful. This information must be localized and it must provide advance warning of winter precipitation. Maintenance personnel usually cannot rely on generalized forecasts for a TV station's viewing area or a radio station's listening area.

Technology is necessary to properly control and operate the equipment used to apply the anti-icing materials. Users must be able to accurately gauge how much material is being applied to the road surface, especially if it's a liquid. Otherwise, material is wasted and the anti-icing may not be effective. To address this requirement, all spreaders must be accurately calibrated or equipped with ground speed control. Luckily, calibration is relatively simple and can be done in less than half an hour. Pavement temperature sensors also are a near necessity for anti-icing, but they are relatively inexpensive and can be easily retrofitted into existing units.

Training is critical because anti-icing techniques are different from traditional deicing. Road crews should understand the benefits of anti-icing and agree that it's a good idea to achieve the best results. With their buy-in and willing participation, the odds of establishing a successful program are greatly enhanced. With training, crews clearly understand when to perform anti-icing, how to calculate application rates, and more. An effective training program can contribute greatly to the successful implementation of an anti-icing program.

Tales of two cities

The city of Marlborough is located in southwestern Middlesex County between Worcester and Boston. Marlborough has a population of approximately 38,000 and their road crews are responsible for clearing approximately 140 miles of roads.

Marlborough has been practicing anti-icing for approximately four years using salt prewetted with liquid calcium chloride.

"Our trucks are equipped with Snow Equipment calcium dispensing systems and Basic Technologies CS-230 Compuspread ground speed controls. When the calcium dispensing system is combined with a CS-230, we receive more accurate calibration and we collect live data, which can be used as a tool for material assessments that ultimately result in cost savings," explained Sandra Waterman, assistant commissioner for Marlborough.

Based on the success of their existing anti-icing program, Marlborough plans to experiment with liquid anti-icing next winter. "We've purchased a new, convertible truck with a removable sander body," said Waterman. "We can then replace the new V-body sander with a 1,000-gal liquid tank and applicator unit."

According to Waterman, the cost of the liquid tank and applicator unit for the new truck will be approximately $5,000. She also indicated that users should plan for storage of the liquid calcium chloride or other anti-icing agent.

"We already have the necessary storage capacity—two 2,500-gal tanks for the liquid calcium chloride we use to prewet our salt," Waterman stated. "Our cost for these tanks was approximately $5,000."

The cost of training Waterman's road crews is relatively low. "In our experience, the amount of training needed is typically one day or less per year for initial training and refreshers," she explained. "The cost for this training is approximately $500 to $1,000 per year."

Waterman is sold on the benefits of anti-icing. "We've seen a noticeable improvement in road surface quality since we started anti-icing, and we've also reduced our material (salt) costs by about 20% at the same time," she stated. "This has encouraged us to expand our program and experiment with liquid anti-icing."

The town of Tolland is located northeast of Hartford along I-74. Situated in the Eastern Connecticut Highlands, Tolland's weather can vary significantly from conditions in the Hartford Valley. Tolland's road crews are responsible for 125 miles of roads covering approximately 40 sq miles.

Tolland is currently developing an anti-icing program. They will begin with a pilot program in two test areas—one a high-traffic trunk line, the other a low-traffic residential area.

To minimize the initial equipment cost for their pilot anti-icing program, Tolland plans to use a spare truck that was replaced but not traded in. "Our application unit will be mounted on the back of this truck," stated David Smith, director of Public Works for Tolland. "The truck doesn't have ground speed control, but it will be calibrated before we begin anti-icing with it."

Tolland had previously purchased a storage tank for liquid calcium chloride, so they already possessed the necessary storage capabilities. "We've been using calcium chloride for dust control and stabilization of

Marlborough uses a mixture of salt and abrasives for anti-icing and deicing.

our gravel roads," explained Smith, "but now we can use the storage tank during the winter season as well."

Weather conditions can vary considerably throughout Smith's territory. "Our elevations range from a few hundred to 1,000 ft above sea level," explained Smith. "We've also got west-facing slopes and north-facing slopes. So we can't depend on weather forecasts for Hartford, and we also need information for the different portions of our territory."

To address these varying conditions, an infrared pavement sensor will be installed in their anti-icing vehicle. The sensor will measure the road surface temperature under the wheels of the truck, giving the operator an instant snapshot of the outside conditions. Tolland also subscribes to a weather service that provides the customized forecasting information needed for anti-icing.

Tolland plans to have a consultant train the personnel who will be involved in their pilot program. "We don't envision training our entire staff at this point," Smith explained. "But we may walk everyone through the basics. If our anti-icing program grows beyond the pilot level, the people who have participated at the pilot level—the drivers, the foreman and superintendent—will be resources we can use."

Smith estimated that Tolland's initial training would require two or three half-day sessions with perhaps another follow-up session partway through their pilot program.

Liquid or prewetted?

The decision of when to use a straight liquid solution or prewetted salt should be based on a number of factors, including available resources (equipment and storage facilities), the type and amount of precipitation that is anticipated, air and pavement temperatures, sky conditions, wind, humidity and timing.

According to Joe Althouse, a technical service specialist with the Dow Chemical Co., both techniques—using a liquid solution or prewetted salt—will reduce material costs and usage rates. "Liquid deicers spread quickly on the road, forming a thin film that prevents snow and ice from bonding with the surface," Althouse stated. "With no bond formation, slippery conditions are prevented and plows can easily remove accumulation down to the bare pavement."

Prewetted salt offers advantages over rock salt alone. "Using salt that has been prewetted with calcium chloride is beneficial in two ways," Althouse explained. "First, bounce and scatter are decreased, so more material stays on the road surface where it's needed instead of rolling off into the ditch. Second, the prewetted salt melts snow and ice faster and at lower temperatures than dry salt alone."

Change is good

Anti-icing is based on a completely different philosophy than traditional road deicing: anti-icing is a preventive technique, whereas deicing is reactive in nature. The old cliché about an ounce of prevention being worth a pound of cure applies: Anti-icing has the potential to provide better road surface quality in less time while also lowering material costs.

As Marlborough and Tolland have discovered, none of the challenges that must be addressed to successfully implement an anti-icing program is insurmountable. Even with a relatively modest budget and limited available resources, forward-thinking agencies can reap the benefits of this proven technique.

For more information about anti-icing, refer to the Federal Highway Administration's *Manual of Practice for an Effective Anti-Icing Program* (FHWA-RD-95-202) available online at www.fhwa.dot.gov.

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