Snow and Ice Control

The City of River Falls takes pride in being the largest City in WI on a Class I trout stream and we intend to do all we can to keep it that way. One significant challenge for us is balancing the public's expectations for safe winter driving conditions with our desire to limit our impact on our environment, including the Kinnickinnic River. The City of River Falls has implemented various improvements to our snow and ice control operations to limit impacts on our environment.

Application Rate

Decreasing the application rate can significantly decrease environmental impacts. The City of River Falls typically applies salt only at intersections and to a select few higher volume roadways within the City. We also reduce application rates by anti-icing, prioritizing streets and utilization of pavement temperature sensors.

Pre-Wetting

The City of River Falls began pre-wetting salt that it applies to its street in the late 90s. Pre-wetting otherwise dry salt before it is spread on the road surface produces a number of desirable effects. The pre-wetted salt is more apt to stick to the road surface rather than bouncing off the road surface and being scattered in unnecessary areas. It is estimated that this reduces salt use by 20-30%. Rock salt by itself does not melt snow and ice; it needs some liquid water to dissolve into. Pre-wetting the salt before it hits the road surface provides this liquid water and results in faster melting and allows for less salt to be used overall.

Anti-icing

City crews begin their response to a snow event before the snow falls by commencing anti-icing efforts on main, high traffic roads. In 2007, the City of River Falls was near the forefront in adopting and implementing an anti-icing program to its snow and ice control operations. Anti-icing consists of applying liquid salt brine to the pavement surface ahead of an anticipated snow or ice storm. Anti-icing prevents the snow from bonding to the pavement, allowing the roads to be plowed more cleanly using less salt. Salt brine is typically applied at a rate of 20-40 gallons per lane mile which is equivalent to 45-90 pounds of salt per lane mile. Anti-icing significantly reduces the amount of salt used because it prevents snow from becoming compacted and bonded to the surface allowing easier removal by snowplows. Anti-icing can also reduce overtime costs because application can be made during regular working hours. The drawback to this method is that, if forecasting is inaccurate, deicers are applied unnecessarily.

Street Priorities

The City of River Falls has assigned different snow and ice control strategies to its approximately 100 miles of roadways based on the traffic volumes and the physical characteristics of the road, such as being on a steep hill. Sixty percent of the roadways maintained by the City are classified as low priority roads for snow and ice control. Bare pavement is not the goal of the City on these streets and as such, they do not receive routine anti-icing or de-icing. De-icing chemicals (i.e. salt) are applied sparingly on these low priority roadways at strategic locations such as approaching stop signs or in the event of glare ice.

Salt or Deicer Storage

The City of River Falls stores salt on an impervious surface to prohibit groundwater contamination. Furthermore, salt piles are placed in a structure protected from rainfall, eliminating contamination of runoff by exposed salt. This salt storage facility is licensed annually by the state of Wisconsin.

Sanding

Up until about 2007, the City routinely applied sand to its streets to help aid with vehicle traction. Although the City has discontinued routine use of sand, we are able to purchase sand from the County in rare instances when immediate traction is needed (such as ice storms) or when temperatures are too low for salt or other de-icers to be effective. Reasons that the City has moved away from using sand include:

- Sand applied to streets, parking lots, and sidewalks eventually washes into the nearest waterway, where it can fill wetlands, lakes, and waterways, or obstruct the flow of water through storm sewers.
- Sand damages waterways by clogging the spaces in gravel where insects live, making it hard for them to cling to rocks. Insects are a key part of a Trout stream's food chain and an indicator of stream health. Keeping sand out of the Kinnickinnic River is important to maintain a healthy fishery.
- Twenty to thirty percent of the sand is lost immediately due to scatter, similar to the loss of dry salt as noted above.
- Sand piles trap moisture, even when covered, and 2-4 percent salt by weight needs to be added so the moist sand won't freeze. Typical application rates of 500-1000 pounds per lane mile result in 10-40 pounds per lane mile of salt.
- Sand becomes ineffective when covered by new snow and much be reapplied.
- According to the WisDNR, research on friction on pavement treated with sand shows that there is little benefit when traffic is present.
- The US EPA indicates that sand loses its effectiveness as a traction enhancer on many roads after as few as 10 vehicle passes.

Pavement Temperature Sensors

At a pavement temperature of 30°F, one pound of salt can melt 45-46 pounds of ice. At a pavement temperature of 20°F, one pound of salt can melt 8-9 pounds of ice. The City uses pavement temperature sensors, which allow us to calibrate application rates and choose the correct products based on actual pavement temperatures, not air temperatures. We often find that pavement temperatures are significantly different than air temperatures. Concrete (South Main) compared to asphalt surfaces can vary significantly as can bridge decks compared to regular road surfaces.

New Technology

The City has been very proactive with new technology and continues to try and stay on the forefront of new technologies that may help us balance the public's expectations for safe winter driving conditions with our desire to limit impact to the environment. We have tried a number of other chemicals in recent years that include rust inhibitors as well as allow us to better utilize salt in colder conditions (typically below 15 degrees).

Snow Removal Strategy

The City's plowing strategy depends on the interaction of several factors: the time the snow began, the duration and accumulation of snowfall, the type of snow - light/dry or wet/heavy, the temperature before and after snowfall, high winds, and available staff and equipment. Despite what can seem like a complex process, the goal of the City's plowing efforts is simple: to maintain safe travel by pedestrians and vehicles throughout River Falls.

Once snow has begun to accumulate on the roads, City crews and contractors will plow high volume main roads. Local residential streets will not generally be plowed while it is still snowing. Crew shifts are adjusted for the following day to begin citywide snow removal operations after midnight and avoid overtime costs to the greatest extent practical.

Supervision / Training

As you can see, we have thoughtful approaches to chemical management. Although we actively manage the level and degree to which we use de-icing techniques, the equipment and manpower used to deploy it sometime results in more or less usage of the products than desired. Our Streets-Lead is involved in actively monitoring plow and salting routes to detect malfunctioning equipment (like salt spreaders) and to remind operators of the proper techniques regarding operation of the equipment to match application rates with the expected outcomes for anti-icing or de-icing.

Follow Up

After snow removal operations have been completed, Public Works crews respond to complaints and inspect for areas where snow has not been removed from sidewalks by the adjacent property owner. Property owners are required to shovel their sidewalk, full width, within 24 hours after a storm. On corner lots, the property owner must clear the pedestrian ramp of snow deposited by plows so that pedestrians can safely and freely use the ramp. This may need to be done more than once as a full cleanup from a storm generally takes three days and involves multiple plow passes. If the owner/occupant fails to clear sidewalks and ramps adjacent to their property, the City will have the snow and/or ice removed and the cost charged to the property owner. The cost for the City to remove the snow and/or ice shall be billed according to the City's current Fee Schedule (Currently $80 minimum). Failure to pay for said services, upon billing, will result in the costs being assessed against the property and placed on the annual tax roll. Only one (1) notice will be given to the property address this snow season regarding clearing of sidewalks. After the first notice, the City will clear sidewalks if they have not been done.