

Winter Road Maintenance Information: Excerpts from “What you should know about safe winter roads and the environment”

According to US EPA of New England: “What you should know about safe winter roads and the environment,” road maintenance crews use salt, sand, and other products to keep roads clear of snow and ice in the winter. But too much salt and sand can harm the environment and contaminate drinking water supplies. Numerous scientific studies indicate that salt and sand can pose health risks to people, plants and animals. Bridges, roads, and automobiles also suffer damage from salt use. With some simple techniques and new equipment, however, crews can use less sand and salt while making roads significantly safer.

What are the effects of salt and sand on the environment?

When spring rains and snowmelt occur, the salt that has accumulated over the winter is carried into storm water catch basins and streams. In surface waters, such as lakes, ponds, and streams, salt can harm or kill aquatic life, including fish and plants. Salt also attracts animals, including moose and deer, to the roadside, where they can be struck by traffic. Along the shoulders of roads, salt damages vegetation and soil, leading to erosion issues.

If salt reaches surface and underground drinking water supplies, it can cause problems in people with hypertension. It can also affect the taste of water and corrode plumbing infrastructure. Salt gets into the drinking water in two ways: it can collect in lakes and reservoirs, or it can infiltrate into the groundwater and contaminate wells. Once in the groundwater, salt remains there for decades.

Sand is easily moved to the side of the road by vehicular traffic, where it collects oil, grease, and other automotive byproducts. If it is collected, it may have to be disposed of as a hazardous waste. If it is not swept up, it clogs storm water catch basins and fills streambeds. It also clouds the water, hurting aquatic animals and leading to an increase in microorganisms. Sand is also ground into a fine dust by traffic. This dust can trigger respiratory problems like asthma.

Safety Concerns of Reduced Salt/Sand Use:

Municipalities justifiably want their roads to be as safe as possible. Because of this, the tendency to think that “more is better” can be difficult to overcome. But several recent studies have shown that by using new techniques, equipment, and chemicals, roads can actually be safer with less salt use.

Results from a US EPA of New England study showed that Canada saw an overall 8% decrease in accidents after changing to low-salt application

techniques. When transportation officials in Idaho switched to liquid magnesium chloride on one stretch of road, the number of accidents fell by 83%. Just as remarkably, that same stretch of road saw crews putting out 83% less salt and sand. Not every story will be this successful, but both travelers and the environment win when municipalities make changes that keep roads bare and use fewer materials.

Recommended actions to reduce salt and sand applications:

Every member of a winter maintenance team can benefit from the training programs offered in every state by the local Technology Transfer center. They will often teach a program known as the “4 R’s.”

- 1. Use the Right Material.** Stop using sand, except for low-speed intersections, curves, and hills. Use a chemical that is effective at current road surface temperatures. Consider using alternate chemicals on bridges and in source water protection areas.
- 2. Use the Right Amount.** The number one factor in applying salt is the surface temperature. Warmer roads need less salt. Consider purchasing inexpensive infrared thermometers for spreading trucks.
- 3. Apply at the Right Place.** Put salt down where it will do most good. Hills, curves/corners, shaded sections of road, bridges, etc., need special attention. A section of road with a surface temp below ~10° F won't benefit from rock salt. Use another chemical instead. Designate sensitive areas as low or no salt zones.
- 4. Apply at the Right Time.** Apply as early as possible! Obtain and use the most up-to-date weather forecasts. Don't wait until snow is falling to get started. It takes much more salt to melt accumulated snow than it does to prevent accumulation. Factor in expected traffic, approaching day/night change in temperatures, etc. Brine can be applied very early, forming a bond with the road that can be effective for days in the right conditions.

The information above is provided as a summary of some the facts. I personally have attended multiple classes on the standard method of salt application. The trucks that apply the salt are calibrated as low as possible. In my opinion, the industry standards which during an average storm is about 250 lbs. per lane mile and 500 lbs. per center lane mile. By that, when there is a storm in the forecast we will apply 500 lbs. of salt down the center of the road as a pre-

treatment. As it starts to snow the salt will go from solid into a solution, and creates a brine. When I say brine, the snow melts into water that is saturated or strongly impregnated with salt, and that stops the snow/ice from adhering to the road. In brine stage, you are able to get down to the black top easier with each pass of the snow plow, resulting in a more complete scrape. When snow is removed, we need to re-apply salt to stop the road surface from freezing. That is when the 250 lbs. per lane mile is applied. Because we are treating just one lane at a time we cut the application rate in half. If you would like more information on salt/sand application and environmental effects, please check out the following links on this website.

Sincerely,

Michael Shattuck
Heath Highway Superintendent