



Pre-wetting

NH Best Management Practices

PRE-WETTING?

Pre wetting is the process of coating a solid de-icer with a liquid before it is spread on a roadway.

WHY PRE-WET?

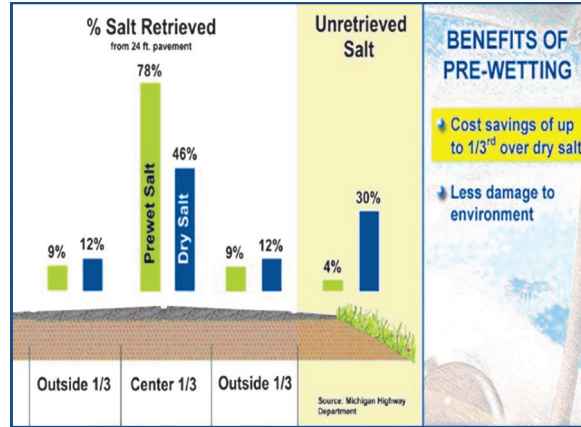
De icing chemicals must form a brine before they can begin melting ice. Pre wetting your chemicals accelerates the brine making process, which improves the melting action of the material. Pre wetting also reduces bounce and scatter of material during spreading, and reduces the total amount of de-icer needed to obtain the desired results.

REDUCED RATES

If you are pre wetting, don't forget to reduce your application rates accordingly. Reductions in the range of 15-20% are typical.

HOW MUCH LIQUID?

A good rule of thumb is to use 8-10 gallons of pre-wetting liquid for every ton of de-icer. For other chemicals, such as magnesium chloride, consult your supplier for application rates.

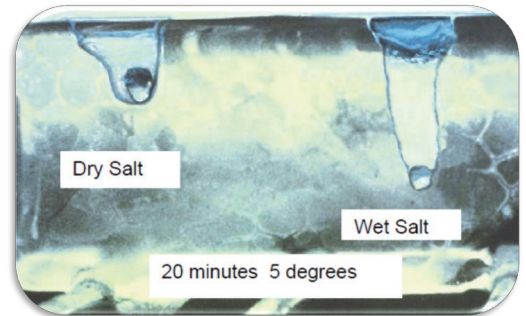


Getting Started

Wet the pile! There are two ways to pre-wet your de-icing chemicals. The easiest way to get started with pre-wetting is to spread your salt pile, spray it with pre-wetting liquid, mix it around, and re-pile it. More advanced truck-mounted pre-wet systems can be installed on your trucks if you decide to make the investment.

Pre-wetting Liquids

You have a few options for pre-wetting liquids. The most commonly used is a 23% sodium chloride brine solution. Calcium chloride at 32% solution is also used, as well as Magic Minus Zero™ and other patented products.



Source: Wisconsin DOT Transportation Bulletin

Spraying the Pile

This is the easiest and most cost-effective way to get started in pre-wetting. The first step is to spread your salt pile on a flat, impermeable surface. Next, spray the salt while it is spread out, and mix it around to ensure adequate and consistent liquid coverage. After the salt is sufficiently covered, re-stack the salt in your storage shed for later use.



Truck Mounted Systems

These systems are mounted in the truck bed and coat the de-icer with liquid as it comes off the conveyor/auger onto the spinner. These systems have the benefit of applying liquid only to the material you use as you use it. However, these systems must be installed on every truck that will be used to spread pre-wetted material.



Produced in partnership with:



The basic equipment used in brine making is a mixing tank, a holding tank, a pump, and a salometer. It is recommended that brine mixing and storage be indoors to reduce the risk of freezing when temperatures are below 0° F; a circulatory pump may be used to reduce this risk if outdoor storage is the only option. If a mixing facility is not available or desired brine may be purchased from an independent vendor. DOT is currently willing to sell brine to the town of Windham for a pre-wetting trial period.



Figure 35. Salometer

Use the following guidelines for working with brine:

- Salometer reading should be 88.3 for 23% solution
- Specific gravity of 1.179 at 60° F
- Freeze point of -5.8° F for 23% solution
- One gallon of saturated brine contains 2.647 pounds of salt and weighs 10.027 pounds.
- One gallon of water dissolves 2.991 pounds of salt to produce 1.13 gallons of saturated brine.
- One ton of salt will produce 755.5 gallons of saturated brine.
- Chemical additives can be mixed with brine to further lower the freeze point.

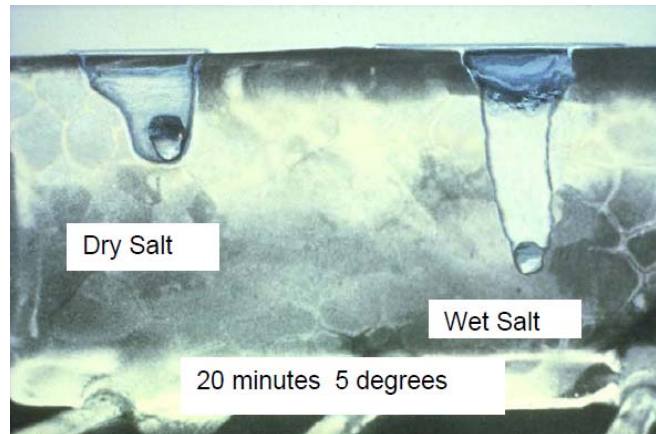
For information about the proper storage of brine, see the Brine Storage and Management section. Refer to Appendix G for the New Hampshire Best Management Practices fact sheet on making brine.

Pre-Wetting

Pre-wetting is a term referred to a liquid deicer that is applied to a solid-based deicer in order to create a quicker reaction time for the solid deicer to begin melting snow and ice. Salt doesn't work until it is in solution, so it is recommended that all dry salt be pre-wetted regardless of the temperature. By introducing moisture into salt prior to application, the results are a quicker melting action, reduced bounce and scatter of material, and a reduced application rate.

Figure 36. Ice Melting

With a quicker melting action the application rate of pre-wet salt can be decreased by approximately 20 percent over dry salt, which saves money, increases level of service, and reduces chloride in the environment.



Pre-wetting decreases the amount of material that resides outside the target application area due to bounce and scatter. In a Michigan Highway Department study it was found that 20 percent to 30 percent of dry salt applied was immediately removed from the target

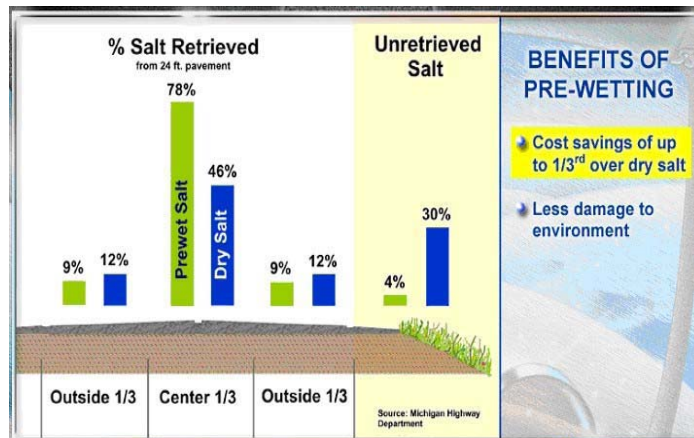


Figure 37. Bounce and Scatter of Salt

shown to increase the performance of solid chemicals and their longevity on the roadway surface, thereby reducing the amount of materials required. (O’Keefe and Shi, 2005)

Pre-wetting can be accomplished at the stockpile, in the body of a truck, at the spinner, and at the auger.

Wetting stockpiles can be done with a liquid injector that uses special nozzles that inject deep into the pile, but this method is not readily used due to the level of management required. The degree of coating on dry salt is highly dependant on the skill of the operator

and frequent reworking of the pile is needed. Because of leaching risks, all stockpiles should be covered and on an impervious pad.

Another method of pre-wetting at the pile is to move the needed amount of dry salt into an area for mixing. Spray liquid deicer onto the smaller pile at the desired rate, mix, and then load into the truck.

Figure 38. Overhead Pre-Wet Spray System

Spraying truckloads is accomplished by spraying liquid chemical onto a loaded truck, or while material is being loaded to the truck with an overhead spray-bar system. Spraying stockpiles and truck loads is not as practical since granules are not



uniformly coated and liquid may drain out of the solid material. Performance on the road may not be consistent throughout the route.

The most efficient method is to pre-wet while salt is being discharged from the chute or at the spinner.

Solutions for pre-wetting can include sodium chloride brine, calcium chloride, magnesium chloride, potassium acetate, calcium magnesium acetate and various agricultural products.

For the UNH T2 best management practices fact sheet on Pre-wetting please refer to Appendix H.

If pre-wetting salt is not an option then pretreated salt may be available for purchase from your local supplier. It is important that the pre-wetted salt be stored in a covered area or within a building to reduce leachate and material waste.

Abrasives

Abrasives (sand and fine mineral aggregates) provide temporary traction on roads, hills, intersections or other problem areas. Abrasives do not melt ice or snow. They are generally used in very cold temperatures when other materials are not as effective. Abrasives, once applied, are quickly dispersed off the road surface by traffic, therefore they are most beneficial in very low traffic areas.