

NJLTAP Tech Brief: Winter Weather Treatment and Preparedness



New Jersey roadways are within the nation's snowy regions, which guarantees they will be subject to winter weather conditions every year. They also represent the unique combination of rural roads and congested urban centers, making for complex winter storm management response by local public agencies. High traffic volumes in the state mean that typical reactive responses like de-icing and snowplowing are only part of the solution. Often, pre-treatments such as the use of pre-wetting and anti-icing liquids ahead of the start of the storm are needed to lessen the impact of a weather event. Managers must also be aware of the amount of snow expected, snowfall rate and anticipated duration, temperature, and whether wet or dry snow is expected.

What's the difference?

While the names might sound similar, anti-icing, de-icing, and pre-wetting are all distinctly different methodologies.

Anti-icing – The application of chemicals to roads before a snow-pavement bond occurs. Anti-icing emphasizes prevention rather than reaction. Anti-icing is shown to reduce or prevent the formation of black ice on roadways.

Pre-treatment – A form of anti-icing where chemicals are applied to the road up to 48 hours before a winter storm to prevent a bond from forming between the pavement and the snow and ice when the storm starts. A non-caking liquid is mixed into the stockpile of salt prior to application.

De-icing – The practice of removing snow or ice once it has bonded to the pavement. This involves plowing and continual application of chemicals and abrasives. Plowing generally begins when an inch or more of snow has accumulated on the road.

Pre-wetting – Involves treating the dry de-icing chemicals with liquids before they are applied to the roadway as part of the deicing efforts. This accelerates the activation of the chemicals before they are applied to the road. Pre-wetted chemicals are not typically applied to roads before snow or ice accumulate.-

Anti-Icing and De-icing Practices

Highway anti-icing is the practice of preventing the formation of bonded snow and ice by applying chemical-freezing point depressants to roadways before snow events. Anti-icing has several advantages, most importantly that the roadway surface never becomes impassable and roadways are returned to normal conditions more quickly. **Salt**, which is sodium chloride, is often referred to as rock salt or road salt in its mineral form. It is thought to be more efficient than brine salt-water mixtures, as the brine spray does not bounce or blow off the road surface. This allows maintenance managers to use less material while speeding up cleanup, with the benefit of increased cost savings, and resulting in fewer delays for travelers. Brine spray is widely used due to its availability and cost.



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Brine – magnesium chloride, sodium chloride brine - Sodium chloride (salt), magnesium chloride, calcium chloride, calcium magnesium acetate and potassium acetate are chemicals used to prevent and remove snow and ice from roadways. Several agencies use a combination of liquid magnesium chloride, calcium chloride and sodium chloride for anti-icing and pre-treatment. Sodium chloride and calcium chloride in dry form are used for de-icing, but can be used in some cases for anti-icing.

With salt and brine use in anti-icing programs, labor hours typically go down as roads can be cleared faster without the need of overtime, and roadway damage is far less than that caused by snowplowing or other abrasive materials like sand.

However, to achieve these benefits managers must exercise considerable judgment when making these decisions - weighing all of the unique aspects of the roadway system to ensure that a systemic approach is undertaken.

Calcium chloride- Available in both wet and dry forms, calcium chloride is often more costly- but ideal for temperature ranges under 25° F Dry flake calcium chloride can be mixed with salt to improve melting at low temperatures. Liquid calcium chloride is used for pre-wetting salt or abrasives.

De-icing is a reactive treatment intended to break the bond of existing snow and ice. Once they dissolve and extend downward to reach the pavement, they melt the ice and snow to a point it can be removed by plows.

We can help

New Jersey LTAP offers a one day workshop that covers the full range of snow and ice removal and control. The six module course includes program development, planning, pre-season activities, in-season operations, post-storm activities, and post-season activities. It is designed so that all involved personnel can have a sound understanding of the fundamentals and a better appreciation for why others in the network are doing what they are doing. Plow operators, other equipment operators, road superintendents, supervisors, town managers, town clerks, and elected officials can all benefit from this one day of training.

Keep an eye out [on our training page](#) for the course, entitled **Winter Maintenance: Snow and Ice Control for Local Roads**. Also, feel free to use the resources below to inform your decision making process.

The Salt Institute: <http://www.saltinstitute.org/road/snowfighting/>

Federal Highway Administration Manual of Practice for an Effective Anti-icing Program:

<https://www.fhwa.dot.gov/reports/mopeap/mop0296a.htm>

Safe Winter Roads: <http://www.safewinterroads.org>

NJDOT Winter Readiness: <http://www.state.nj.us/transportation/about/winter/>

