



# Residential Snow and Ice Removal and Management

One of the consequences of living in the Northeast is that we frequently have to deal with snow and ice. Snow and ice make it difficult to walk or drive by creating obstructions (snow) or slippery conditions (ice). It is important to manage the snow and ice so that people and property are safe and accessible. A simple move, smooth and remove approach is recommended for most winter weather problems, where we move the snow, smooth out obstacles and improve traction and finally remove persistent hazardous conditions.

## Removal and Management

While both are present together, we deal with snow and ice removal differently. Snow is generally moved mechanically by pushing or blowing through the use of shovels, plows or blowers. Ice can also be removed mechanically through scrapping, but we can also use chemical de-icers which melts the ice. Heat is also used, but has limited application or requires a preexisting heating system. Another approach is to spread a material over the ice that will provide traction. While not removing the ice, this method eliminates the slippery conditions created by the ice.

## Best Approaches for Snow Removal

Start with timely snow removal. Frequent and early mechanical removal of snow limits the buildup of snow and inhibits the development of ice. Also early removal prevents problems that arise from foot and vehicle traffic on the snow that compress the snow and make it more difficult to remove. While prevention of ice is often impossible, the removal of the snow will limit snow melt forming into ice. Early and frequent removal is also recommended to limit the difficulty of moving the snow. While this approach will require more trips it will limit the likelihood of ice formation and personal injury.

## Late Removal of Snow

Often we can't remove the snow in a timely fashion. Snow that has been undisturbed for a period of time will undergo both settling as well as thaw and refreezing. These actions will often produce heavier and hard packed snow with an underlying ice layer. It is recommended that you remove the snow prior to ice removal as de-icers will not effectively remove snow.

It is important to note that traditional traction or chemical de-icing agents will not effectively remove snow, so before dealing with ice you will need to remove the snow.

## Best Approaches for Ice Management

While prevention is the best approach when dealing with ice, even with the most dedicated of snow removal methods, we are often not able to completely eliminate its formation and it can buildup to become a hazard.

Breaking or scrapping the ice is a good first step so that the ice can be **physically removed**, but often this can be prohibitively difficult. In these cases we apply a surface treatment to **improve traction** or **melt the ice**. In most situations we use a combination of methods that best reflect our needs.

**Physical removal** of ice is difficult, but it is the best first option as it removes the initial ice hazard and potential melt water as a source of future ice buildup. It requires breaking, through impacts and/or scraping, the ice off of the affected surface. Ice removal tools such as hammers and scrapers are readily available and should be selected based on the surface being cleared to prevent damage to the surface. We also can use heating systems, but these are preexisting systems embedded in roofs, roads or sidewalks which melt both snow and ice.

**Improved traction** methods are an excellent alternative if physical removal or heating systems are too difficult or expensive to use. This method uses loose materials to make a rough surface that improves the grip of foot and vehicle traffic. There are a variety of materials that are effective and safe. The most common are sands and gravels, wood ash, saw dust, bird seed or unused cat litters.

Though any small loose product will work to improve traction, care should be taken in selection of the material. The material should be small enough that it doesn't become a tripping hazard and stable so as to not be carried or washed away as some cat litters and wood ash will do.

These materials should also not be used in areas or in quantities that will clog pervious pavements or drains and in the case of bird seed be used carefully to prevent the spread of unwanted weeds.

When removal and traction is not practical, de-icers are used to **melt the ice**. These methods use a chemical that when spread will lower the freezing point of ice to prevent ice buildup or will melt ice to allow for easy removal or run off from the surface. The three general varieties of de-icers that are used are inorganic salts, organic compounds and fertilizers and lastly petroleum or alcohol based antifreezes. Petroleum or alcohol based antifreezes are primarily used on aircraft, vehicles and equipment and should not be considered for residential or road use as they are highly toxic and/or poisonous.

Chloride based **inorganic salts** are regularly used as de-icers for sidewalks and roads. Sodium chloride (table salt) is the most commonly used. It is relatively inexpensive and effective to 23°F (-5°C). Sodium chloride does have harmful local and regional effects to soil health, water quality as well as to plant, pets and wildlife. It is also a strong corrosive and can damage vehicles, sidewalks, roads and bridges and as such it should be used carefully. Calcium and potassium chlorides are more expensive alternatives which are effective to -62°F (-52°C) and -11°C (12°F) respectively, but are safer for plants, animals, equipment and pavements.

While often, but not always used as an additive to salts, other **organic compounds, fertilizers and agricultural byproducts** are being used as alternative de-icing agents. Reducing the environmental impact of salt use by eliminating or diluting the salt, these compounds act to increase the effective duration and placement of the de-icers.

While urea and sugar beet molasses are perhaps the most commonly discussed, these compounds also often act as a barrier between road and ice or serve to lower the effective temperature for de-icing. In many cases experimental, these products are seeing increased use on roads with favorable reviews. While having detrimental effects of increasing nutrient concentrations and toxicity in streams and lakes, these products can outweigh the environmental concerns of salts by reducing overall salt usage with careful use.

## Further Considerations

While we can't control the weather we can plan ahead on how we are going to manage the snow and ice. Think about where you are going to place the snow and that with future storms the snow will build up. Melting water will also collect in cracks and low spots and with freezing will cause damage and hazardous conditions. Find the problem areas and plan for alternate snow placement and ways to redirect the snow and ice melt.

Make sure your tools are ready and available.

Read the labels on the de-icing agents so that you understand the effective use to minimize side effects of the chemical. These chemicals damage sidewalks, roads and vehicles as well as have toxic effects to wildlife, pets, plant and aquatic life - use them wisely.

## Use a Combined Approach

Snow and ice management is not easy, but the simple move, smooth and remove approach will be your most effective and efficient method of management. Move the snow and eliminate both the obstruction of snow and problems of future snow melt. Smooth the path by improving traction for pedestrians and vehicles. Remove persistent ice and obstacles that create hazardous conditions. Remember move, smooth and remove.

For more information contact



Cornell University  
Cooperative Extension

Jonathan Russell-Anelli  
School of Integrative Plant Sciences  
Soil and Crop Sciences Section  
<http://scs.cals.cornell.edu/>

2020