



Anti-Icing

Anti-icing is defined as the process of placing chemicals on pavement surfaces prior to an event in order to prevent the formation of ice on the pavement, also to prevent snow and ice from bonding to the pavement surface. Anti-icing may be accomplished by using solid or liquid materials depending on the given circumstances and predicted weather conditions. The most common and widely accepted method of anti-icing is the application of salt brine to roadway surfaces prior to an event. However, anti-icing as a strategy also encompasses additional application of road salt (in either solid or brine form) after precipitation begins, to continue the prevention of bond formation.

Conditions must be correct in order to apply this liquid chemical to a roadway and be effective. In general, three major conditions should be considered: whether the event will begin as rain, a minimum pavement temperature at which to apply, and the moisture in the air and on the roadway. Other considerations are loose and blowing snow and residual salt that may be on the roadway. The use of a decision chart for anti-icing is a best practice when using anti-icing as a strategy. Application rates of salt brine of 30 to 50 gallons per lane mile are common for anti-icing applications. Done correctly there is little to no loss of material off the pavement, it dries very quickly and is effective in preventing frost from forming and snow and ice from bonding to the pavement at the inception of the event.

Rock salt in its solid form can also be used for anti-icing. There can be a variety of reasons to consider this. Should an event start as rain or freezing rain liquids may be diluted quickly and have little or no effect. Solids are likely to last somewhat longer and help prevent ice from forming. Solids are also a good choice when road and atmospheric conditions are damp and situations when liquids are not recommended. The common drawback to using solids is that some of the applied material is likely to be lost off the surface due to traffic prior to the event beginning. When solids are used for anti-icing, they should be pre-wet (see above) to minimize this loss.

Anti-icing can result in huge savings to an agency and a safer roadway system for its users. Frost callouts can be reduced or eliminated. Ice prevention can result in a 75% savings versus de-icing a roadway that has become ice bonded. Agencies that have implemented an anti-icing program have seen significant reductions in material use.

An anti-icing strategy used throughout a storm allows level of service goals to be achieved while using only 25% of the salt required for a de-icing, reactive strategy.

MATERIALS

The numbers: Studies suggest that anti-icing can reduce crashes by up to 85% compared to a de-icing strategy. Plus, bond prevention can result in a 75% savings verses de-icing a roadway that has become ice bonded.

The Alternatives: What if you cannot use liquids? You can still anti-ice using pre-wet solids, although the benefits may not be quite as strong. However, in some circumstances even if you have liquids you should use pre-wet solids. If a storm is going to start with rain rather than snow, for example, you should not pre-treat your roads with liquids, but rather use pre-wet solids.

The needs: If you are changing to an anti-icing strategy, there are quite a few things you will need. You will need the ability to place liquids directly onto the road, which means liquid storage facilities, transfer facilities and trucks capable of direct liquid application (you can use trailers for this too). You will also need weather forecasts that provide you with enough information on both storm types and storm start times to allow you to have confidence in your pre-application program.

An example of a Anti-Icing Decision Chart used by MNDot

| Event Type | Pavement Temperature | Need for Anti-icing |
|---|-----------------------------|--|
| Light Freezing rain/drizzle | All | Consider anti-icing |
| Rain, medium/heavy freezing rain. Sleet | All | Liquid anti-icing not suggested |
| Powder snow | Cold (12 °F or colder) | Anti-icing often not required (less chance of ice/snow to pavement bonding) |
| Light to Moderate snow | Between 12°F and 32°F | Consider anti-icing |
| Light to Moderate Snow | Warm (Remaining above 32°F) | Usually will not produce bond. Anti-icing usually not required. |
| Heavy/Wet Snow | All | Liquid anti-icing not suggested because of rapid dilution of solution (DOS) potential. |

