



### 1.0 *Appropriate Use of De-icing Agents*

De-icing agents are used under appropriate winter maintenance conditions to: 1) prevent the formation of ice (anti-icing); 2) prevent the formation of a bond between accumulated snow, ice or slush and the pavement and keep the accumulation "plowable"; 3) de-ice, which is the melting of bonded ice or snow; and 4) keep abrasive material free flowing in freezing conditions. Plowing or other mechanical means available to achieve our service objectives are an important part of an overall strategy, and are preferable to the use of de-icing agents for snow removal, de-icing, or cleanup. In general, we will maximize the use of mechanical tools in order to control the use of chemical tools, subject to the specific storm or roadway situation.

It is essential that careful consideration be given to the appropriate use of any de-icing agent for winter operations. Use of these de-icing agents on state highways shall be limited to the amount needed to provide the established level of service or "bare/wet pavement" expectation. This special attention to controlling the use of these de-icing agents is important to minimize any adverse environmental impacts that may result from the material. As concerned stewards of the environment, we have a keen interest in preserving and protecting our environment in the accomplishment of our work.

In addition to our interests in reducing negative impacts or effects of using de-icing agents, we also have a responsibility to provide cost effective service and operate within budgetary constraints. Budget allocations provide for winter service based on standard costs for labor, materials, and equipment. The choice of tools to provide the winter service should be consistent with this guideline to provide for uniformity of service and the objectives of limiting de-icing agent use and providing cost effective service. Achieving the established service level while reducing the use of de-icing agents can free up dollars that might have been spent for salt to be used for other operations activities. The balancing of these goals requires each service provider to exercise discretion on how to best respond to winter maintenance needs.

Environmental concerns associated with materials used for winter operations include impacts on soil, vegetation, and water, as well as the influence of residues on the behavior of animals. Corrosive impacts on steel in automobiles, bridges and concrete reinforcing bars are also a concern. Even use of abrasives (sand) generates concerns for negative environmental impacts related to residue and particulates that may impair air quality. Careful use of these materials is important to minimize negative impacts on the environment. We must insist on careful use to retain the public's confidence that we are prudent users of salt and other de-icing agents used for winter operations. Without this trust, we risk losing the tools needed to provide the mobility, safety, and quality of service the public has come to expect of Wisconsin's highway system. Effective control of the use of these materials is also important to efficient operation and cost considerations.

Appropriate uses include:

1. Anti-icing by applying a light application of de-icing agents when snow begins to fall or just prior to the expected freeze point of the precipitation on the pavement. Anti-icing helps prevent the formation of a bond at the pavement interface. Failure to prevent the bond may result in a hazardous driving condition and the energy required to break the bond requires substantially more de-icing agent to be used. Timing, traffic and weather conditions are critical to successful anti-icing. Use of the winter weather forecasts is critical when using this application. Anti-icing is best accomplished using direct liquid de-icing agent applications onto a dry roadway surface.
2. Bond prevention by applying de-icing agents during the storm to prevent the bond of accumulated precipitation and to keep the snow in a plowable condition.

Failure to keep the bond from forming during the storm can result in a thick snow pack on the pavement that can only be removed by extraordinary and expensive de-icing measures such as heavy salt application, additional de-icing agents, and heavy equipment. Bond prevention is preferable to de-icing because it may take 5 to 10 times more de-icing agent to remove ice than to prevent it.