

"Prewetted salt... works faster and at lower temperatures than does dry salt, with less waste." —Technology News, October 1995

Once snow has accumulated and bonded to the road or an ice storm has glazed road surfaces, deicing operations must begin to restore safe driving conditions. The bond between snow and/or ice and the pavement surface must be destroyed by chemical or physical means or a combination of the two.

More than a dozen chemicals have been tested for deicing use. The most common products used are sodium chloride, calcium chloride and magnesium chloride. Sodium chloride in the form of rock salt or brine (see previous chapter) is by far the most commonly used chemical in deicing operations due to its lower cost and proven effectiveness. Therefore, in the words of the Transportation Research Board in its 1992 analysis of deicers says salt remains the "deicer of choice."

Abrasives have no melting effect for deicing operations, in fact research by the Strategic Highway Research Program (SHRP) and the University of Wisconsin suggests that sand inhibits the melting process of deicing materials.

Choosing the Proper Application

Salt can be applied in solid, prewetted solid, or liquid form. Application methods are determined by weather and road conditions as well as equipment available. Salt needs moisture to provide melting action. Deicing rock salt or solar salt dissolves in road surface moisture to form a brine which melts snow and ice to form more brine which continues the process. Once salt has penetrated the packed snow and ice to make brine on the pavement surface, the bond will be broken and removal operations can be successful in restoring bare pavement conditions.

Forecasted conditions and road surface temperatures at the time of treatment determine whether winter maintenance materials should be applied in solid,

prewetted solid or liquid form. The type of precipitation event, dry snow, wet snow, ice, sleet, freezing rain, etc. must be considered. Keep in mind that changing conditions will affect operations. Falling temperatures can cause refreezing. Additional precipitation can dilute winter maintenance materials, rendering them ineffective. Refer to the Phase Change diagram in the previous chapter for assistance in determining the proper course of action.

If the road surface is wet and temperatures will not cause refreezing, then application of dry salt is appropriate. Necessary moisture is already present so brine will be formed immediately and melting action can begin. The application rate will be determined by the amount of snow and ice coverage. Keep in mind the reduced mobility effect as dilution of deicing salt occurs.

If snow pack and ice is solid, or temperatures will fall to the point that refreezing will take place, then prewetted solid application of deicers may provide more rapid results. Adding moisture to the salt either at loading or at the spinner when applied will jump start the deicing process by providing more moisture to begin the melting process.

Spraying liquids is not recommended for packed snow as the liquid destroys surface friction and the brine may become so diluted before melting action is completed that refreezing could occur. Application of brine is an effective treatment for "black ice" conditions. Although salt can melt ice at temperatures as low as -6°F, the practical limitation of brine application is considered by the Federal Highway Administration to be around 15°F. Below that temperature, pre-wet with calcium chloride or calcium magnesium chloride mixed with sodium chloride.

Deicers should be applied close to the crown or high point of the road. The resulting brine will run downhill from the



Prewetting brine can be added to the load at the yard, (see next page) or during spreading operations using saddle tanks, shown here, or home built "over-cab" tanks.

crown to the rest of the surface. Spinner speed should be low enough to ensure that deicing materials remain on the road surface. Spinner speed and application rates should be higher at intersections and other high traffic areas to spread deicing material over a larger area or in higher concentrations as required by the condition. However, use of the "BLAST" override on automatic controls while stopped at a stop sign or light is not appropriate.

Road conditions, temperature, amount of snow and ice cover, storm progress, and traffic conditions all affect deicing application rate. The tables on page 5 of this Handbook, will assist you in determining appropriate application rates.

Equipment Used

Solid deicers or pretwetted salt is applied with spreader trucks. If the load is wetted, then no additional equipment is necessary. Saddle tanks and a sprayer at the spinner are necessary if brine is applied to the salt at time of application to the roadway. Brine can be applied with tank trucks or towed equipment using the same equipment discussed in Chapter 9.

Summary

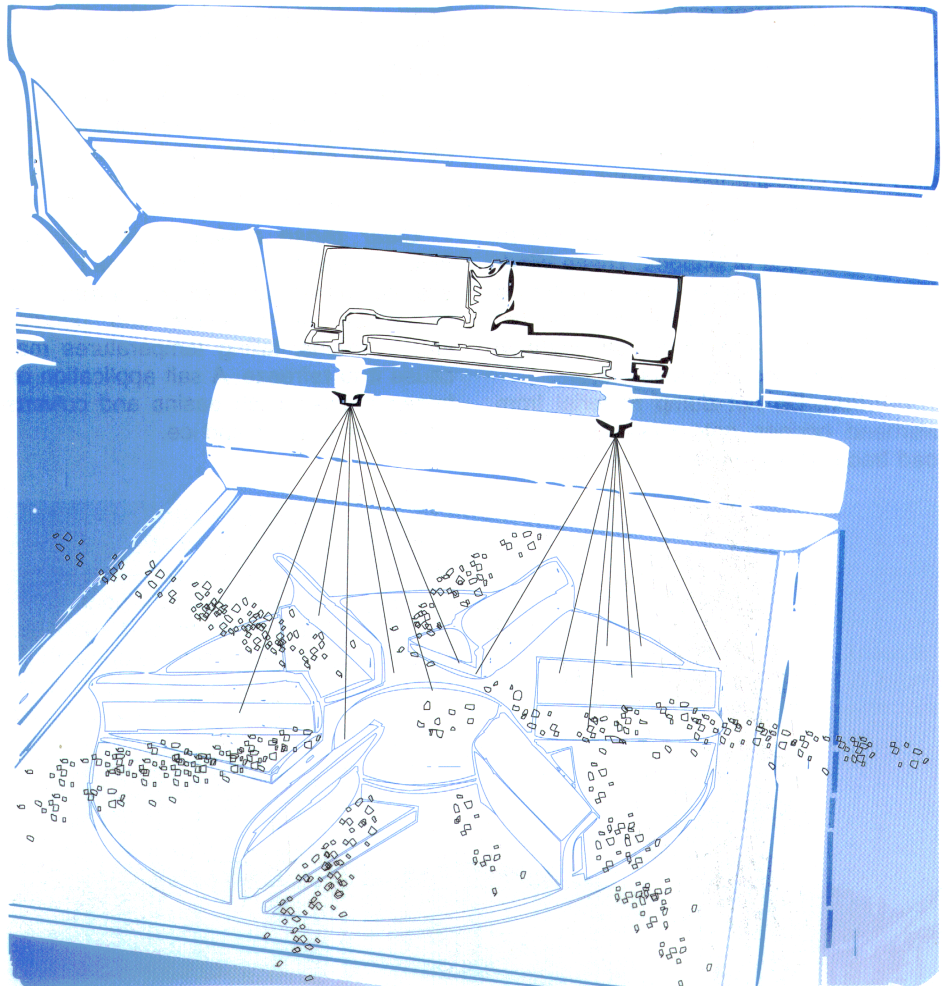
Use of salt is a proven snowfighting technique with many advantages:

- Returns roadway surfaces to bare pavement conditions more quickly, thereby reducing the number of accidents and property damage, and saving lives. Research has shown that use of salt as a deicer more than pays for itself;
- Lowers manpower costs by reducing the time necessary to restore dry pavement conditions;
- Eliminates or greatly reduces cleanup costs;
- Compared to alternatives, salt is safer to handle, and kinder to the environment when properly used.

Pretwetting may enhance salt use:

- Salt can be spread more uniformly with less waste on shoulders and in

"Sodium chloride, or common road salt, is by far the most popular deicer, because it is reliable, inexpensive, and easy to handle, store, and apply." — Transportation Research Board Special Report 235 on Highway Deicing



ditches because wetted salt sticks to the pavement;

- The amount of dry materials used can be cut by 20-30% (IADOT) because of the dual action of added brine and more materials remain on roadway;
- Works faster because more brine is present;
- Driving/spreading speeds can be increased because salt stays on the roadway.

Pretwetting brine can be sprayed onto deicing materials at the spinner during snowfighting operations using commercial or home built equipment.

An entire load can be pretwetted at the yard using equipment designed for this purpose.

