



Liquid Usage

In salt best management practices, liquid use can help reduce the amount of granular material used each season. Anti-icing, pre-wetting, treated salt and slurries can all reduce the amount of material used by an agency. In the right conditions, liquids can be used in place of granular material, they can also be used as a de-icer.

There are many different liquid deicers from which to choose. Most commonly used in winter maintenance are liquid chloride deicers. There are also liquid acetates and glycols that are used in certain situations. Liquid salt brine is the most commonly used product. Also widely used are liquid calcium chloride and liquid magnesium chloride.

Just like common salt, salt brine, works to about 15 °F pavement temperatures. Liquid calcium chloride and liquid magnesium chloride work at lower temperatures. When choosing liquid chemicals, it is important to look at the working temperature of the chemical, not just the eutectic temperature. It is also very important to know the properties of the chemical and how it will act when placed upon a roadway.

The use of liquids does require an agency to modify its equipment or have the versatility to change from liquids to solids. It also must have a secondary storage facility for its liquids and the ability to load the liquids into the vehicles. Liquid storage facilities also must have some sort of containment system in case of a spill or rupture. Agencies can purchase liquids from vendors or in some cases produce liquids onsite (using, for example, a brine maker). An additional process known as blending can also be done onsite and can produce enhanced salt brine. In order to produce salt brine or to start a program of in-house blending an agency should consult with vendors or other agencies to determine the appropriate program to adopt.

There are many agencies that serve as examples where liquid use has been implemented and the overall amount of granular material has been reduced. Iowa DOT is one good example of an agency that has implemented liquid use and has reduced their overall granular use.

In the right circumstance, the use of liquids can save significant materials and operational effort, all while achieving excellent levels of service.

The numbers: The most effective use of liquids is in frost prevention, where a suitable liquid program can reduce frost problems close to zero. Of course, liquids are also an effective method for anti-icing, but as the data shows, using liquids can reduce solid use by as much as 50% when done right.

The Alternatives: If you do not have the ability to store liquids, to make liquids and to dispense liquids, then the only sort of ice control material you can use is solids, hopefully pre-treated in the stockpile so they can stick to the road.

The needs: The first need is the ability to store liquids on site. They should be stored in tanks that are suitable protected in case of spillage or bursting. Also needed are spray units, which might be dedicated trucks, slide in units for regular plow trucks, or trailers to pull behind trucks (typically but not always, prior to a storm). Most agencies that make extensive use of liquids also make their own salt brine, using road salt, water, and some sort of brine making system. These systems can be enhanced with blending systems, allowing for the mixture of salt brine with other chloride brines and enhancing liquids (most typically carbohydrate based).

In the example below McHenry county in Illinois tracked its operators' granular salt use against its operators' liquid use and found operators that used more liquid used less granular salt. The first figure shows solid salt usage by employees over a winter season, while the second figure shows liquid brine usage by those same employees. It is notable that the employee who used the most brine, used the least salt (excepting those employees who did not operate plows on a regular basis).

