



Building A High Performance Material Program

With any project, a variety of essential tools is required to effectively and efficiently master the job. The same holds true with snow and ice control. Liquid materials and the strategies for their application are integral tools that offer versatility, capabilities and efficiencies that solids simply cannot duplicate. They are not intended to replace solid deicing strategies, but rather to complement them.

The objectives of a high performance material program are to maintain or regain friction by:

1. Preventing snow and ice from bonding to pavement - **Use liquids.**
2. Creating friction on the ice - **Use solids.**
3. Breaking the ice pavement bond for physical removal - **Use a combo of both.**

The following factors should be considered in the development of a strategically balanced materials program:

- Customer Requirements
- Storm Management Objectives
- Material Selection
- Material Supply Management

Customer Requirements

The scope of work stipulated in your contracts is the first factor in developing a high performance materials program. Property owners are increasingly aware of the benefits liquids offer and are starting to demand services that produce safety results faster and that are less damaging to their property. By illustrating for your clients how liquids can meet these requirements and gaining their buy-in, you achieve optimum leverage, as the expert, to manage your time and resources, which in most contract structures will also reduce your overall costs.

Storm Management Objectives

The next factor when integrating liquids into your materials program is to evaluate and prioritize the following to determine your operation's goals:

- Service requirements/deliverables for your accounts.
- Strategies you want to execute: pile-treating, anti-icing, deicing w/without pre-wet, plowing and the timing of operations required to achieve desired results.
- Equipment and labor assets available/levels of training.

Integrating liquids into your material program will expand the timeframe in which to accomplish your goals, free up resources and enable you to achieve goals faster. Using the appropriate liquid and solid materials in conjunction with each other will equip you to work most efficiently and reduce costs.

Liquid Application Objectives

Application/Delivery	Objective	Timing of Operation	Training Level, Notes
Spreading with solids pre-wet at spreader auger or spinner	Deicing - soften compacted snow/ice	During or after storm	Beginner – requires least change to existing operations/equipment
Direct Liquid Application (DLA) pretreatment of pavement surface	Anti-icing to inhibit snow/ice from bonding	Up to 48 hours before the storm, if no rain expected	Moderate – some deicers effective at lower temps, prevents black ice/frost
DLA post-treatment of surface with minor accumulation	Anti-icing to inhibit snow/ice from bonding	During or after storm	Advanced – <1" additional accumulation expected, >20° F - post plowing or liquid only

Amp Up Your Material Program Using Liquids

Material Selection

Like their solid counterparts, liquid deicers have different properties, effective temperatures, dilution factors, application rates and uses that should be considered in determining products best suited to achieve your goals.

- **Basic Deicers** include the following chlorides, the building blocks of most deicing products, available in both solid and liquid forms: **Sodium Chloride**, **Calcium Chloride** and **Magnesium Chloride**. Calcium and magnesium chloride exist naturally as liquids while sodium chloride is a solid that has to be made into a brine using water.
- **Enhanced Blends** are one or more of these basic chlorides combined with organic or proprietary additives to lower the freeze point, increase melting capacity or recovery time, reduce corrosivity, or extend the brine's residual effect.
- **Non Chlorides** are commonly used for parking decks, bridges and high-end properties where corrosivity concerns outweigh cost factors.

Effective Temperature: Calcium and magnesium chloride perform better below 15° F than both the solid and liquid versions of salt. Consider the typical pavement temperature range in your area of service to identify the chloride(s) that will perform best. Measuring pavement temperature during an event is easily accomplished with either a hand-held or truck-mounted infrared temperature sensor.

Moisture Present: Solids are better for wetter snow; treated and pre-wet solids are good to provide traction and soften ice. Liquids perform better in drier snows, at lower temperatures and to prevent black ice and frost.

Application Rate: In choosing an appropriate deicing material it is crucial to weigh the application rate required for effective performance against the economic efficiency of the product under anticipated conditions.

Material Supply Management

Determine the type of material procurement/production and the quantities required to best achieve your goals. The basic products are all available nationwide, however calcium and magnesium chloride are more cost effective closer to their regional sources of supply.

Supply availability and storage are critical factors in determining the best liquid products for your materials program and whether to buy or produce them yourself.

Cost vs Purchase Price: If the purchase price of materials were the only factor to be considered in developing a materials program, then it is impossible to beat salt. However, other factors also impact the 'true costs' involved. Since application rates of liquids are noticeably lower due to their effectiveness and the precision with which they are applied, **the overall material and labor savings achieved using liquids can result in reduced 'true cost', even when the product price is more.** Liquids may have a higher price point than rock salt, but because you typically use and lose less, they can ultimately end up 'costing' less.

According to the Salt Institute, salt brine is the most effective deicer for anti-icing above 15° F. **Because of salt brine's wide ranging usefulness, producing it yourself can add decisive value to a high performance and ultimately cost effective materials program.**

Liquid Procurement and Production Methods

Method	Pros/Cons	Equipment
Pretreating Stockpiles	Enhances solid material performance, reduces freeze point and corrosivity/ Still needs to be pre-wet for optimal efficiency	Liquid Storage/Tote, Transfer/Application System
Brine Making Make Your Own (MYO)	Most cost effective over long run, added supply control, relatively quick ROI/ Greater startup costs, labor, training required	Brine Maker, Storage & Transfer/Application System
Purchasing in Bulk	Easy, value-added product engineering, product consistency/ Supply availability, higher purchase price than MYO	Liquid Storage & Transfer/ Application System
Purchasing by Tote	Easy, value-added product engineering, good for entry level/ Supply availability, higher purchase price than MYO	Transfer/Application System

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