Exercise: How Does Salt Work?

1. True or False? Salt absorbs energy to dissolve.

2. True or False? To melt snow and ice, rock salt must mix with moisture and create brine.

6. Salt Brine

a. What is salt brine?

i. Salt brine is commonly used in anti-icing operations and for pre-wetting solid rock salt.

a) Salt brine is made by mixing rock salt in water to approximately a 23% solution.

ii. The proportion of salt to water is critical to the effectiveness of the brine.

a) Too much or too little salt affects the freezing point depressing qualities of the brine.

b) The proper salt brine mixture is 23.3% (the optimum solution for salt brine) at which the freezing point is –6° F (the eutectic temperature).

iii. Most of the ODOT garages across the state are equipped with salt brine production equipment and storage tanks.


Spray Bar
Approx. 3000 GL per HR
Salt Hopper
3 to 4 Ton Capacity
Brine Collection Tank
Calcium Chloride Storage Tank
Capacity
6000 GL
Brine Storage Tank
Capacity
6000 GL
Automated Brine System

Exercise: Salt Brine

True or False? The proportion of salt to water is critical to brine effectiveness.

b. How is salt brine used in anti-icing?

   i. In anti-icing the application is made ahead of or before an event to:

      a) prevent frost,

      b) prevent black-ice,

      c) prevent freeze-bond to pavements and

      d) buy critical response time.

   ii. The brine is applied directly to the pavement surface in anticipation of an upcoming event.

      a) The material is applied with a liquid application unit in streams, at controlled amounts, in an application that leaves the surface merely damp.

      b) The brine streams are placed about 8” to 12” apart and will dry on the pavement surface.

   iii. Once frost forms or snow begins to fall, the moisture will activate the dried strips into brine that helps prevent frost from forming on the surface or snow/ice from bonding.

   iv. Anti-icing applications do not result in the flow of liquid on the pavement so the uniformity of spread must be achieved at the time of application.

      a) Anti-icing applicators use the typical series of stream nozzles to allow for uniform coverage without excessive mist and fanning of the liquid (early models of applicators used fan nozzles and created problems with premature freezing of the mist).

c. Brine used in pre-wetting solid material

i. In the pre-wetting of solids, the brine is usually placed in a holding tank on the salt truck and sprayed on the salt at the time of spreading.

ii. Pre-wetting the solid material improves its effectiveness in many ways:

a) Accelerates the solution process

b) The pre-wetted material adheres to the road surface better than a dry material and results in less loss through bounce and scatter.

c) Provides faster effect of the chemical

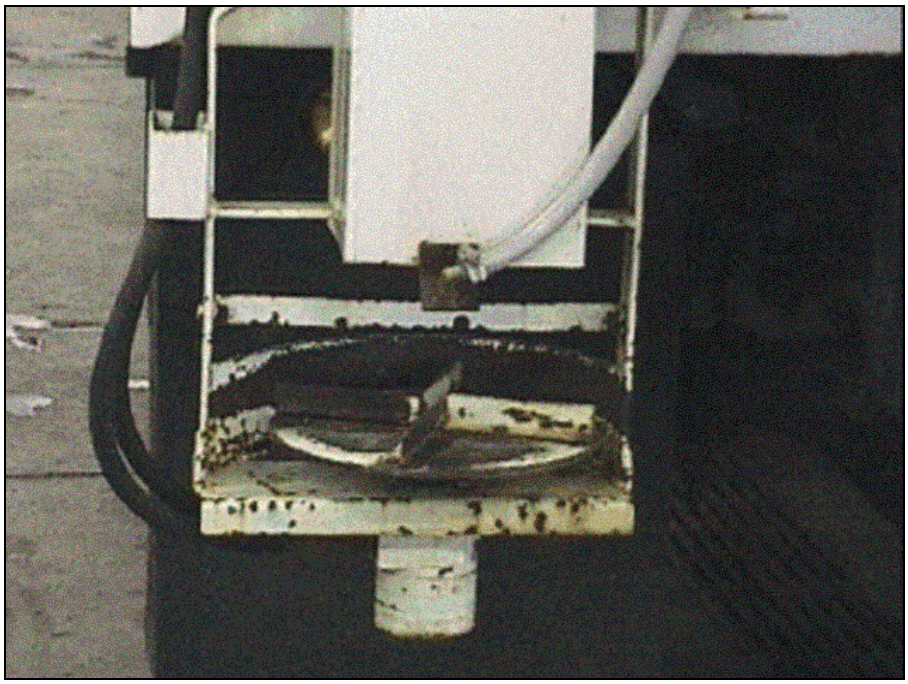
d) Reduces material requirements because more stays on the road surface.

iii. Salt brine is widely used because it is:

a) Readily available (easy to produce)

b) Very economical

c) Effective for events occurring at moderate subfreezing temperatures



7. Other Chlorides (Calcium or Magnesium)

a. What are chlorides?

i. These materials are also naturally occurring and are liquids in their natural state and maintain an affinity for returning to a liquid.