Salt Brine: Breaking the Snow and Ice Bonds on Your Pavement
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Unanswered Questions from the Click, Listen & Learn
-Completed by Bret Hodne and Dennis Burkheimer

1. We recently purchased a brine maker manufactured by Etnyre. Do you have any advice for us as we start our operation?
   Make sure you have a hydrometer and achieve a 23% solution and clean up your system to keep corrosion to a minimum after each event. You should also try to track your use of salt brine so you get a better understanding of when, where and how to use salt brine.

2. Is lane mile – 2 lanes or centre line?
   Each individual driving lane.

3. Do you have any liability where rusting of patron vehicles are concerned?
   No

4. On the last equipment slide showing the tailgate tank, who was the manufacturing company?
   Monroe Equipment from Monroe Wisconsin

5. Will salt brine hurt the internal workings of a street flusher?
   I would not recommend using a street flusher for applying salt brine. There is a good chance that corrosion will appear in areas that you cannot adequately clean out. If this doesn’t bother you, I would at a minimum flush it thoroughly with water after each use.

6. Are pumps necessary, or would controlled gravity flow work?
   You can use gravity feed but pumps work much better at achieving a uniform application rate. One thing to remember with gravity flow is that there will be a different rate of output when the tank is full versus on the bottom side due to pressure. The Iowa DOT started using pumps to prewet the dry material before discharging onto the roadway but found that gravity can achieve similar results and costs less. For anti-icing operations pumps are required.

7. What ration of brine to calcium are they using?
   The Iowa DOT has been testing Calcium Chloride at about a 3-5% solution to salt brine but having the best results when we spray them separately.

8. What percentage of mix do you use when mixing salt brine and calcium chloride?
   3-5% seems to be the best solution but we are continuing to experiment to see if we can develop a guide to blending/mixing the two products for liquid applications

9. Re: CaCl injection- What is the temperature threshold for use?
   The Iowa DOT will use the calcium injection down to about 5-10 degrees F for pavement temperatures

10. Do the 1800 gallon tanks have baffles?
    No, but they are usually (2) 900 gallon tanks put together. You can use baffle balls or irrigation tubing to take care of this issue.
11. Close up of a steamer nozzle please. What exactly is this steamer?
   A steamer nozzle is a nozzle that shoots a straight pin point type of liquid. A fan nozzle sprays in a wide pattern and covers more area. You want to use a steamer nozzle for anti-icing.

12. Is there a standard size (orifice diameter) of nozzle that you use?
   The Iowa DOT specifies 0.25 inch diameter.

13. Are there any concerns regarding lack of ballast when ploughing + anti-icing at the same time as the anti-icing is a diminished load? We have not had any problems with this. You can buy baffles balls or a cheaper alternative is to use irrigation tubing and coil it up inside your tanks.

14. Are you worried about the hinge point being strong enough to handle the weight of a 250 gal Tailgate tank? We have worked with the Monroe trucking to make sure the design is safe and will not cause problems. Monroe worked with Crysteel on the modifications to the truck bed.

15. What is the low temperature for salt brine?
   With straight salt brine (23%) we do not usually recommend going much lower than 15 degrees pavement temperature. It will still work, but less effectively and you increase your chance of creating problems.

16. What is the average cost per gallon?
   Around $.04/gallon

17. If you don't use the brine in the tanks for days or weeks, does it settle or cake?
   We have not had a problem with this.

18. Can you mix the brine and calcium in the same tank?
   You need to be careful if you try doing this. Mixing different types of chlorides together can create a “snotty” type of substance that does not flow through screens and nozzles very well. If not added in the right order and done carefully you can also create some tremendous heat when mixing these two products. Check with the chemical suppliers before trying this in the garage.

19. What is the maximum gallon per lane mile for the use of calcium chloride before the pavement starts to get slick from the use of calcium?
   I would stay in the 15-20 gal/lane mile for bridge treatments and no more than 30 gal/lane mile for anti icing on dry streets.

20. What has been your experience with public perception, positive or negative?
   Mostly positive. We will still get a few people complaining if they follow the trucks to close and get the material on their windshields.

21. How is Magnesium Chloride shipped? Liquid or solid? If liquid, what is the concentration as shipped?
   In a liquid form. Usually 26-30%.

22. Was it operators of the trucks or mechanics in the shop? Roughly, how much time was spent making the brine unit?
   Most homemade brine systems took very little time to build since they used off the shelf products. Two galvanized livestock watering tanks, a couple pumps, hosing and a storage tank are about all that is required
to get into the production of brine. The livestock tanks will only last a few years but since they are cheap it’s a good way to get started with salt brine production. Depending on the cleanliness of your salt supply you may also need to add screening near the pump intakes to keep from causing damage to pumps from rocks, etc. The Iowa DOT web site has plans for building your own brine maker.

23. As snow and ice storms in Dallas are very infrequent, Dallas agencies do not have the manpower needed for operations. DO you have and experience in contracting out drivers?
   We have on-call temps that we train pre-season to assist us in our snow removal efforts. Training is the key.

24. We seem to see more crack distress after anti-icing. You see that too? Can it be attributed to salt use?
   No, we have not seen any change from past practices. We use to dump rock salt on the pavement, moisture would then turn it in to a brine solution and so it basically is doing the same thing. We just did more deicing in a reactive mode, so we typically used more salt.

25. How critical is using advance RWIS vs more traditional forecasting techniques?
   Very important. What you need to have is pavement temperatures. If you do not have access to an RWIS site, I would recommend getting an infrared temperature measuring device, watch the air temperature forecast and make your own estimated forecast on where you think the pavement temps might go. With some experience you should be able to get in the ballpark.

26. How often do they circulate salt brine in storage?
   We don’t. As long as you do not add by-products it seems to remain stable.

27. With brine use have you seen less material in your street sweeping operations?
   Yes. We also have went away from using sand unless it gets cold enough that salt is not effectively melting the snow and ice and we need to increase traction. One thing to remember is sand does not melt anything. Taking a look at the overall costs from sand usage may lead you down this path also.

28. Are you lining RWIS to anti-icing applications?
   The Iowa DOT uses RWIS information and also contracts for pavement forecasts from a private forecasting agency that specializes in pavement forecasts. Understanding what pavement temperatures are going to do will help develop a plan of action on how and when to treat roadways.

29. Has your vehicle maintenance increased as a result of using liquid products?
   Not significantly. Where we do spend a little more money is probably by being more pro-active in the clean-up and preparation of new equipment.
30. What is your expected life span on the brine maker and tanks?
   I would say with proper maintenance you should be able to easily get 10+ years out of a brine maker. Tanks should easily go longer than that. The pumps are where you will see most of the maintenance.

31. Do you not get fallout from your salt brine as temps go down?
   No.

32. FYI: regarding environmental impact, high chloride content in our ground water supply or water dept., is funding the implementation of a salt reduction program?
   Considerations of salt-free zones are being examined near well sites.

33. When you first started with the salt brine, did you have an increase in complaints about concrete failures at driveways of property owners?
   No.

34. Can you make recommendations on neutralizing and wash down products?
   We use a product from Rhomar Industries out of Springfield MO. It seems to work well. Road Solutions makes products that are supposed to work in a similar fashion. Washing with hot water and soap will also help a great deal.

35. What is deck temp?
   Bridge deck pavement temperature.

36. For West Des Moines, have you observed any changes in amount of damage to roadside vegetation when using MgCl?
   We don’t use a lot of MgCl, but where we have I would say that I have not noticed it being any worse than other deicers.

37. What’s your e-mail address?
   bret.hodne@wdm-ia.com , dennis.burkheimer@dot.state.ia.us

38. What is the percentage of inhibitors?
   It depends on the deicer. The LCS product we are experimenting with is mixed at about a 5%. Others can go as high a 50%/

39. Do you have any experience with humidity related slipperiness with Magnesium Chloride?
   No, but I have heard issues from other agencies that use it more during warmer periods. It can cause problems under certain conditions. That is one of the reasons we also use salt brine so heavily during those pavement temps above 15 degrees.

40. What is your average route length that you are treating with brine?
   Typically 18-20 miles

41. How long are typical control section lengths in Iowa/Des Moines? Also what are typical cycles in Iowa?
   Usually .5 to 2 miles. Cycle times for Iowa DOT are typically 1-3 hours but will vary depending on the roadway. Interstates will have more frequent cycle times while rural roads less frequently.