

SALT &**Highway Deicing™**

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INVENTORY MANAGEMENT OF SOLID ICE CONTROL CHEMICALS (SALT)

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One of the most heartburn-causing situations faced by highway maintenance managers is to run low on, or out of salt during the snow and ice season. The vast majority of highway maintenance agencies do not have structural covering capacity to accommodate enough salt for a full winter season's use. As a result, a heavy reliance is placed on re-supply deliveries during the time period having the highest product demand and the worst road, rail and water shipping conditions. Significant quantities of salt are coming from "off shore" locations and there have been interruptions in that supply chain for a variety of reasons. In recent years, re-supply activities have been disrupted in one or more areas in North America, for a variety of reasons, almost every year.

After a near disaster of nearly running out of salt, agencies usually implement procedures to minimize the possibility of recurrence. These procedures can add significantly to the cost of salt. As a few years go by without re-supply problems, the fiscal people question the extra cost and salt inventory management returns to "normal". Then, guess what happens

There are a number of management techniques being used to keep agencies from running out of salt.

These include:

- Have salt storage capacity to handle as much of the season as possible – the closer to 100% or greater, the better.
- Do timely and anticipatory ordering of re-supply to stay at full capacity, consistent with contract requirements and storage capacity.
- Begin the winter season with salt storage structures at full capacity.
- Fully utilize storage capacity by conveyor or other loading techniques.
- Have an emergency plan in place to acquire salt and conserve salt in the event of serious re-supply problems.
- Take advantage of "opportunity" pricing that is sometimes available at the end of the season to fill salt storage structures.
- Make sure salt usage on the road is controlled to the point of applying the "right" amount of salt for prevailing weather and road conditions.
- Utilize covered "surge" or contingency piles, either on site or at the vendor's site, as necessary.
- Keep track of salt usage and remaining inventory by the most accurate means available.
- When estimating inventory from geometric measurements of stockpiles, realize that as salt consolidates in a stockpile, its density will change from about

1944 lbs/cy (unconsolidated) to about 2270 lbs/cy over a period of about one year.

- Establish a quid pro quo relationship with your salt supplier to **the extent possible** by trying to order "worthwhile" quantities, and sufficient other work to be worth the mobilization effort, allowing some flexibility in the delivery schedule and providing for rapid unloading of delivery trucks.
- Be careful when submitting contract quantity requirements – not too much, not too little.

The following are agencies that have instituted sound salt inventory management practices with some of the techniques they use:

La Porte District, State of Indiana Department of Transportation

Tom Konieczny is the District Operations Engineer and Cindee McKie is the landscape supervisor who manages inventory and supply for salt and other ice control chemicals. The District has an aggressive anti-icing program that utilizes around 110,000 tons of salt annually. Of that, about 625 tons is used to make 600,000 gallons of salt brine. The salt brine is made in

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house using recycled wash water for over 75% of the total.

The District has been systematically increasing salt storage capacity to the point where they can store about 85% of average annual usage. They utilize conveyor charging of some of their smaller structures in order to maximize the amount stored. New structures are being planned and they have a new fabric covered structure that allows sufficient salt storage space and the ability to load trucks within the structure.

With the high storage capacity, re-supply normally begins at 25% depletion. There can be a little flexibility with the supplier's delivery schedule. Contingency covered salt piles are created at

some of the other INDOT District locations.

There was only one year when salt inventory reached a low level here. A contingency plan was in place to acquire salt, but was never utilized. With newer structures coming on line, it is unlikely that there will be any salt supply/inventory problems in the future.

Rockland County, New York Highway Department

"Skip" Vezzetti is the Highway Superintendent for Rockland County. The County has a very progressive snow and ice control program. A comprehensive written plan and policy is the cornerstone of the program.

The County recognized the need to have sufficient salt storage capacity some time ago. As a result, they have been systematically adding capacity over time. They currently have the ability to store about 80% of their average annual salt consumption. They are planning to add additional capacity by constructing a new cooperative facility that will serve the County as well as some of the local Townships. When complete, the County's salt storage capacity will be around 115% of average annual consumption.

The high storage capacity has served the County well over the years. There have only been rare instances when salt inventory supply was "tight". The County has a

New Study Calculates Cost of a Snowstorm

Six years ago, the Salt Institute commissioned a study by Standard and Poor's to estimate the cost of not responding adequately to winter ice- and snow-storms. Costs identified by the economic forecasters included lost wages of some hourly employees, lost, non-recovered retail sales and diminished government tax receipts. Reports were completed for 12 U.S. states and two Canadian provinces. A new, updated study has just been prepared for the same jurisdictions.

The report can be used in budget presentations by snowfighting agencies to explain to legislatures and councils that control their purse-strings the cost-effectiveness of the service they provide. Dennis Burkheimer, Winter Maintenance Administrator for the Iowa DOT says: "The economic information provided in this report helps drive home the potential impact of a winter storm on the state's economy. The report can be a useful tool when talking with the legislature or management on the importance of winter maintenance operations." U.S. transportation agencies spend about \$2 billion a year keeping winter roads safe and

passable. Most agencies' annual snowfighting budgets are less than the costs of a single storm not effectively managed by road maintenance crews. "Fighting winter storms may be the most cost-effective use of taxpayer dollars known to man," explains Salt Institute president Richard L. Hanneman.

The 1998 report was prepared by Standard and Poor's DRI, a Harvard-based economic forecasting firm. In 2001 S&P/DRI joined with a similar group at the Wharton School at the University of Pennsylvania and became Global Insight, Inc. The Salt Institute commissioned Global Insight to prepare the new study. Here are the updated figures.

Economic Impact of a One-Day Shut Down, Economic Impact in \$ millions

States	Wages/Salaries	State/Local Taxes	Federal Taxes	Retail Sales	Total
Illinois	220.66	10.79	19.64	98.48	349.57
Indiana	88.23	4.59	6.35	41.18	140.35
Iowa	38.25	1.99	2.52	19.91	62.67
Michigan	165.33	8.75	12.90	71.50	258.48
Minnesota	95.79	5.69	7.66	40.32	149.46
Missouri	90.70	4.01	6.44	39.05	140.19
New Jersey	174.44	8.68	17.09	80.66	280.87
New York	381.63	22.50	31.68	161.76	597.57
Ohio	179.29	10.23	12.91	79.07	281.50
Pennsylvania	214.17	12.02	17.35	93.17	336.70
Virginia	130.39	6.43	11.21	56.95	204.98
Wisconsin	84.82	4.40	6.36	38.78	134.36
Provinces					
Ontario	272.02	17.36	34.43	33.33	357.14
Quebec	142.77	14.39	13.62	19.23	190.01

Links to the methodology and downloadable one-page summaries for each state and province are found at <http://www.saltinstitute.org/30.html>.

contingency plan for acquiring salt from an in-state salt mine if the contract supplier fails to perform or if purchase quantities exceed contract limits. The County salt inventory management plan allows the County to assist local government in times of supply difficulties.

The County goes into the winter at full capacity and immediately refills salt storage facilities in the early to mid-winter time frame. After that, inventories are allowed to draw down while maintaining enough inventory to provide a high level of comfort. This allows the County to take advantage of “discount pricing” that often becomes available at the end of the season.

City of Marquette, Michigan

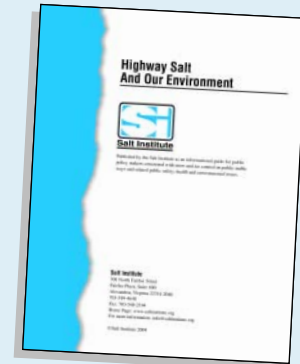
Steve Lawry is the Public Works Superintendent for the City. The City shares a significant salt storage facility with the Marquette County Road Commission. Even with sharing, the City is able to store over 100% of its average annual usage. This allows the city to take advantage of favorable early season salt pricing. As a result of that capacity there was only one occasion when the salt inventory dropped below the comfort level.

Even with excellent storage capacity, the City has a contingency supply stored at the suppliers dock facility. This is due to the high variability in winter severity that does not reflect well in average use data. The City tries to work with the vendor on delivery schedules and order quantities.

The City controls on-road use by spreader calibration and the use of ground speed controllers. Pre-wetting is used, as necessary to speed the melting action of salt. With winter temperatures being generally very low most of the time, and the presence of many hills in

Salt Institute Publishes a Revised, Updated Highway Salt and Our Environment

For more than thirty years, the Salt Institute has promoted “sensible salting” to highway salt customers, primarily to reduce the environmental impacts of deicing salt. Transportation agencies need to satisfy a concerned public that their salt storage and application practices are consistent with best salt management practices. Often, however, concerned citizens’ fears exaggerate the environmental stress of using salt properly. The Salt Institute has a new and revised booklet addressing these questions – *Highway Salt and Our Environment*. Copies can be ordered



or downloaded free from the Institute’s website (<http://www.saltinstitute.org/34.html>).

the City, a sand/salt mixture is used much of the time.

Township of Goffstown, New Hampshire

Carl Quiram is the Public Works Director for the Township of Goffstown. The Township has a salt storage capacity of about 30% of average annual consumption. They purchase salt off a statewide contract and almost always end up with the same supplier. Over time, a positive and cooperative relationship has developed between the Township and the supplier. That, in combination with immediate, timely and anticipatory ordering once there is sufficient room in the salt storage structure has resulted in very few salt shortage problems. If salt supply gets short there is a cooperative relationship among the other highway agencies in the area that has been able to deal with shortages on a loan and replacement basis.

The Township has in recent years placed an emphasis on salt management. A focus of that effort has been in making sure salt application rates were consistent with weather and road conditions. A parallel effort was to make sure the

application rates were correct. This was accomplished through calibration of all spreading equipment and systematically acquiring ground speed spreader controllers.

To further control salt application, all loaded trucks are weighed when they leave the yard and when they return to the yard. This has resulted in a high degree of salt application uniformity among the 10 primary plow routes. Another benefit of this effort is a dramatic reduction in overall salt use. This, in effect, raises the existing storage capacity to over 50% of “new” average seasonal use. Wow!!

The scales were originally purchased for the solid waste program. Carl estimates that the cost of the scale equipment and operator were recovered in about one year of salt savings. The scale data is also useful for satisfying the NPDESII and FEMA reporting requirements.

This did not happen without operator training and buy-in. The operators quickly realized that the “right” amount of salt did as satisfactory a job as “too much” salt.

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McHenry County Highway Department, Woodstock, Illinois

Richard "Mark" DeVries is the Superintendent of Highways and Todd Destree manages the procurement of salt. The County is fortunate to have a state of the art salt storage facility that is capable of storing 100% of average annual consumption. In addition to having an extensive environmental control system, the facility is equipped with a "below grade" conveyor system that enables full capacity use of the structure and rapid unloading of salt delivery trucks. In addition to prescribed maintenance, the conveyor is run for 1/2 hour each month, year around and treated with a salt neutralizing agent at the end of the season of use.

As a result of high storage capacity and other management practices there have been no salt shortage situations. The County has been able to be flexible in salt delivery schedules and even accept deliveries at the vendor's request. This has resulted in accommodations from the vendor when requested. Salt replenishment begins immediately at about 15% draw down to provide worthwhile delivery quantities and a high inventory comfort level. The County is also able to assist other agencies that sometimes have salt shortage issues and enter into

reciprocal agreements for the use of satellite salt storage facilities that permit more efficient operations.

On road use of salt is controlled by a combination of equipment, training and operational procedures. About 63% of the snow and ice fleet is equipped with ground speed controllers. These and the remainder of the fleet are calibrated annually. Pre-wetting is used as required to control bounce and scatter and speed the ice melting action of salt. The snow and ice workforce receives training each fall on proper salt application techniques and application rates.

The experience of the agencies above clearly demonstrates that effective salt inventory management is no accident. It takes people willing to execute the principles of continuous improvement and to sometimes take the associated "heat." ■

Salt Storage Award Deadline Nears

Is your salt storage program worth bragging about? Would you like to prove to your council budgeters or legislative appropriators the value of their investment in your salt storage facility? Then it may be time to invest a bit more by completing the application form for this year's Salt Institute Excellence in Storage program. One 2003 winner reported afterwards: "This will be brought up at our next Transportation committee meeting and at the County Board. We received the plaque and it is very impressive....this was the best press we have ever received. Besides *Public Works*, we had an article in the Northwest Herald (a local paper that covers our meetings) and *IDOT Interchange*, a statewide newsletter. I received many calls from other agencies saying they had read about us and congratulating us." Perhaps your winning entry would bring the same payback. Application forms online at <http://www.saltinstitute.org/39.html>. Deadline: May 1st.

You just enjoyed another electronic **Salt and Highway Deicing** Newsletter! It helps you make better decisions in your winter maintenance responsibilities and gives even more information by active links to www.saltinstitute.org <<http://www.saltinstitute.org>> with specific pages to further snowfighter information. Feel free to forward this newsletter to other interested persons so they can also enjoy this informative free quarterly. Be aware Salt Institute never sells or distributes any of your contact information to any outside source. Please sign up at: <http://www.saltinstitute.org/subscribe/index.html>



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