

IN THE APPELLATE COURT OF ILLINOIS
FOR THE FIRST DISTRICT

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STEVEN M. RAVID
CLERK OF COURT

SALT INSTITUTE,

Petitioner,

v.

ILLINOIS POLLUTION CONTROL
BOARD,

Respondent.

Petition for Administrative Review
of Rulemaking and Order Issued by
the Illinois Pollution Control Board
R08-9 (Sub-docket D)

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JUL 27 2015

STATE OF ILLINOIS
Pollution Control Board

Docket No.

15-2003

**PETITION FOR ADMINISTRATIVE REVIEW OF AN ORDER AND RULE ADOPTED
BY THE ILLINOIS POLLUTION CONTROL BOARD**

The Salt Institute, on behalf of its members and participating companies, hereby petitions this Court for review and vacation of the June 18, 2015 order of rulemaking issued by the Illinois Pollution Control Board, which adopted a chloride water quality standard of 500 mg/L for the Chicago Area Waterway System ("CAWS") and the Lower Des Plaines River ("LDPR"). In further support thereof, Petitioner states:

PARTIES

1. Petitioner, the Salt Institute, is a non-profit advocate for the traveling public and a trade association dedicated to ensuring that salt is available to achieve winter roadway safety, maintain quality water, and provide health and nutrition. *See* Affidavit of President Lori Roman of the Salt Institute in Support of the Petition for Review ("Roman Aff.") at ¶3, which is attached hereto as Exhibit 1 and is hereby incorporated by reference. The Salt Institute is comprised of members that both produce and sell road salt for use as a deicing agent.

2. Several of Petitioner's members and participating companies, including, but not limited to, Cargill Deicing Technology, Cargill Salt, Central Salt L.L.C., Compass Minerals, Inc., and Morton Salt, Inc., operate in Illinois and along the CAWS or LDPR. The Salt Institute, including its members and participating companies, will be adversely affected or threatened by the new chloride rule adopted by the Board. *See Roman Aff. (Ex. 1) at ¶¶ 4-5, 19.*

3. Petitioner's members and participating companies would otherwise have standing to sue in their own right.

4. The interests Petitioner seeks to protect in this action are germane to the Salt Institute's purpose both as an advocate for the traveling public and as a trade association.

5. Neither the claims asserted nor the relief requested requires the participation of individual members in this action.

6. Respondent, the Illinois Pollution Control Board ("Board"), is an independent state agency that decides cases and promulgates environmental rules and regulations. The Clerk's Office for the Board is located at the James R. Thompson Center, Suite 11-500, 100 West Randolph Street, Chicago, Illinois 60601.

JURISDICTION AND VENUE

7. This Court has jurisdiction over this action pursuant to 735 ILCS 5/3-113, 415 ILCS 5/29 and 415 ILCS 5/41.

8. Venue is proper in the First District because the Board's headquarters and the Clerk's Office for the Board are located in the First District. The order challenged in this proceeding also was issued and filed in the First District.

9. Moreover, venue is proper in the First District because the rulemaking concerns waters and roadways that are located within the First District and many of Petitioner's members

and participating companies, which are affected by the rule, operate in and do business within the First District.

FACTUAL BACKGROUND

10. On October 27, 2007, the Illinois Environmental Protection Agency (“IEPA”) filed a proposal under the general rulemaking provisions of Sections 27 and 28 of the Illinois Environmental Protection Act (415 ILCS 5/27 and 5/28). The proposal sought to update the Board’s rules for Secondary Contact and Indigenous Aquatic Life Use by updating the designated uses and standards for the CAWS and LDPR.

11. The CAWS area is approximately 740 square miles and comprises the Chicago River and Calumet River drainages.

12. The LDPR extends from the confluence of the Des Plaines River and Chicago Sanitary Ship Canal (“CSSC”) to the Interstate 55 Bridge at River Mile 277.9. The LDPR is part of the Upper Illinois Waterway, which is one of the busiest inland commercial navigation systems in the United States.

13. The Chicago metropolitan area has approximately 54,600 miles of roads and streets, including 2,500 miles of expressways, 17,300 miles of highways and arterial streets, and 34,800 miles of local streets. The State of Illinois has the third most miles of interstate highways in the United States. All of these roadways are adversely impacted by and susceptible to resulting safety risks to the people of the State of Illinois and interstate travelers from harsh winter weather. *See Roman Aff. (Ex. 1) at ¶¶10-12, 14.*

14. The application of road salt prevents snow and ice from binding to road pavement and also acts to melt ice and snow. *See Roman Aff. (Ex. 1) at ¶13.*

15. The primary components of road salt are chloride-containing minerals, including chlorides of sodium, calcium, and magnesium. *See* Roman Aff. (Ex. 1) at ¶7.

16. On November 1, 2007, the Board accepted the proposal for hearing. Sub-docket D was created to address amendments to the water quality standards and criteria for aquatic life use designations. However, despite multiple requests, the Board refused to open a new sub-docket to consider water quality standards specific to chloride.

17. Hearings on aquatic life water quality standards were held on July 29, 2013, September 23, 2013, and December 17, 2013.

18. On September 18, 2014, the Board issued its first notice opinion and order on rulemaking, which included a proposal for a year-round single-value chloride standard of 500 mg/L.

19. On March 19, 2015, the Board adopted a second-notice opinion and order on rulemaking which altered the proposed year-round 500 mg/L chloride standard by delaying the effective date for three (3) years. In the interim, the Board proposed that the 500 mg/L standard would apply from May 1 through November but for the winter months (December 1 through April 30), the Total Dissolved Solids standard would remain in effect.

20. On June 18, 2015, the Board formally adopted the amendments to the chloride water quality standards—a year-round 500 mg/L limit—as proposed at second notice. *See* 35 Ill. Adm. Code 302.407.

21. The chloride water quality standard and accompanying amendments took effect on July 1, 2015 and were published in the Illinois Register on July 10, 2015.

**GROUNDNS FOR REVIEW AND VACATION OF THE
CHLORIDE WATER QUALITY STANDARDS**

22. The Board's actions in approving the June 18, 2015 order relating to chloride water quality standards were arbitrary and capricious, and, therefore, the rulemaking should be invalidated.

23. In proceeding with rulemaking, the Board was statutorily-required to take into account "the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring and reducing the particular type of pollution." 415 ILCS 5/27(a).

24. In adopting the chloride water quality standards for CAWS and LDPR, the Board ignored and failed to take into account the technical feasibility and economic reasonableness of implementing the proposed chloride standard in conformance with its statutory obligation.

25. During the comment period, IEPA and other commenters recognized that there would be repeated and unavoidable violations of the 500 mg/L standard during the winter months when the pre-treatment and treatment of pavement with road salt occurs. Yet, the Board failed to take into account these repeated and unavoidable violations that are necessary to provide crucial, life-saving deicing of roadways for the traveling public.

26. In addition, commenters noted that the chloride standard was not practicable, would have a significant adverse economic impact on industrial dischargers, and would cause wide-spread and severe hardships. Again, however, the Board failed to take into account these statutorily-required factors.

27. IEPA specifically requested that the Board delay action on chloride water quality standards until guidance could be developed with USEPA, which USEPA expects to issue in the

near future. However, the Board refused to take into account the current lack of updated USEPA guidance.

28. Notably, the Board recognized that it is an “enduring reality that as long as it snows and water freezes on the roadways in this highly urbanized watershed, chloride will continue to be used for road safety in the foreseeable future” and admits that “there is no information in the record that demonstrates [transportation authorities] are planning to reduce the use of road salt to the point of compliance with the 500, 620 or 990 mg/L chloride water quality standards during the winter in the foreseeable future.”

29. In addition, the Board recognized that “the record has presented limited options for addressing the chloride issue.”

30. Although the Board acknowledged that dischargers are and will be unable to comply with the new chloride water quality standard now and in the future, that variances may not be feasible due to recent USEPA actions, and that “the record has presented limited options for addressing the chloride issue,” the Board nevertheless refused to reconsider the validity and advisability of the rule.

31. Instead, the Board stated that USEPA’s stance in opposition to temporary variances *could* change and that adjusted standards and site-specific rules *may* be available in the future.

32. The Board’s choice of a three-year delay in implementation of the year-round chloride water quality standards as a means to provide relief also is not adequately supported by the record. There is no evidence that a delay in the effective date will relieve any of the demonstrated hardships, will resolve the technical feasibility issue, and/or that an alternative deicing agent to road salt will become available in that timeframe.

33. Moreover, selection of the 500 mg/L chloride standard was not based on any assessment of risk or scientific study, but was chosen as an average between the acute (860 mg/L) and chronic (230 mg/L) national aquatic life criteria for chloride. Despite requests from multiple commenters, the Board also did not allow a mixing zone concept to be used when setting the chloride water quality standard. The Board failed to provide sufficient consideration or explanation as to why mixing zones for chloride would not be permitted.

34. Further, the Department of Commerce and Economic Opportunity failed to conduct any study of the economic impact of the Board's proposed rules, and the Board did not perform an economic impact study.

35. The Board failed to make a determination as to whether the proposed rule would have any adverse economic impact on the people of the State of Illinois. 415 ILCS 5/27(b).

36. The Board also arbitrarily failed to open a separate sub-docket to consider the propriety of a new chloride water quality standard.

37. Finally, the Board adopted the 500 mg/L year-round chloride standard without considering the effect of the standard on the condition of roads in the CAWS and LDPR during winter months and the resulting safety risks to be borne by the traveling public.

38. The new chloride water quality standard will adversely affect and threaten the availability and use of crucial, life-saving road salt on roads in the CAWS and LDPR and will adversely impact the Salt Institute's members' and participating companies' road salt sales.

RELIEF REQUESTED

39. Because the Board failed to consider all statutorily-required factors, its adoption of a chloride water quality standard in its June 18, 2015 order was arbitrary and capricious.

40. Accordingly, the Board's order and related rulemaking should be vacated, the amendments to 35 Ill. Adm. Code 302 should be declared invalid, and the matter remanded to the Board for further consideration in conformance with its statutory requirements.

41. Petitioner further requests that the Board file the administrative record as required under Supreme Court Rule 335.

Respectfully submitted,



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Respondent.)	

AFFIDAVIT OF PRESIDENT LORI ROMAN OF THE SALT INSTITUTE
IN SUPPORT OF THE PETITION FOR REVIEW

I, Lori Roman, being duly sworn, depose and state as follows:

1. My name is Lori Roman. I am over 18 years of age and am competent in all respects to make this Affidavit. I have direct and personal knowledge of the statements contained herein.
2. From 2009 through the present, I have served as President of the Salt Institute.
3. The Salt Institute is a non-profit public advocate and trade association that is dedicated to ensuring salt is available and maintained for use by the public to enhance winter roadway safety, maintain quality water, and provide health and nutrition. The Salt Institute analyzes research and public policy to increase the public's understanding and awareness of the utility and benefits of salt.
4. The Salt Institute, by and through its members and participating companies including, but not limited to, Cargill Deicing Technology, Cargill Salt, Central Salt L.L.C., Compass Minerals, Inc., and Morton Salt, Inc., is adversely affected and/or threatened by the

Illinois Pollution Control Board's ("Board") adoption of a year-round chloride water quality standard for the Chicago Area Waterway System ("CAWS") and the Lower Des Plaines River ("LDPR") located in and near Chicago, Illinois.

5. The traveling public, for whom the Salt Institute is an advocate, also is adversely affected and/or threatened by the Board's adoption of the year-round chloride water quality standard for the CAWS and LDPR.

6. Over the objection and comments of the Illinois Environmental Protection Agency and other participants, on June 18, 2015, the Board adopted a 500 mg/L year-round chloride standard with a three-year delayed effective date.

7. The primary components of road salt are chloride-containing minerals, including chlorides of sodium, calcium, and magnesium.

8. Because the Chicago metropolitan area experiences harsh winter weather, the safety of the traveling public is dependent upon the use of road salt as a deicing agent.

9. While spreading rates differ based upon the type of storm, weather conditions, and operational procedures, application rates of road salt generally range from 300 to 800 lbs. per two-lane mile. *See The Snowfighter's Handbook, A Practical Guide for Snow and Ice Control* at p. 9, a true and accurate copy of which is attached hereto as Exhibit A.

10. The Chicago metropolitan area has approximately 54,600 miles of roads and streets, including 2,500 miles of expressways, 17,300 miles of highways and arterial streets, and 34,800 miles of local streets. *See Encyclopedia of Chicago, Streets and Highways*, a true and accurate copy of which is attached hereto as Exhibit B.

11. In fact, the State of Illinois ranks third in the United States for the number of interstate highway miles. *See Illinois Facts* by the Illinois Department of Natural Resources at p. 2, a true and accurate copy of which is attached hereto as Exhibit C.

12. Every winter, more than 116,000 Americans are injured and over 1,300 are killed on snowy, slushy, or icy pavement. *See Road Salt Fact Sheet*, a true and accurate copy of which is attached hereto as Exhibit D.

13. When applied to either pre-treat or treat roads in wintry conditions, road salt both prevents snow and ice from binding to road pavement and acts to melt snow and ice.

14. A Marquette University study commissioned by the Salt Institute has shown that the application of road salt in northern climates reduces crashes by 88% and injuries and related costs by 85%. *See id.* (Ex. D).

15. In addition, commerce in northern states, such as Illinois, is impacted as much as \$700 million per day in both direct and indirect costs when roads are impassible due to snowy and icy conditions. *See id.* (Ex. D).

16. Just last year, more than 560 Illinois communities participated in the solicitation of road salt bids according to the Illinois Department of Central Management Services; however, 195 of those communities could not procure enough salt to ensure safe roadways for the winter of 2014-2015. *See Crane's Chicago Business, Road Salt in July? Illinois Towns Scrambling Now for Winter Supplies*, a true and accurate copy of which is attached as Exhibit E.

17. The City of Chicago alone used 436,000 tons of road salt during the winter of 2013-2014 due to excessive winter weather. *See CBS Chicago, Road Salt Will Be Scarce, Expensive This Winter*, a true and accurate copy of which is attached as Exhibit F.

18. The Board's adoption of a 500 mg/L year-round chloride standard adversely affects and threatens the availability and use of crucial, life-saving road salt in and around the CAWS and LDPR. Because road salt is comprised of chloride-containing minerals, the new standard will force the diminished use of road salt in the CAWS and LDPR areas.

19. As a result, the Board's adoption of a 500 mg/L year-round chloride standard will adversely impact and threaten the Salt Institute's members' and participating companies' road salt sales. And, most importantly, the Board's action will adversely impact and threaten the physical safety of the traveling public.

FURTHER AFFIANT SAYETH NOT.

Lori Roman

Lori Roman

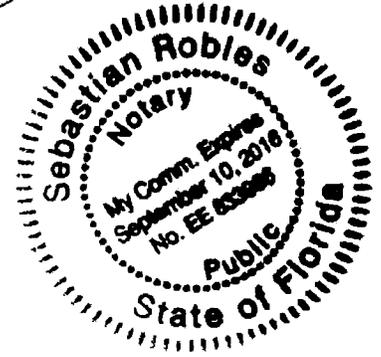
STATE OF FLORIDA)
) ss.
CITY OF NAPLES)

On this 23 day of July, 2015, before me personally appeared Lori Roman, to me known to be the person described in and who executed the foregoing Affidavit, and who, being duly sworn by me, did acknowledge that she executed the same as her free act and deed and further did state that the statements made herein are true to the best of her knowledge, information and belief.

IN TESTIMONY WHEREOF, I hereunto set my hand and affix my official seal in the independent City and State aforesaid, the date and year written above.

[Signature]
Notary Public

My Commission Expires: *09/10/2016*



S N O W F I G H T E R ' S H A N D B O O K

Safe and *Sustainable* Snowfighting

S A F E W I N T E R R O A D S . O R G

Exhibit
A

Sustainable

The

Snowfighter's Handbook

A Practical Guide for Snow and Ice Control

*Dedicated to the people
who provide safety and mobility
on roads in winter — **the snowfighters***



Copyright 1967, 1977, 1991, 1999, 2007, 2013

PUBLISHED BY THE SALT INSTITUTE: The Salt Institute is a North American based non-profit trade association dedicated to advancing the many benefits of salt, particularly to ensure winter roadway safety, quality water and healthy nutrition. See saltinstitute.org and safewinterroads.org for more information.



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FOREWORD

This manual, prepared by the Salt Institute is dedicated to the thousands of men and women in public works agencies at all levels whose task is providing safe streets and highways during winter storms.

The modern snowfighter must be accountable for meeting the community's needs for safety and mobility, as well as the safeguarding of our environment.

We commend all those agencies practicing the Safe and Sustainable Snowfighting approach to snow and ice control, which emphasizes getting the most from every application of deicing salt while maintaining the safest roads possible in the most economical way, and protecting the environment.

Every winter, over 115,000 people are injured and over 1,000 are killed on snowy or icy American roads. Clear roads protect lives and commerce and salt is a necessary strategic resource.

- Road salting and effective plowing can reduce injury crashes by up to 88%.

- The economic impact of snow-related closures far exceeds the cost of timely snow removal. A one day major snowstorm that shuts down roads can cost a state between \$300 and \$700 million in indirect costs.
- Deicing pays for itself within the first 25 minutes after salt is applied.

Modern strategies to effectively deal with winter road hazards depend upon having the most up-to-date information of expected weather conditions, the timely deployment of anti-icing to prevent ice-pavement bonding, properly calibrated application of road salt, improved equipment, automatic spreader controls, sufficient covered storage, and stockpile logistics to make salting of roads the most effective and safest customer-driven method for snow and ice control.

Environmental problems concerning use and storage of salt need not exist if there is a balanced approach to the use of salt for snow and ice control — one that demonstrates excellent practices in achieving safety, mobility and care for the environment.

The Snowfighter's Handbook was originally published in 1967. It has been widely accepted as a recommendation for proper salting procedures and techniques.

The purpose of this manual is to provide the snowfighter with information and suggestions for combating winter storms.

The *Sustainable Snowfighting* methods contained in this manual are the cornerstones of an effective winter maintenance program which will help snowfighters provide the public with the most effective snow and ice control program possible at the lowest overall cost and least impact on the environment.

Two other practical publications, *Highway Salt and Our Environment* and *The Salt Storage Handbook*, are also available from the Salt Institute. Two websites, saltinstitute.org and safewinterroads.org, are further resources. *



1 HOW IMPORTANT IS THE WINTER MAINTENANCE FUNCTION?

Snow and ice control is often the single largest cost item in the maintenance budget for streets and highways. In a recent year, snow removal in 33 snow belt states accounted for 20-25% of total maintenance costs and almost 5% of all highway expenditures.

For this reason, and because of its impact on public safety and essential mobility, snow and ice control deserves special attention from top highway management as well as from those in maintenance at all levels.

With nearly 300 million motor vehicles registered in the U.S., and more than four million miles of roads and streets, more must be done with the winter maintenance dollar than simply providing traction over ice and snow.

Most Canadian road authorities have an even tougher job than their U.S. counterparts. Canada's commerce and industry depend upon safe transportation and communication throughout the vast nation. Yet, Canadian winters threaten for six months every year, with colder temperatures and more frequent snows than in the United States.

The common practice for snow and ice control on many miles of streets and highways is removal of these substances as soon as possible to provide safe pavement through Sustainable Snowfighting. Nearly every state, province, city and toll road in the snow belt has some mileage on a clear pavement program. These facts about our motorized economy show why:

- Motorists now travel more than three trillion vehicle miles each year.
- More than 75% of workers who commute drive to work.
- More than 80% of intercity travel is by motor vehicle.
- Suburban growth has drastically increased traffic densities on most street and highway systems.
- Access to retailers, service establishments and other businesses is often wholly dependent on auto or truck transportation.

- Just-in-time manufacturing practices require reliable highway access for economic efficiency and competitiveness in snow belt areas.
- Web-based sales are pushing incredible parcel delivery growth.
- Increasing traffic volumes, the reliance of our society on daily mobility and the urgency of moving emergency vehicles without delay demand efficient snow and ice removal to keep traffic moving all year around.

Sustainable Snowfighting provides safe pavement in an environmentally sensitive manner. By preventing the bonding of snow and ice to pavement and clearing all snow and ice from pavements as soon as possible, snow fighting materials are used most efficiently with minimal loss to the environment. Benefits of this high maintenance are apparent:

- Traffic keeps moving.
- Commerce and industry go on at near-normal pace.
- There are fewer accidents, injuries and deaths.
- Minimal environmental impact.
- Emergency vehicles get through.

The public is less tolerant of failure in snow and ice control than in any other highway or street department function. A snowstorm affects the entire community — often entire states. Unless a storm is handled capably by maintenance forces, it can upset considerably the daily routines of individuals, endangering public safety and adversely affecting business and commerce. *



2 TRAIN FOR TEAMWORK

Maintenance people typically feel a keen obligation to the traveling public. They have a kind of esprit de corps that comes only with training and experience.

Proper training for maintenance personnel is vital. It provides the know-how to get the job done and encouragement to perform in a way that brings praise rather than discredit to your organization.

Many maintenance organizations conduct training courses in the early fall months to assure that:

- Equipment operators fully understand how to operate and maintain plows, spreaders, loaders and other equipment used for winter maintenance.
- All employees are thoroughly familiar with their responsibilities.
- All employees receive a full review of snow removal schedules, snow routes and personnel and equipment assignments.
- Dry-runs are made over areas to be covered during actual snowfighting operations.
- All employees understand how salt works in snow and ice so they know how, when and in what amounts it should be applied.

The underlying theme of all training sessions should be the Sustainable Snowfighting concept, which includes:

- Concern for public safety
- Concern for mobility and commerce
- Concern for the environment
- Proper covered storage
- Good maintenance of storage areas
- Good equipment maintenance and knowledge of equipment
- Proper spreader calibration
- Proper salt application

Every agency should have a fall meeting.

A session on snow and ice removal well ahead of winter gives a chance to discuss your plans with the people expected to carry

them out. This meeting is a refresher course on snowfighting tactics for experienced employees and an introduction to winter maintenance for new personnel.

This meeting gives management a chance for a formal review of the previous winter's operation with operators and supervising

personnel. Use it to determine what may have gone wrong last winter, and then make corrections for the coming season.

Promote a free exchange of ideas at the fall meeting. Encourage all personnel to speak up. New ideas and better tactics can come out of this session. *

Suggested Program Outline For Fall Training Sessions

I. The Importance of Coordination

- Know Your Plowing and Spreading Routes
- Effective Radio Communication
- The Storm Warning System
- Working with Police, Other Public Agencies and the Media

II. Equipment — Its Operation and Maintenance

- Plows
- Spreaders, Sprayers and Their Controls
- Loaders
- Emergency Repair and Refueling Stations
- The Importance of Preventive Maintenance

III. Application Procedures

- How Salt Works
- How and When to Salt
- Anti-Icing vs Deicing
- Application Rates
- Special Storm Conditions
- Special Deicing Problems (Bridges, Elevated Curves, Ramps, Intersections)
- When to Re-Apply Salt

IV. Review of Winter Maintenance Policy

- Snow Emergency Routes
- Parking Ordinances
- Procedures for Helping Motorists
- Importance of Personal Public Relations by Maintenance Personnel

V. On-the-job Safety

- Safety Equipment
- Safety Practices

VI. Discussion, Questions and Answers

To assure yourself that your department is ready for winter, you might have superintendents or foremen complete a check list showing their progress in pre-winter preparations.

3 Making Equipment Count

Equipment can make or break a maintenance organization. It must be suited to the job – and it's a tough job. Winter operations require the highest level of equipment maintenance.

It is a good idea to review equipment needs immediately after each winter season, when they are fresh in your mind. If new equipment is required, it can be ordered with good assurance of delivery prior to the next winter season.

A secret to successful winter maintenance is the ability to fight storms with equipment already on hand. The key is proper equipment maintenance. Snow and ice control equipment should never be stored without being cleaned. It should be inspected for possible repairs, and repaired if necessary.

In Fall training sessions, discuss each type and class of equipment which employees will operate. Go over strengths and weaknesses of each. Describe performance capabilities, load and weight limits, specifications, safety considerations, attachments and modifications.

If possible, assign each operator to a specific spreader, plow or loader. Man and machine make a better team when they work together regularly. The feeling that a vehicle "belongs" to an employee also will make an operator show more responsibility for its upkeep.

In some organizations, it may be necessary to switch operators from one piece of equipment to another. Then management must depend on a system of checks to ensure that equipment is properly operated and maintained.

Thoroughly inspect all equipment during late summer or early fall. Make all repairs and order stocks of parts not locally available. Pay particular attention to these components:

- Inspect condition of moldboard and cutting edge of all snowplows. Order adequate stocks of parts for all types of plows.
- Inspect snowplow hoists and under-body blades. Check air and hydraulic hoses and other critical parts of power units and obtain adequate replacement stocks.

- Mount, load and test all spreaders and sprayers. Make necessary repairs and order critical parts. Calibrate all spreaders and lace the calibration card on a visor or in the glove compartment of the truck. Supervisors should have copies of all calibration cards on file.
- Inspect all vehicle lighting, including wiring and sockets on headlights, tail lights, stop lights and turn signals. (Warning lights must be visible from all sides, whether bodies are raised or lowered.)
- Make sure sufficient stocks of tire chains, tires, spreader repair parts and other miscellaneous supplies are on hand.
- Make sure all personnel are familiar with spreader/sprayer controls, whether manual or automatic.

To keep equipment in top condition, establish a regular maintenance routine to be followed all winter. Equipment operators should inspect vehicles after each storm and report needed repairs to the garage or to the staff mechanic. Spreaders will need to be recalibrated after repair to the hydraulic system.

The first step in vehicle maintenance is to make sure every operator knows what to expect of each piece of equipment. Operators should check these items carefully.

Spreaders /Sprayers – Inspect pumps, hoses, controls, and fittings. Check spinners, augers, and auxiliary engines.

Controls - The two major components of any hydraulic system are the pump and the controls, whether manual or automatic. All operators should become thoroughly familiar with spreader controls. No two hydraulic systems are exactly the same. Therefore, controls may differ from truck to truck. Know your equipment and how the auger or conveyor and the spinner react at various settings.

Plows – Carefully inspect blades after each use. If blade wear begins eating into the moldboard, it will be very costly to replace. Remember that snow plow blades do not wear evenly. Replace blades when they are badly worn at any point! Have operators check blade wear during storms.



(Right-hand plows wear most rapidly on the left side, while the opposite is true for left-hand plows. Reversible plows may show wear on either side, depending upon operating time in each position.)

All Electrical Equipment — Inspect and service all lighting and electrical equipment regularly, including wiring and sockets. Carry ample stocks of parts for rotating flasher units, including lenses and lamps. Faulty wiring and failure of alternators, generators and batteries cause the most downtime in winter maintenance vehicles. Nothing is more terrifying and dangerous than a stalled and darkened vehicle in a winter storm.

Safety Equipment — Make sure there are flashlights, flares, flags and safety vests in truck cabs. A first aid kit is also a good idea. It is preferable to wear hardhats at all times and don't start out without securing seat belts.

All vehicle operators should know the location and telephone numbers of emergency repair and refueling stations. Qualified personnel should be on hand in garages during storms to carry out minor repairs promptly or make a start on major repairs. **Replenish spare parts inventories immediately following storms.**

Equipment needs vary markedly. How many plows, spreaders or sprayers are necessary for each mile of pavement depends upon snowfall, frequency of storms, traffic and topography. How much equipment an agency can afford is an important consideration as well. A straight salt program requires less equipment than one using abrasives, or alternative deicers.

Despite careful planning, equipment on hand may be inadequate in certain situations. *Don't be caught short!* Compile a list of all rental equipment available from contractors or haulers during snow emergencies. List specifications, rental rates and the names, addresses and telephone numbers of owners.

Establish ground rules for contracting for this equipment. It is important that every supervisor understands who has the authority to call rental equipment into action.



Arrange before winter to borrow equipment and operators in emergencies from local military installations, reserve units or neighboring maintenance agencies. Determine which officer is responsible for specific equipment and negotiate details for its use, if it is needed. It is difficult to know when a blizzard will strike, requiring tracked vehicles or other heavy equipment. Training sessions should include operators who may be brought in during emergencies, whether contract operators and/or equipment. They should also include other departments such as sewer and water or the park service. In fact, anyone capable of driving a plow and/or spreader should be trained and included whenever possible.

Warning! Before permitting rented or loaned equipment to operate, make sure your department is protected from liability for property damage or injuries resulting from accidents, and that insurance coverage is adequate and complies with all state and local laws or ordinances.

Preventive maintenance is crucial! After each storm, all equipment must be cleaned, washed and allowed to dry. When dry, components such as chains, sprockets, hinges, spinners and other moving parts should be coated with used motor oil, diesel fuel or kerosene. Grease all bearings.

Check hydraulics and quick disconnects for leakage. All washing and maintenance must be conducted in specific areas to protect the equipment and to allow capture and treatment/recycling of washwater.

The versatile underbody plow is very valuable in snowfighting. In light snow, it can run at fairly high speeds with safety. It can usually be purchased economically. The underbody blade is also a good training tool for new operators. *

4 OTHER PRE-WINTER PLANNING



All major arteries and feeders, including interstates, primary and secondary roads should be included in an agency's *Sustainable Snowfighting* program. Primary routes should have higher priority than secondary roads.

Only someone thoroughly familiar with a given locality can assign levels of maintenance and schedule performance of the work for optimum results. Local traffic patterns, traffic volume, the needs of local industry and business and special problems created by topography or climate must be considered.

However, here are a few recommendations for determining required levels of maintenance:

- Many agencies determine maintenance levels based on average daily traffic (ADT)
- Give priority to important local arterials, including school bus routes, access roads to industrial parks or major plants, mail delivery routes and streets leading to hospitals, fire stations and maintenance garages.
- Provide safe pavement on all truck routes that carry heavy vehicles around a city or through selected sections. Remember that these routes require around the clock attention.
- Carry levels of maintenance to logical stopping points, such as traffic signals, intersections or slow speed zones. This priority gives motorists time to adjust to the shift in maintenance levels.
- Make sure maintenance sections link or overlap. Leaving a gap between sections on a high-speed roadway can present potentially hazardous conditions.

Interstate and expressway routes that pass through or near cities carry increased traffic volumes onto city arterials. Ramps and other approaches to major city routes need special attention. A bare street or road is worthless unless traffic can get on and off. Plow and salt ramps of major arterials early in storms.

After thorough planning has been done, post a master-map showing routes, snow plowing and salting schedules and equipment and operator assignments.

For added control, give each driver an individual map of his route or area. Be sure to update maps each year to show new roads, interchanges, streets, bridges and governmental boundary lines.

For top efficiency in scheduling operations, aim for maximum equipment and manpower utilization. Try setting up salt routes that bring spreaders back to storage sites as

they empty. It may be desirable to stockpile salt at several locations so spreaders won't waste time deadheading.

Spreading rates differ based on types of storm, weather conditions and operational procedures. Application rates generally range from 300 to 800 lb per two-lane mile. **For convenience in estimating your season needs, the following chart is based on four 500 lb applications per storm.**

Mark the spots that won't be there. Before winter, mark all structures, such as drop inlets, catch basins, ends of curbing and guardrail and fire hydrants. Once covered with snow, they will be difficult or impossible to see from a plowing or spreading vehicle. Use special markers to pinpoint locations of drains and waterways that must be opened after each storm.

Where does snow fencing go? Only practical experience and analysis can tell where to erect snow fencing. Where it is placed depends entirely upon topography, prevailing winds and existing vegetation. Fencing should never be erected nearer than 75 to 100 ft from the centerline. It always is placed on the side of the roadway from which prevailing winter winds blow and should be perpendicular to wind direction, not necessarily parallel to the road. Positioning of snow fencing may be changed from one year to the next. Slopes, grading and tree growth often alter placement.

Notify property owners. Remember to contact property owners before erecting snow fence outside rights-of-way. In long fence sections, leave an occasional gap so livestock can go through. It is good community relations and will prevent damage to fencing as well. *

Tons of Salt Required Per Season

(Based on 4 applications of 500 lb per 2-lane mile per storm)

No. of Storms	Miles of Two-lane Highway on Clear Pavement						
	100	200	300	400	500	600	700
4	400	800	1200	1600	2000	2400	2800
6	600	1200	1800	2400	3000	3600	4200
8	800	1600	2400	3200	4000	4800	5600
10	1000	2000	3000	4000	5000	6000	7000
12	1200	2400	3600	4800	6000	7200	8400
14	1400	2800	4200	5600	7000	8400	9200
16	1600	3200	4800	6400	8000	9600	10,200
18	1800	3600	5400	7200	9000	10,800	11,600
20	2000	4000	6000	8000	10,000	12,000	14,000

*Note: Minimum storage requirement is usually $\frac{3}{4}$ of annual salt use.
This chart is computed on the basis of one ton of salt per two-lane mile per storm, or four 500 lb applications per storm.
Note: These are average figures. Conditions in some areas require several times the salt needed in some other areas.*

5 KNOW DIFFERENT TYPES OF SNOW

In spots where unusual drifting is expected, place one or more rows of fence, with the second line parallel to and about 50 ft from the first. **What about “self-help” barrels?** Many public works agencies place “self-help” salt barrels at critical points where motorists are likely to have tough going during winter.

Eliminate runoff from stored salt.

Improper stockpiling of salt is responsible for as much as 80% of environmental problems associated with salt use. Rain and melting snow can carry salt from uncovered piles into the ground and nearby bodies of water and possibly cause chloride build-up.

Salt piles **must** be covered on an impermeable pad. Salt users usually prefer permanent structures on asphalt pads with proper drainage. Temporary waterproof coverings can be effective if tended carefully. Covering salt also helps avoid loss of material through leaching and caking. Also, salt without cakes and lumps spreads with no difficulty.

Snow occurs when water vapor in an air mass is cooled below freezing. Density of snow varies greatly. Some storms produce wet snow like wet sand, others dry snow like sawdust. Wet or heavy snow can often be plowed away. Time is of the essence. Use of reliable weather forecasting services allows for crew readiness in advance of storms. Salt should be applied as soon as snow or ice begins to accumulate.

Winter storms produce a number of hazardous conditions other than snow. Even without rain, ice may occur when moist air contacts a cold surface, particularly on bridge decks. Rain may freeze as it falls on pavement. Frozen rain falls as sleet or hail; it may stick to pavements.

There are roughly five major kinds of storms, as shown in the “Stormfighting Practices” box. Each requires a somewhat different approach. Everyone on the maintenance force should know these basic kinds of storms and how to combat them.

Stormfighting Practices

The following chart is designed to combat various types of storms. Local conditions and policies will be the final determining factor.

<p>Condition 1 Temperature Near 30 Precipitation Snow, sleet or freezing rain Road Surface Wet</p>	<p>If snow or sleet, apply salt at 500 lb per two-lane mile. If snow or sleet continues and accumulates, plow and salt simultaneously. If freezing rain, apply salt at 200 lb per two-lane mile. If rain continues to freeze, re-apply salt at 200 lb per two-lane mile. Consider anti-icing procedures.</p>
<p>Condition 2 Temperature Below 30 or falling Precipitation Snow, sleet or freezing rain Road Surface Wet or Sticky</p>	<p>Apply salt at 300-800 lb per two-lane mile, depending on accumulation rate. As snowfall continues and accumulates, plow and repeat salt application. If freezing rain, apply salt at 200-400 lb per two-lane mile. Consider anti-icing and deicing procedures as warranted.</p>
<p>Condition 3 Temperature Below 20 and falling Precipitation Dry Snow Road Surface Dry</p>	<p>Plow as soon as possible. Do not apply salt. Continue to plow and patrol to check for wet, packed or icy spots; treat them with heavy salt applications.</p>
<p>Condition 4 Temperature Below 20 Precipitation Snow, sleet or freezing rain Road Surface Wet</p>	<p>Apply salt at 600-800 lb per two-lane mile, as required. If snow or sleet continues and accumulates, plow and salt simultaneously. If temperature starts to rise, apply salt at 500-600 lb per two-lane mile, wait for salt to react before plowing. Continue until safe pavement is obtained.</p>
<p>Condition 5 Temperature Below 10 Precipitation Snow or freezing rain Road Surface Accumulation of packed snow or ice</p>	<p>Apply salt at rate of 800 lb per two-lane mile or salt-treated abrasives at rate of 1500 to 2000 lb per two-lane mile. When snow or ice becomes mealy or slushy, plow. Repeat application and plowing as necessary.</p>

Note: The light, 200 lb application called for in Condition 1 and 2 must be repeated often for the duration of the condition.

Most storms occur under Conditions 1, 2, or 3. But variations in temperature, precipitation, pavement condition or other factors are common. Management must depend upon well-trained maintenance crews to use initiative and imagination in coping with unforeseen problems.

Pavement will often freeze dry following a storm, if the last salt application is properly timed. Often, moisture on the pavement will turn to vapor and disappear as it freezes, leaving a completely clear, dry surface.

Keep an eye on the weather. Proper preparation for a storm is not possible unless management anticipates when it will arrive, how long it will last and the nature of its special characteristics. Arrange with the U.S. Weather Bureau, a local airport weather station or a private forecasting service to get complete, detailed reports during winter.

Some maintenance departments hire a private forecaster to assure a balanced and more localized weather picture. Some progressive agencies are using pavement sensors and local weather instruments to receive instantaneous road and atmospheric conditions for more precise snow and ice control operations.

It may also be useful to call 511 to get road conditions. Some states also have excellent 511 websites such as Minnesota (www.511MN.org) or Wisconsin (www.511WI.org) where road and travel conditions are described. In addition, the National Weather Service has a website (<http://www.nws.noaa.gov/>) that provides a comprehensive report of both local and surrounding conditions.

While weather conditions are generally measured 30 ft above ground, it is critical in snowfighting to know what is happening

where the rubber meets the road. Pavement temperatures are what counts when determining application rates. This requires some type of road surface sensors or gaining access to the Road Weather Information System (RWIS).

There are a variety of electronic sensors that can be used to measure surface temperatures. Hand-held or truck-mounted infrared, laser-based sensors are able to quickly get a pavement temperature and are very useful in establishing application rates.

RWIS is a system consisting of several meteorological stations strategically located alongside the highway that allows the DOTs to make more informed decisions during winter storms. Specialized equipment and computer programs monitor air and pavement temperature to make forecasts regarding how the winter storms will impact the highways. This provides the opportunity to make optimal use of materials, equipment and staff, and practice anti-icing and deicing techniques perfected through years of experience.

Any changes in weather conditions should be relayed to all personnel. If late afternoon reports indicate possibility of overnight snowfall, prepare equipment by attaching snowplows and spreaders before the workday ends. If weather forecasts indicate, a certain portion of the work force should remain on duty to start fighting the storm when it arrives. If the forecast indicates snow during the night, the work force should be sent home to get some rest, but alerted that they may be called back during the night. Arrange with the highway patrol, local police, sheriff's department or weather service to notify key personnel of storms that develop late at night. Ensure that someone is responsible for relaying the alert to the entire maintenance force, if and when the need arises. *

Pounds of Ice Melted Per Pound of Salt

Temperature Degrees F	One Pound of Sodium Chloride (Salt)
30	46.3 lb of ice
25	14.4 lb of ice
20	8.6 lb of ice
15	6.3 lb of ice
10	4.9 lb of ice
5	4.1 lb of ice
0	3.7 lb of ice
-6	3.2 lb of ice

Application of Salt

Rate of Application Per Two-Lane Mile	Coverage Per Cu. Yd. of Salt Per Two-Lane Mile
800 lb	2 1/2
700 lb	2 3/4
600 lb	3
500 lb	4
400 lb	5
300 lb	6
200 lb	10

Note: Salt meeting ASTM Specification D632 weighs approximately 80 lb per cubic foot.

6 CALIBRATION

Different materials will spread at different rates at the same setting, so spreaders must be calibrated with the material that will be used.

Spreader Calibration Procedure

Calibration of spreaders is simply calculating the pounds per mile actually discharged at various spreader control settings and truck speeds. It is carried out by first counting the number of auger or conveyor shaft revolutions per minute, measuring the salt discharged in one revolution, then multiplying the two and finally multiplying the discharge rate by the minutes it takes to travel one mile. An excellent example of a calibration chart in spreadsheet format can be found on the Salt Institute website. Operational spreadsheets can be found on the same page. A sample calibration chart is on this page.

With hopper-type spreaders, specific gate openings must be calibrated. Measure from floor of conveyor to bottom edge of gate.

Each spreader must be calibrated individually; even the same models can vary widely at the same setting.

Equipment needed:

1. Scale for weighing
2. Canvas or bucket/collection device
3. Chalk, crayon or other marker
4. Watch with second hand

Calibration steps:

1. Warm truck's hydraulic oil to normal operating temperature with spreader system running.
2. Put partial load of salt on truck.
3. Mark shaft end of auger or conveyor.
4. Dump salt on auger or conveyor.
5. Rev truck engine to operating RPM (at least 2000 RPM).
6. Count number of shaft revolutions per minute at each spreader control setting, and record.
7. Collect salt for one revolution & weigh, deducting weight of container. (For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution.) This can be accomplished at idle or very low engine RPM. Multiply shaft RPM (Column A) by discharge per revolution (Column B) to get discharge rate in pounds per minute (Column C), then multiply discharge rate by

minutes to travel one mile at various truck speeds to get pounds discharged per mile.*

*For example, at 20 MPH with 30 Shaft RPM and 7 lb discharge – $30 \times 7 = 210 \times 3.00 = 630$ lb per mile.

Calibrating Automatic Controls

Automatic controls come with factory calibration cards that indicate the proper rate of spread for each setting. However, when there is a need to calibrate, use the following steps:

1. Remove or turn off spinner.
2. Set auger on given number, such as No. 2.
3. Tie sack or heavy canvas under discharge chute.
4. Mark specific distance, such as 100 or 1,000 ft.
5. Drive that distance with spreader operating.
6. Weigh salt collected in sack or canvas.
7. Multiply weight of salt by 5.3 (in case of 1,000 ft) or 52.8 (in case of 100 ft).

This will be the amount of salt discharged per mile, which remains constant regardless of speed, but calibration must be done for each control setting. *

Calibration Chart

Agency: _____
 Location: _____
 Truck No.: _____ Spreader No.: _____
 Date: _____ By: _____

Gate Opening (Hopper Type Spreaders)			Pounds Discharged Per Mile									
	A	B	C	Minutes to Travel One Mile								
Control Setting	Shaft RPM (Loaded)	Discharge Per Revolution (Pounds)	Discharge Rate (lb/min)	5 mph x 12.00	10 mph x 6.00	15 mph x 4.00	20 mph x 3.00	25 mph x 2.40	30 mph x 2.00	35 mph x 1.71	40 mph x 1.50	45 mph x 1.33
1		This weight remains constant										
2												
3												
4												
5												
6												
7												
8												
9												
10												

7 RECOMMENDATIONS FOR SALT APPLICATION

Timing is crucial in applying salt. Ideally, brine is sprayed as an anti-icing treatment prior to the storm's arrival. If that is not possible, then salt should be spread as soon as a storm begins in order to prevent bonding of snow or ice to the pavement. The salt will quickly produce brine or keep snow mealy, allowing for efficient plowing.

The melting action of salt applied early in a storm works from the pavement surface up so snow and ice do not form hardpack.

There are times and storm conditions where salt alone is the only answer to keeping the pavements clear. For example, freezing rain cannot be plowed and salt is the only solution for clearing the roads when it occurs.

Anti-icing is rapidly becoming the best and most popular means of preventing ice-pavement bonding.

The best advice is to be prepared to mobilize all forces as soon as a winter storm approaches.

There are no easy answers or solutions with snow and ice control because there are too many variables. It has been estimated there are over 66,666 different storm conditions – pavement temperature, ambient temperature, pavement type, solar radiation, traffic volume, traffic speed, wind direction and velocity, type of precipitation, topography, lake or ocean effect, shaded areas (by mountains, trees or buildings) and wind chill factor, to name a few.

Snow and ice control is a very complex issue and those people on the front line need the best information possible.

Salt is usually applied at the rate of 300 to 800 lb per two-lane mile. As temperatures drop, either the quantity of salt or the frequency of application must be increased.

Anti-icing, that is spraying brine on pavement before the storm arrives, requires anywhere from 1/3 to 1/4 the material of deicing, making it the most cost-effective option for improving winter traffic safety.



Ideally, with any deicer, at the end of the storm all material should be completely used. Since storm forecasting is not precise, some residue may remain on the surface after some storms. That residue, if not blown off or washed away, will be effective in helping prevent bonding of ice and snow in the next storm. A deicer only has residual effect if too much was applied for the storm condition.

Prewetting salt with brine speeds the reaction time of salt and also keeps salt from bouncing off the road so more of it is available to do the work. See Section 10, page 18, for details on this deicing procedure.

There may also be a combination of applications of any of the above. Most agencies agree that early anti-icing spraying is most effective and that prewetting of salt provides a faster, higher level of service at all temperatures.

Spreading can be done full-width or windrow. Both have strengths depending on conditions. Pay special attention to spinner speeds. A spinner that revolves too fast will throw salt over a wide area, possibly wasting material. You may correct overthrow by adjusting the drop location on the spinner by using your directional baffles or reducing spinner speed. Traffic density and highway design largely determine the spreading pattern required.

A **windrow** of salt applied in a 4-8 ft strip along the centerline is effective on two-lane pavements with a low to medium traffic count. Less salt is wasted with this pattern and quickly gives vehicles clear pavement under at least two wheels. Traffic will soon move some salt off the centerline and the salt brine will move toward both shoulders for added melting across the entire road width.

The **full-width** spreading pattern is used most often on multiple-lane pavements with medium to high traffic volumes. Melting action is obtained over the full pavement width. Vehicles tend to stay in line to clear wheel paths in the lanes.

Often the full width pattern is used when trying to get salt down under a storm. But be careful not to waste salt when using this pattern.

Play the wind in spreading. A strong wind blowing across a street or highway can cause salt to drift as it comes out of the spreader, pushing it onto the shoulder or into a gutter. This is particularly true in rural areas where there are few windbreaks. How the wind affects spreading depends on both wind velocity and pavement condition. Spreader operators should play the wind to put salt where it will do the most good.

Because of the much greater control inherent to the spray process, anti-icing is best applied with full-width stream nozzle systems to maintain a small width of bare pavement to reduce slipperiness. A fan spray is not recommended and care must be exercised during windy conditions.

Give salt time to work. Time plowing operations to allow maximum melting by salt. When you plow salt off the pavement, you waste the deicing material and increase the cost of snow removal.

Know when to plow and reapply salt. The need for another salt application can be determined by watching melting snow kicked out behind vehicle tires. If the slush is soft and fans out like water, the salt is still working. Once the slush begins to stiffen and is thrown directly to the rear of vehicle tires, it is time to plow and spread more salt.

Has the weather changed? Remember that salt application rates may have to be increased at night, on sunless days and when the temperature drops sharply. Without the sun, the effect of solar radiation and warmth is lost. At night, traffic usually diminishes, minimizing another heat source that helps melt ice and snow. It is important to remember that pavement temperatures are seldom the same as air temperatures — a critical thought when choosing the options for snow and ice control — it is the pavement that will be treated.

Don't overlook salt's anti-skid value. For years, maintenance people have observed that salt, applied as an ice melter, also gives anti-skid protection. Tests conducted in cooperation with the National Safety Council show that salt, applied at normal deicing rates, gives as much anti-skid protection as abrasives. The anti-skid effect of salt is immediate as it starts melting snow or ice.

Safeguard the environment. The way salt is spread can make the difference between whether the public appreciates or condemns snowfighters' efforts. Misuse ignores concern for the environment. Proper calibration of spreading equipment and good storage can avoid most problems.

There is no correlation between yearly snowfall and the total quantity of salt used. The type of storm dictates frequency of application and total amount of salt necessary. A freezing rain or ice storm may require enormous amounts of salt, perhaps even more than a prolonged snowstorm. There is no way to combat freezing rain other than salt use. *



8 SPECIAL SPREADING AND PLOWING PROBLEMS

Salt bridges first. Bridges freeze long before road surfaces because they do not hold warmth as a roadbed does, since cold air reaches both the top and bottom surfaces of bridge decks.

They should receive early attention and an application of salt. Bridge decks may ice over even when there is no precipitation because of high humidity and low temperatures. (Or under certain other conditions, bridges will frost over without precipitation and must be salted.)

Salt on the high side of elevated curves. Salt brine will flow down and across a banked curve. If salt is spread down the centerline, everything above it will remain icy. Spread salt on the high side of the curve and let gravity do the rest of the work. Leave no gaps.

Operators must go beyond their assigned areas, if necessary, to plow or salt a gap that has not been treated for some reason. A short, neglected stretch of roadway can be very hazardous to an unsuspecting motorist.

Watch for drifting. In continued high winds, maintain a patrol to watch for drifting and slick spots, even after the pavement has been cleared. Treat icy buildups with a salt application. If the highway has a blacktop or stabilized shoulder, drifting may be controlled with a salt application on the shoulder to form a melting barrier.

During some very low temperature storms with dry blowing snow, the use of salt may not be appropriate. The dry snow may blow off the pavement if no salt is used.

Delay in getting to critical areas may cause severe traffic tie-ups.

Make a list of trouble spots that operators should salt first during storms. Make sure all personnel understand that bridges, intersections, ramps, hills and curves come first. Have operators patrol highways rather than wait at maintenance areas for direction.

It is far better to have equipment on the road when snow begins than in the maintenance yard. Nothing is more reassuring to motorists than to see anti-icing sprayers or loaded spreaders and plows patrolling prior to storms.

Give interchanges special attention. Salt on and off-ramps as quickly as possible. A safe road or street is of little value without safe entrances and

exits. Can trucks be kept out of the way? Intelligent transportation systems have been developed to do just that.

Basic management controls such as truck navigation, traffic light controls, container management systems, variable message signs or speed cameras as well as monitoring applications such as security CCTV systems which have been designed to manage trucking logistics. Additionally, predictive techniques are being developed, to allow advanced modeling and comparison with historical baseline data. *



Avoid slick conditions from buildup of ice or packed snow by applying a salt application heavy enough to prevent refreezing.

Traffic icing is very dangerous. Occasionally, under certain weather conditions, a paper-thin sheet of ice forms in wheel paths on a bare pavement even when pavement looks clear. This black ice formation can be deadly. Maintenance operators should be instructed to watch for this condition and to apply salt immediately when it is detected.

Get equipment on the road. Once a word of an impending storm has been received and plows are mounted and trucks loaded, get vehicles out of the yard and onto their plowing and spreading sections as soon as possible.

9 ANTI-ICING

A relatively new weapon in the sustainable snowfighting arsenal in North America is anti-icing. But it has a long history of keeping European roads safe and passable.

Anti-icing differs significantly from deicing because brine is applied before precipitation to prevent the formation or development of bonded snow and ice on the road surface. It is a proactive approach to snowfighting and is often the first in a series of strategies employed for a winter storm. By applying freezing point depressant materials before a storm it is possible to prevent the bond from forming between the pavement and snow or ice. Research has shown that timely applications of anti-icing materials can cut the cost of maintaining a safe road surface by 90% compared to traditional deicing. Liquid sodium chloride (NaCl) is the most effective choice for anti-icing above 15°F.

Anti-icing has many advantages.

- Anti-icing returns road surfaces to normal faster, resulting in fewer accidents and delays.
- Anti-icing can reduce airborne dust and salt particulates.
- Salt needs moisture to be effective. Applying brine jumpstarts the melting process.
- Brine sticks to the road surface. It will not be as easily blown off the road by wind or traffic, so material is more efficiently used.
- If the storm is delayed, salt residue remains on the road ready to begin work when precipitation begins.
- Crews can begin treatment in advance of a storm. Because anti-icing prevents the bonding of snow and ice to pavement, snowfighters have less work to maintain safe roadways as the storm progresses.
- Increased efficiency results in use of less deicer and manpower, therefore lowering the cost of maintaining safe road conditions. The use of less deicing materials also minimizes environmental concerns.

Products available for use in an anti-icing program are sodium chloride, calcium chloride, magnesium chloride, potassium acetate, and calcium magnesium acetate.

Each product has its own advantages and disadvantages. The most common material in use is sodium chloride (salt) in the form of a brine made from a mixture of rock salt and water. Salt brine is effective to -6°F and is a proven anti-icing agent in use throughout the snowbelt.

Some agencies use calcium or magnesium chloride in a brine solution which is effective down to -6° F, but is more than six times more expensive than salt, and is more difficult to handle. Also, calcium and magnesium chloride residue on road surfaces can attract moisture at lower relative humidity than salt resulting in dangerous, slippery conditions under certain circumstances.

Salt Brine Manufacture

Salt brine is made by mixing rock salt or solar salt with water. The process is simple: the resulting brine should be approximately 23% NaCl.

The proportion of salt to water is critical to the effectiveness of the brine. Too much or too little salt affects the freeze point depressing qualities of the brine. The proper brine mixture is 23.3% salt content by weight. This is the concentration at which salt brine has the lowest freezing point, -6° F. Can we keep adding salt to water until the freezing point goes down much further? No. The solubility of salt in water decreases with decreasing temperature. We eventually reach what is called the eutectic point. This is the point at which a solution achieves a maximum salt concentration. Any colder and salt will begin to leave the solution and raise the freezing point. At the eutectic temperature, ice, saltwater, and solid salt exist in equilibrium. For water, the eutectic temperature is -6° F. The percentage of salt is measured with a salometer, a specialized hydrometer, until a 88.3% measurement on the salometer is obtained. This results in the proper 23.3% salt content.

Commercial brine makers are available at a cost of approximately \$5,000. Many agencies have made their own brine makers using water tanks and PVC pipe for substantially lower cost. Brine is usually made at the local maintenance facility sites and stored in large tanks in locations convenient for loading into saddle tanks on the sides of the V-box or anti-icing equipment. It is essential to clean out brine makers after brine is prepared to reduce the potential for corrosion.

Application Equipment

Brine applicators are commercially available for about \$1,500. Some agencies have manufactured their own application equipment using large tanks and PVC piping. Some equipment is designed to be

Hydrometer/Salometer Chart for Salt Brine		
% Salt	Hydrometer Specific Gravity	Salometer Using 0-100%
0	1.000	0
1	1.007	4
2	1.014	7
3	1.021	11
4	1.028	15
5	1.036	19
6	1.043	22
7	1.051	26
8	1.059	30
9	1.067	33
10	1.074	37
11	1.082	41
12	1.089	44
13	1.097	48
14	1.104	52
15	1.112	56
16	1.119	59
17	1.127	63
18	1.135	67
19	1.143	70
20	1.152	74
21	1.159	78
22	1.168	81
23	1.176	85
24	1.184	89
25	1.193	93
26	1.201	96
27	-	100

loaded onto the bed of spreading trucks, towed behind maintenance equipment or permanently mounted on truck beds. It can be as simple as a gravity fed spraying system with a operator controlled cut-off valve or a more complex (and more controllable) pump driven sprayer system. Fan sprayers are not recommended. Control should be available to vary spreading rates from 25 to 60 gallons per lane mile.

If large, horizontal tanks are used in the design, consider installing baffles inside the tanks to help prevent the liquid from suddenly shifting in the tank, creating a hazardous control situation for the operator.

Application

Accurate weather and road surface information are critical for the efficient use of anti-icing materials. Road surface temperatures, precipitation amounts and form, wind conditions, and road environment (sunlight exposure, surface condition, bridges, etc.) all affect the use and application of anti-icing measures.

Understanding the freeze point depressing qualities of brine is important to its use and application as an anti-icing agent. (See the Phase diagram below.) As you can see from the chart, the minimum freeze point of salt brine is -6°F at a concentration of 23.3%. Road surface temperatures are indicated on the side of the chart, solution concentrations along the bottom. The line represents the freeze point of the solution at a given temperature. The colored portion in the center of the chart shows the melting range of brine solutions. The area to the left shows the results of a solution with too little salt, the road surface will refreeze unless more salt brine or deicing salt is applied. The area to the right shows the results with too much salt, with a resultant non-functional loss of material to the environment. As you can see, additional precipitation and heavy traffic can dilute the brine solution allowing the road to refreeze.

ADDITIONAL PRECIPITATION ALWAYS RESULTS IN A DILUTION OF BRINE AT THE ROAD SURFACE.

Weather information is getting better with everything from air temperature, dew point, optical weather identifiers, to pavement temperature, surface status, and compound information being available. Some agencies utilize remote television cameras to monitor traffic and bridge conditions. This information will help agencies accurately determine the appropriate application of anti-icers.

Do not apply anti-icer under blowing conditions, particularly in areas prone to drifting and anywhere else that might be problematic for salt, such as all areas subject to wind issues.

Don't apply too much or the roadway may become slippery. Always follow application recommendations.

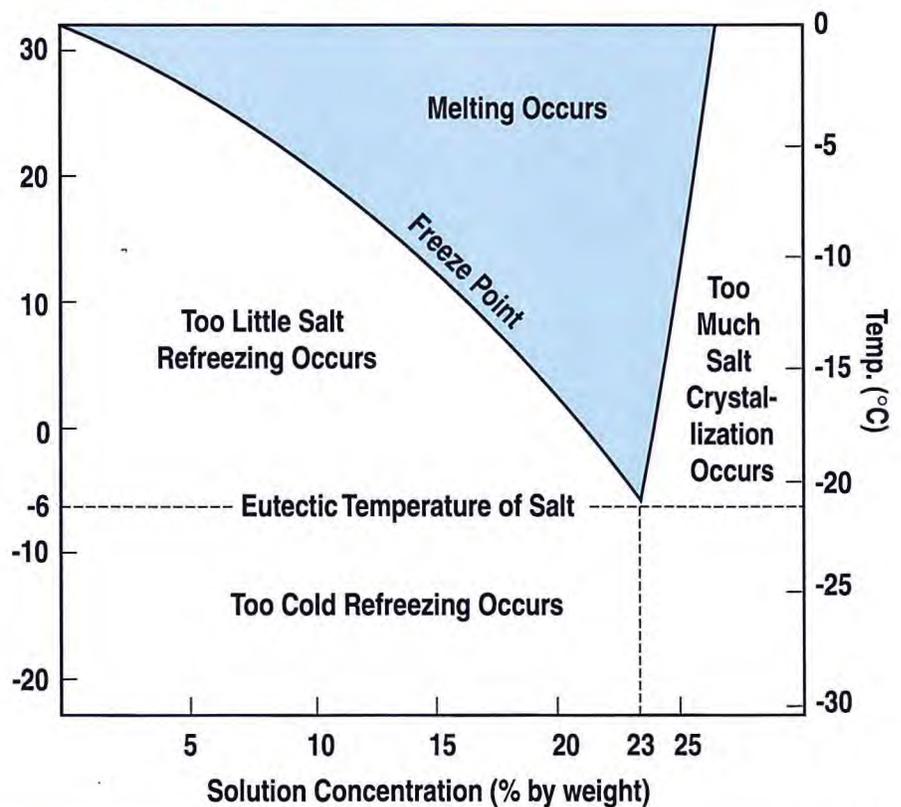
Don't apply CaCl₂ or MgCl₂ to a warm road (above 28°F pavement temperature). It can become very slippery and cause crashes!

Summary

Anti-icing measures are an important weapon in the snowfighter's arsenal. The appropriate use of anti-icing techniques results in:

- Returning to bare pavement conditions more quickly, saving lives and reducing property damage due to fewer accidents, as well as the reduction of traffic delays and the resulting reduction of losses to local economies;
- Reduction in the quantity of deicer use, resulting in cost savings and less environmental concerns; and
- Reduction in the manpower necessary to maintain safe road conditions, resulting in less overtime costs, less operator fatigue and safer working conditions. *

Phase Diagram for Salt



10 DEICING-PREWETTING

Once snow has accumulated and bonded to the road or an ice storm has glazed road surfaces, deicing operations must begin to restore safe driving conditions. The bond between snow and/or ice and the pavement surface must be destroyed by chemical or physical means or a combination of the two.

More than a dozen compounds have been tested for deicing use. The most common products used are sodium chloride, calcium chloride and magnesium chloride. Sodium chloride in the form of rock salt or brine (see previous chapter) is by far the most commonly used chemical in deicing operations due to its lower cost and proven effectiveness. Therefore, in the words of the Transportation Research Board in its 1992 analysis of deicers, salt remains the “deicer of choice.”

Abrasives have no melting effect for deicing operations; in fact research by the Strategic Highway Research Program (SHRP) and the University of Wisconsin suggests that sand inhibits the melting process of deicing materials.

Choosing the Proper Application

Salt can be applied in solid, prewetted solid, or liquid form. Application methods are determined by weather and road conditions as well as equipment available. Salt needs moisture to provide melting action. Deicing rock salt or solar salt dissolves in road surface moisture to form a brine which melts snow and ice to form more brine which continues the process. Once salt has penetrated the packed snow and ice to make brine on the pavement surface, the bond will be broken and removal operations can be successful in restoring bare pavement conditions.

Forecasted conditions and road surface temperatures at the time of treatment determine whether winter maintenance materials should be applied in solid, prewetted solid or liquid form. The type of precipitation event, dry snow, wet snow, ice, sleet, freezing rain, etc., must be considered. Keep in mind that changing conditions will affect operations. Falling temperatures can cause

refreezing. Additional precipitation can dilute winter maintenance materials, rendering them ineffective. Refer to the Phase Change diagram in the previous chapter for assistance in determining the proper course of action.

If the road surface is wet and temperatures will not cause refreezing, then application of dry salt is appropriate. Necessary moisture is already present so brine will be formed immediately and melting action can begin. The application rate will be determined by the amount of snow and ice coverage. Keep in mind the reduced mobility effect as dilution of deicing salt occurs.

If snow pack and ice is solid, or temperatures will fall to the point that refreezing will take place, then prewetted solid application of deicers may provide more rapid results. Adding moisture to the salt either at loading or at the spinner when applied will jump start the deicing process by providing more moisture to begin the melting process.

Spraying liquids is not recommended for packed snow as the liquid destroys surface friction and the brine may become so diluted before melting action is completed that refreezing could occur. Application of brine is an effective treatment for black ice conditions. Although salt can melt ice at temperatures as low as -6°F, the practical limitation of brine application is considered by the Federal Highway Administration to be around 15°F. Below that temperature, pre-wet with calcium chloride or calcium magnesium chloride mixed with sodium chloride.

Deicers should be applied close to the crown or high point of the road. The resulting brine will run downhill from the crown to the rest of the surface. Spinner speed should be low enough to ensure that deicing materials remain on the road surface. Spinner speed and application rates should be higher at intersections and other high traffic areas to spread deicing material over a larger area or in higher concentrations as required by the conditions. However, use of the BLAST override on automatic controls while stopped at a stop sign or light is not appropriate.

Road conditions, temperature, amount of snow and ice cover, storm progress, and traffic conditions all affect deicing application rates.

The tables in section 5 of this Handbook, will assist in determining appropriate application rates.

Materials Selection

Generally, all deicers work in the same way. They depress the freezing point of water and turn snow and ice into a liquid or a semi-liquid slush. Solid chemical salts infiltrate down through ice and snow, dissolving to form a strong brine solution which spreads out under the ice or hard-packed snow and breaking the bond to the road surface. Once the bond is broken, the ice and snow can be plowed off or removed by other means. By applying material prior to the storm, we can prevent the bond to the road surface and melt the snow and ice as it comes in contact with the brine.

Agricultural byproducts work in a similar fashion. The resulting solutions act by depressing the freezing point of snow and ice. These products are usually used in combination with other materials.

Although all these materials work in much the same way, they vary widely in performance. Several factors are considered in determining performance, such as effective temperature range, speed of action, amount of material required, and duration of melting action.

Other important criteria for material evaluation include: availability, cost, infrastructure and environmental impacts. Each community will place a particular emphasis on each of the criteria to suit their own specific needs. At times, their needs may change depending upon shifting political priorities. The ability to be able to make a rational decision on material selection to closely fit with ongoing needs is of tremendous importance to winter maintenance planners.

In order to come to grips with this issue, a consortium of state DOTs commissioned a study to develop an evidence-based decision tool for materials selection. This was published by the Transportation Research Board (TRB)

of the National Academy of Sciences in May, 2007. The full report can be downloaded from the TRB website.

Now agencies can objectively compare the de-icing compounds they use in terms that each agency defines for itself to be important. The computer program (called the Material Selections Wizard) crunches the data based upon the agency's set of priorities.

This computer program can be downloaded from the TRB website.

Here is an example of how the new Materials Selections Wizard works.

The winter maintenance agency has had budget cuts and decides that the following priorities reflect their particular needs — see Chart 1.

Price is the primary concern (45%), snow- and ice-melting performance is almost but not quite so important (35%), while environmental (11%) and infrastructural (9%) are somewhat lower down on the overall scale of things.

Using the Materials Selection Wizard, the data is inputted and the following results are obtained showing which material will fit the agency's needs for which temperatures — see Chart 2.

The wizard makes an informed choice based on specific priorities. It is a choice that can be defended before City Council. Citizens value their hard-earned dollars and expect them to be spent wisely to keep roads open and safe while safeguarding the environment. The City Council and the citizens determine the policy. This tool turns the policy into a practical and functional choice.

As another example, here is an extreme environment/infrastructure priority model. It disregards deicer costs and weights performance low (25%, with the logic that a lower weighting would be irresponsible since the material must perform its life-saving deicing mission). Environment and infrastructure together account for three-fourths of the total weighting (split evenly with 37.5% weight for each).

Chart 1

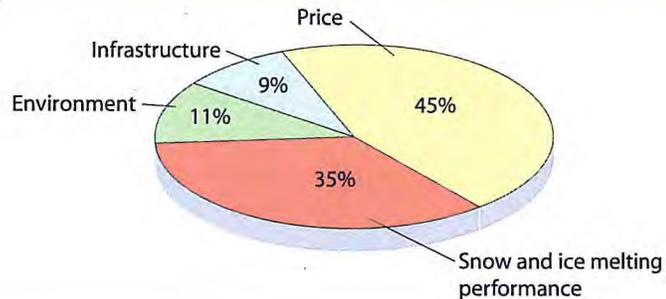


Chart 2

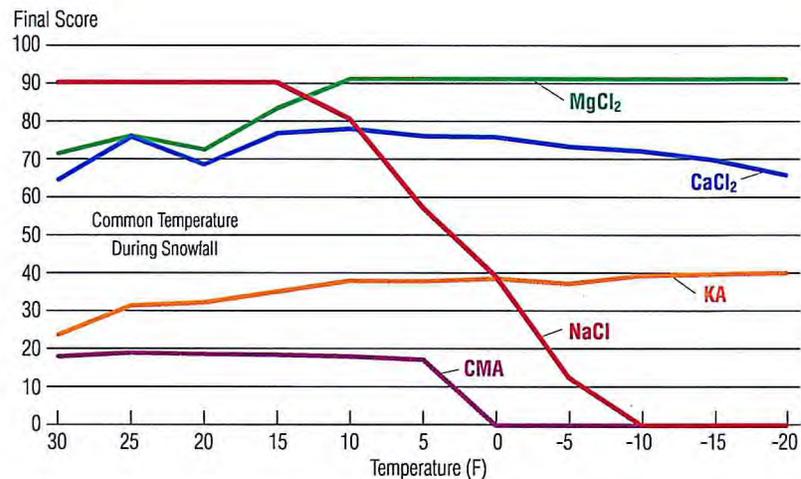
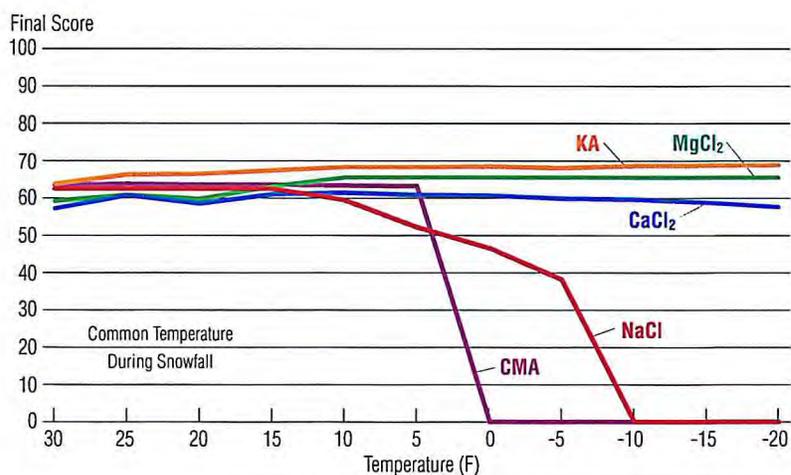


Chart 3



11 AFTER THE STORM

Here is how the various materials stack up with this set of priorities — see Chart 3

So, the choice belongs to the agency that can now be assured that at the temperatures to be encountered, they are choosing materials that comply with their community's particular priorities.

Equipment Used

Solid deicers or prewetted salt is applied with spreader trucks. If the load is wetted, then no additional equipment is necessary. Saddle tanks and a sprayer at the spinner are necessary if brine is applied to the salt at the time of application to the roadway. Brine can be applied with tank trucks or towed equipment using the same equipment discussed in Chapter 9.

Summary

Use of salt is a proven snowfighting technique with many advantages:

- Returns roadway surfaces to bare pavement conditions more quickly, thereby reducing the number of accidents and property damage, and saving lives. Research has shown that deicing pays for itself within the first 25 minutes after the salt is spread;
- Lowers manpower costs by reducing the time necessary to restore dry pavement conditions;
- Eliminates or greatly reduces cleanup costs;
- Compared to alternatives, salt is safer to handle, and kinder to the environment when properly used.

Prewetting may enhance salt use:

- Salt can be spread more uniformly with less waste on shoulders and in ditches because wetted salt sticks to the pavement;
- The amount of dry materials used can be cut by 20-30% (IADOT) because of the dual action of added brine and more materials remain on roadway;
- Works faster because more brine is present;
- Driving/spreading speeds can be increased because salt stays on the roadway. ❄

12 A WORD ABOUT SAFETY

Most snowstorms occur at 20°F or above, with the temperature dropping most severely after the snow stops. After the storm, with the pavement clear and dry, is the time to wing back shoulders, clear structures and haul snow away from critical areas to make room for future snow storage or snow removal.

In plowing, a windrow of snow is often left on each side of bridges. These windrows reduce the usable roadway width on the bridge. Moreover, if allowed to remain, they will later melt and form ice. Remove this snow as soon as possible.

Caution. Do not dump material from overhead bridges onto roadway or railroad tracks below. Hand shovel the snow away, if necessary, to ensure all drains in the bridge floor are open and free-draining.

Clear snow from raised medians to prevent drifting. Also clear snow from barrier walls and traffic dividers to reduce later melting and refreezing and to improve driver visibility.

Clear those drains! It is vital that roadway drains and catch basins be kept open to allow melting ice and snow to run off. When water ponds and puddles around drains, falling temperatures may cause it to refreeze. A salt application on frozen drains, catch basins and culverts frees them of snow and ice.

Accurately record all material used. Hazards, such as raised utilities or low hanging branches, and problems encountered such as area-specific snow accumulations should also be recorded.

Discuss opportunities to improve operations.

Carry out interim cleaning and maintenance of equipment.

At end of season, do full cleaning and maintenance of all equipment and ensure all remaining supply piles are securely placed on impervious pads and covered. ❄

The main purpose of snow and ice removal is, of course, to provide safe travel for motorists. In doing this, those in maintenance must not overlook their own safety; neither must they overlook the possibility that in trying to provide safe pavement they may be creating another safety hazard.

Become familiar with a few “do’s and don’ts” that can make your work far safer:

- Check all equipment before each use. Make sure lights, brakes, windshield wipers, exhaust systems, tires, chains and steering are safe.
- Promptly report all mechanical trouble.
- Remember that speed can kill, especially in a snowstorm and at night.
- Resist the urge to get the job done in a hurry.
- Respect rights of others. Be considerate of motorists who have trouble driving in snow; report stranded motorists when possible.
- Keep first aid kits completely stocked. Check fire extinguishers and flares often.
- Observe traffic laws.
- Watch for signs of fatigue in equipment operators. A limit of twelve continuous hours on duty seems fairly common in public works agencies in the snow belt, although some organizations permit longer work periods. Usually, however, the routine is twelve hours on and twelve off. ❄

13 KEEP THE PUBLIC INFORMED

Publicize snow emergency procedures and regulations. Keep broadcasters and newspapers periodically informed of snow clearing progress and specific problem areas. This way, motorists will know on which routes they will be able to travel with the least difficulty. Advance publicity on snow clearing priorities will reduce time-consuming calls from people demanding to know when their streets or roads will be cleared.

Before storms arrive, pass on information about approaching snow in time for schools, industry and government agencies to decide whether or not to remain open or to close early.

Make contact with other agencies. Long before winter, meet with representatives of other public agencies to discuss means of cooperating in snow and ice removal. Take the initiative to let others know of your plans and to enlist their cooperation.

Consider inviting these people to the pre-winter session: a representative of the top elected public official in your area, the local civil defense director, those in charge of bus transportation for school systems, police and fire officials, emergency road service managers of nearby clubs of the American Automobile Association (AAA), officers from local military units and news media representatives.

Snowfighters are not miracle workers. They are dedicated, hardworking human beings who pit their will against the forces of nature — and usually win!

The real record of their accomplishment is not the tons of snow removed or the miles of pavement kept clear or number of streets plowed. The achievement of open highways that allow business, industry and government to function and people to travel safely and without undue delay is the testament of good snowfighting.

According to a Marquette University study, road salting and plowing can reduce crash frequency by 88%.

A one-day major snowstorm can cost a state \$300-700 million in both direct and indirect costs.

Suggested Program Outline For Fall Training Sessions

I. The Importance of Coordination

- Know Your Plowing and Spreading Routes
- Effective Radio Communication
- The Storm Warning System
- Working with Police, other Public Agencies and the Media

II. Equipment—Its Operation and Maintenance

- Plows
- Spreaders, Sprayers and Their Controls
- Loaders
- Emergency Repair and Refueling Stations
- The Importance of Preventive Maintenance

III. Application Procedures

- How Salt Works
- How and when to Salt
- Anti-Icing vs Deicing
- Application Rates
- Special Storm Conditions

- Special Deicing Problems (Bridges, Elevated Curves, Ramps, Intersections)

- When to Re-Apply Salt

IV. Review of Winter Maintenance Policy

- Snow Emergency Routes
- Parking Ordinances
- Procedures for Helping Motorists
- Importance of Personal Public Relations by Maintenance Personnel

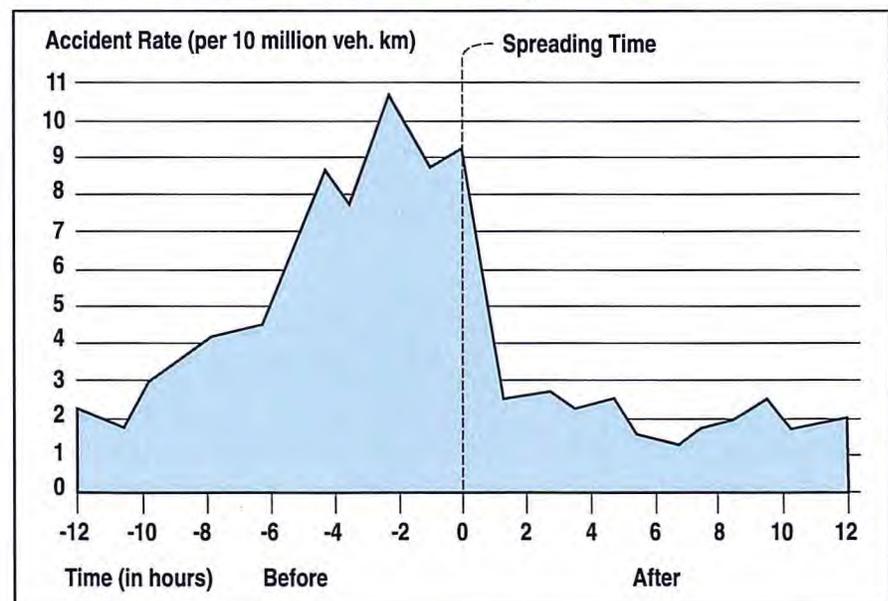
V. On-the-job Safety

- Safety Equipment
- Safety Practices

VI. Discussion, Questions and Answers

To assure yourself that your department is ready for winter, you might have superintendents or foremen complete a checklist showing their progress in pre-winter preparations. *

Accident Rate Before and After Salt Spreading



STORM RECORD



Storm No:	Sec:	Div:	Date:
------------------	-------------	-------------	--------------

1. Time	AM	PM	Day of Week	2. Location	Miles
Storm Started				From:	
Storm Ended				To:	
Road Cleared					

3. Description					
Dry Snow			Temp		Wind
Wet Snow		Max:	Min:	Direction:	Velocity MPH
Sleet		Depth of Snow		Visibility	
Freezing Rain		Avg (in)	Drifts (ft)	Good:	Fair: Poor:

4. Procedures	5. Results					
	No of Apps	Time		Excellent	Good	Poor
Salt		From: To:	Salt			
Plowing		From: To:	Plowing			
Abrasives		From: To:	Abrasives			

6. Labor, Equipment & Materials							
Personnel	Reg Hrs.	O.T. Hrs.	Total	Equip. No.	Type	Hours	Material (TONS)
							Salt
Total							Abrasives

Comments:

Completed by: _____
 Name, Title

Safe and Sustainable Snowfighting *Award* Application

The Salt Institute began promoting safe and sustainable snowfighting in 1972, when it began its Sensible Salting Program. Decades later, SI is still leading the way in advancing effective in snowfighting to ensure winter safety, mobility, and protection of the environment.

Partnering with leaders in winter maintenance, SI has expanded its long-standing “Excellence in Storage Award” to include safe and sustainable operations. In 2012, we presented the Salt Institute’s “Safe and Sustainable Snowfighting Award,” a program that recognizes agencies that demonstrate best practices in salt storage and snowfighting.

Clear winter roads protect lives and commerce. Road salting and effective plowing can reduce injury crashes by up to 88%. And a one-day major snowstorm that shuts down roads can cost a state between \$300 and \$700 million in direct and indirect costs. Snowfighting is often an underappreciated vocation, but at the Salt Institute we recognize snowfighters as heroes who protect lives and enable our winter economy.

To apply for the “Safe and Sustainable Snowfighting Award” the facility manager should complete the application form and checklist (found as an insert to this handbook, on saltinstitute.org, or on safewinterroads.org), have it signed by an immediate supervisor and returned with all supporting documentation to the Salt Institute by May 1. Please answer all questions.

Applications will be judged by our evaluation committee and in some cases a Salt Institute representative will make an on-site facility visit.

Award recipients will receive a “Safe and Sustainable Snowfighting Award” certificate and will be recognized in a Salt Institute press release.

Publications Available *from the* Salt Institute



Refer to saltinstitute.org for further details and other literature

Salt Storage Handbook

A guide for environmentally sensitive handling and storing deicing salt.

ABOUT THE SALT INSTITUTE: The Salt Institute is a North American based non-profit trade association dedicated to advancing the many benefits of salt, particularly to ensure winter roadway safety, quality water and healthy nutrition. See saltinstitute.org or call 703-549-4648.

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S A F E W I N T E R R O A D S . O R G

ENCYCLOPEDIA of CHICAGO

Entries | Historical | Sources | Maps | Special Features | User's Guide

SEARCH

ENTRIES : STREETS AND HIGHWAYS

ENTRIES	
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	Next

Streets and Highways



AERIAL: CIRCLE INTERCHANGE, 1973

Geography was a major factor in the pattern of Indian trails that intersected at the confluence of the **Chicago River** and **Lake Michigan**, and that pattern carried over into the auto age with the **expressway** system.

Indian trails, largely paths that meandered to avoid obstacles, skirted the southern shore of the lake and then radiated in all directions. European settlers arriving after 1830 tried to straighten the trails, but stagecoaches in some cases found it more expedient to use the

beaches along the lake than rutted trails inland.

The first attempts by government to build hard-surfaced roads occurred in the 1840s when Chicago covered some of its streets with planks, and toll plank roads were built in outlying areas. When they quickly deteriorated, Chicago turned to a parquet-like, wood-block paving system that persisted into the twentieth century.



STREET RAISING ON LAKE STREET, 1855

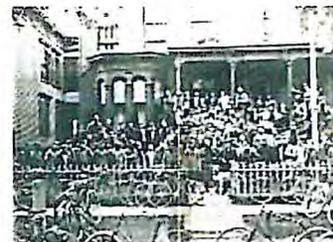


LAKEFRONT AT 59TH STREET, 1920-1929

Dirt roads built and maintained by **townships** were predominant in suburban areas until the 1920s, but Chicago in 1861 created the Board of Public Works, the first agency in Illinois with a professional staff to build roads. A limited-access scenic parkway along the lakeshore was built to connect Chicago with then-suburban **Hyde Park** in 1869-70, and after concrete paving was developed in the twentieth century the parkway became the nucleus of Lake

Shore Drive, the precursor of the expressway system.

Gradually after about 1890 pressure on the state to build hard roads increased as a result of lobbying by recreational **bicyclists**, farmers who needed to move crops to market, and, eventually, motorists. The state's inventory of roads in 1905 counted only 7,864 miles of improved roads in Illinois—1,900 of them in Chicago. The high cost of street **construction** forced the city after 1900 to impose driver and auto license fees to finance them.



LAKE VIEW CYCLING CLUB, 1890S

Systematic planning for public roads in Chicago began in 1910 when the Chicago Plan Commission was created



Exhibit
B

to implement the plan of Daniel Burnham and Edward Bennett, which put heavy emphasis on avenues and thoroughfares. At the time there were fewer



PLAN OF CHICAGO CAMPAIGN
(HIGHWAYS)

than 10,000 automobiles registered in Chicago. The state did not begin a public road program for the suburbs and rural areas until after **World War I** and did not levy a gasoline tax for roads until 1929—by which time auto registrations in Chicago were increasing at a rate of 32,000 vehicles a year. The federal highway program for rural and suburban roads began about the same time.

In 1941, Illinois became one of five states to create a toll highway authority based on the early success of the Pennsylvania Turnpike. **World War II** intervened before anything could be built in Illinois, but during the war various local agencies began planning an expressway (freeway) system.



CONSTRUCTION OF CONGRESS PARKWAY, 1951

Construction on the \$1.1 billion system, which took 18 years to complete, began after the war, with the suburban Edens and Calumet Expressways. They cost about \$1.6 million per mile. In 1949 the city began building the Congress (later Eisenhower) Expressway on the West Side. It cost \$183.5 million, took 11 years to complete, and was unique in that it included a **rapid transit** railway line in the median strip.

The passage by Congress of the Interstate Highway Act in 1956 shifted the bulk of the cost of freeways (90 percent) to the federal government and enabled the city and county to continue their ambitious road building. Until then, the expressways had consumed all available transportation funds, prompting the state to create the Illinois State Toll Highway Commission to build the Tri-State, Northwest, and East-West **toll roads** in the suburbs. The Tri-State was built as a beltway around the city linking interstate highways in Indiana and Wisconsin.



TRI-STATE TOLL PLAZA, 1964

The culmination of the road-building art in Chicago was the Dan Ryan Expressway—a 14-lane road with a two-mile-long bridge over the South Branch of the Chicago River and adjacent **railroad** yards on the **South Side**. It cost \$282.7 million, or \$25.7 million per mile to build.

Public opposition to expressway construction by the 1970s forced the city and state to cancel plans to build a crosstown freeway on the West Side and the state to abandon a proposal for a freeway in the **Fox River** Valley 30 miles west of the Loop in the early 1990s.

By the 1990s, the Chicago metropolitan area had 54,600 miles of streets and roads, including 2,500 miles of expressways, 17,300 miles of highways and arterial streets, and 34,800 miles of local streets. Almost 80 percent of all **commuting** was done by automobile.

David M. Young

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Illinois Facts

General

Capital – Springfield

State abbreviation / Postal code – Ill. / IL

U.S. Senators: 2

U.S. Representatives: 19

Illinois has 21 electoral votes.

The Illinois General Assembly consists of a Senate with 59 members and a House of Representatives with 118 members.

Organized as a territory: Feb. 3, 1809

Entered Union (rank): Dec. 3, 1818 (21)

Present constitution adopted: 1970

The Illinois State Motto: State Sovereignty, National Union

The 2005 estimated population of Illinois is 12,763,371.

Illinois State Song: *Illinois*. The words were written by C.H. Chamberlain. The music was composed by Archibald Johnston.

Illinois is known as the *Prairie State* and the *Land of Lincoln*.

Illinois State Tree – white oak

Illinois State Bird – cardinal

Illinois State Fish – bluegill

Illinois State Animal – white-tailed deer

Illinois State Insect – monarch butterfly

Illinois State Mineral – fluorite

Illinois State Fossil – Tully monster

Illinois State Prairie Grass – big bluestem

Illinois State Reptile – painted turtle

Illinois State Amphibian – eastern tiger salamander

Illinois State Flower – violet

Illinois State Soil – drummer silty clay loam

Illinois State Dance – square dancing

Illinois State Snack – popcorn

Illinois State Fruit – goldrush apple

Exhibit
C

Origin of name: Algonquin for "tribe of superior men."

Number of counties: 102

10 largest cities (2005 est.): Chicago, 2,842,518; Aurora, 168,181; Rockford, 152,916; Naperville, 141,579; Joliet, 136,208; Springfield, 115,668; Peoria, 112,685; Elgin, 98,645; Waukegan, 91,396; Cicero, 82,741

Largest county by population and area: Cook, 5,303,683 (2005); McLean, 1,184 sq mi.

Population density in 2000: 83 people per square kilometer (214 per square mile)

Distribution in 1990: 85% Urban, 15% Rural

Illinois is the fifth most populous state in the country.

2000 resident census population (rank): 12,419,293 (5). Male: 6,080,336 (49.0%); Female: 6,338,957 (51.0%). White: 9,125,471 (73.5%); Black: 1,876,875 (15.1%); American Indian: 31,006 (0.2%); Asian: 423,603 (3.4%); Other race: 722,712 (5.8%); Two or more races: 235,016 (1.9%); Hispanic/Latino: 1,530,262 (12.3%). 2000 percent population 18 and over: 73.9; 65 and over: 12.1; median age: 34.7.

Resident: Illinoisan

Public use areas: 186 (275,000 ac.), including state parks, memorials, forests and conservation areas

Geographic center: In Logan County, 28 miles northeast of Springfield.

Highest point: Charles Mound, 1,235 feet

Lowest point: Mississippi River, 279 feet

Land Area: 57,918 square miles.

Illinois ranks third in the nation in the number of interstate highway miles.

The Sears Tower in Chicago is the tallest building on the North American continent.

Illinois has more units of government than any other state (i.e., city, county, township, etc.), more than six thousand.

The first birth on record in Chicago was of Eulalia Pointe du Sable, daughter of Jean-Baptiste Pointe du Sable and his Potawatomi Indian wife in 1796.

Chicago's Mercy Hospital was the first hospital opened in Illinois.

Chicago's O'Hare International Airport is the busiest airport in the world. A plane takes off or lands there every 23 seconds.

The Chicago Public Library is the world's largest public library with a collection of more than 2 million books.

The Chicago Post Office at 433 West Van Buren is the only postal facility in the world you can drive a car through.

History

Cahokia Mounds State Historic Site in Collinsville is the location of the most sophisticated prehistoric native civilization north of Mexico.

Illinois was explored by Jacques Marquette and Louis Joliet in 1673.

Cahokia is the oldest community in Illinois. It was founded in 1699.

Illinois became the 21st state on December 3, 1818.

Illinois had two capital cities, Kaskaskia, 1809, and Vandalia, 1820, before Springfield became the permanent capital city in 1837.

The first Mormon Temple in Illinois was constructed in Nauvoo in the 1840s.

Before Abraham Lincoln was elected president, he served in the Illinois legislature and practiced law in Springfield. Abraham Lincoln is buried in Springfield at Lincoln Tomb State Historic Site.

Ottawa, Freeport, Jonesboro, Charleston, Galesburg, Quincy and Alton hosted the famous Lincoln-Douglas debates that stirred interest all over the country in the slavery issue, 1858.

Illinois was the first state to ratify the 13th Amendment to the Constitution abolishing slavery, 1865.

Illinois was home to President Ulysses S. Grant, whose home is preserved in Galena.

The Chicago Water Tower and Pumping Station were the only buildings to survive the Great Chicago Fire, 1871.

The world's first skyscraper was built in Chicago, 1885.

The first aquarium opened in Chicago, 1893.

The National Historic Site home of President and Mrs. Abraham Lincoln is in Springfield.

Ronald Wilson Reagan from Tampico became the 40th president of the United States in 1980.

Barack Obama was elected the 44th president of the United States in 2008.

Geography

Water area: 6,022 square kilometers (2,325 square miles)

Illinois measures about 400 miles from its northern border to its southernmost tip. Temperatures generally vary by 10 to 12 degrees from one end of the state to the other. Cold, fairly dry winters and warm, humid summers with ample rainfall allow the land to support many kinds of crops and livestock.

Much of Illinois is comprised of fertile flat loess, left behind by glaciers and wind millions of years ago. About 89 percent of the state's cropland is considered prime farmland, ranking the state third nationally in total prime farmland acreage. Prime farmland is important because it provides an environmentally sound base for crop production. The central three-fourths of the state are especially well suited for growing crops, while hilly areas in the northwest and south provide excellent pasture for livestock.

Illinois is bordered on the west by the Mississippi River. Kaskaskia Island is the only part of Illinois that lies west of the Mississippi River.

Carlyle Lake is the largest man-made lake in Illinois. It covers 26,000 acres.

The Chicago River is known as the river that flows backward because it flowed into Lake Michigan until 1900, when engineers reversed the flow by completing the Chicago Sanitary and Ship Canal. The river now flows from the lake. The flow of the Chicago River was reversed to control the waste waters entering Lake Michigan.

Science

On December 2, 1942, Enrico Fermi and a small band of scientists and engineers demonstrated that a simple construction of graphite bricks and uranium lumps could produce controlled heat. The space chosen for the first nuclear fission reactor was a squash court under the football stadium at the University of Chicago.

According to the latest figures from the National Science Foundation, Illinois ranked sixth in the U.S. with 1,332 Science and Engineering Doctorates awarded in 2005. These graduates are joining the existing 25,320 Doctorial Scientists and Engineers working in the state. US News and World Reports ranked The University of Illinois at Urbana-Champaign fifth nationally for their graduate engineering program, while Northwestern University was ranked at 21 and the University of Chicago also ranked among the top 20 Medical Schools. Illinois is home to hundreds of federal research labs. Argonne National Laboratory is the leading federal laboratory in the state, focusing on advanced materials, chemicals and energy technologies, as well as transportation technology and biotechnology. Illinois' assets also include Fermilab, the National Center for Supercomputing Applications, the USDA National Center for Agricultural Utilization Research, and the National Center for Food Safety. In addition, the state is home to nonprofit research centers including the Gas Technology Institute. A number of research centers also specialize in the emerging field of nanotechnology, including facilities at Argonne, Northwestern University and the University of Illinois' Beckman Institute.

Illinois is known for its wide variety of weather, including major winter storms, deadly tornadoes and spectacular heat and cold waves.

The warmest temperature ever recorded in Illinois is 117°F on July 14, 1954, in East St. Louis.

The coldest temperature ever recorded in Illinois is -36°F on January 5, 1999, in Congerville.

A study using the Illinois Wetlands Inventory found some 918,000 acres of "natural" wetlands (that is, not diked, impounded, or excavated) remained statewide in the 1980s--less than a tenth of their original extent. Remaining natural wetlands cover only about 2.6% of the state's land area. These are concentrated in the northeast (along major rivers such as the Fox, Illinois, Des Plaines, and Kankakee) and in southern Illinois. Of the surviving wetlands, only about 6,000 acres are high in ecological quality and undisturbed.

Illinois has 2,300 acres of high quality prairie remaining, compared to 22 million in 1820.

Illinois has 4.4 million acres of forested land, compared to 13.8 million acres prior to European settlement. Ninety-seven percent of Illinois' forests are classified as hardwoods; three percent of Illinois' forests are classified as conifers.

Illinois ranks 49th among states in percent of land remaining in original vegetation.

About 54,000 species have been identified in Illinois, including about 400 bird species, 200 fish species and 60 mammal species.

Technology

Illinois is a top location for high tech industry. In 2007 Illinois ranked in the top 15 states in the nation for total venture capital investments. Illinois ranks seventh in research and development (R&D) expenditures by universities and colleges, and eighth in industry performed R&D.

Illinois is home more than 1,800 telecommunications establishments that collectively employ about 58,700 workers. Leading telecommunications firms located in the state include Tellabs, Andrew Corporation, Motorola, Shure, and Westell.

The information technology cluster employs 73,000 workers at over 7,200 Illinois establishments.

Illinois' 1,254 electronics establishments employ 36,890 workers.

Illinois has a strong presence in the fields of medical technology, biotechnology and pharmaceuticals.

More than 1,160 establishments manufacture advanced materials in Illinois, employing 64,400 workers.

Over 8,200 establishments comprise the advanced manufacturing cluster in Illinois. This cluster employs nearly 282,800 workers, accounting for 23 percent of high tech employment in the state. Advanced manufacturing firms are technology-intensive and innovative.

The logistics-related service sector employs nearly 209,000 Illinois workers at more than 11,000 establishments.

Nearly 17,300 people are employed at 284 transportation technology establishments, primarily in two major sectors: engine technology and aerospace.

Nearly 8,900 technology support establishments in Illinois employ more than 100,000 workers.

One of Illinois' largest and most established clusters is financial services, making the state a global leader in the securities and brokerage businesses, banking and insurance.

Illinois is a global leader with a strong economy. Per capita Gross State Product (GSP) in Illinois is among the highest in the U.S., and overall GSP is fifth highest in the country. Illinois is also the fifth largest exporting state in the nation. Seventy-five nations maintain consulates in the state and over 30 international banks have established branches or representative offices in Chicago. Illinois ranks first in the Midwest as a destination for foreign investment, as well.

Logistics

Illinois is among the top states in total value of truck shipments with \$858 billion and is ranked number four in value of shipments originating in the state with \$442.1 billion worth of goods shipped.

Illinois has the second largest airport system in the country with 137 airports (83 public and 54 private), 270 heliports and over 840 aviation facilities.

Illinois has 1,118 miles of navigable waterways that provide the state with a direct link between the Atlantic Ocean (through the Great Lakes and St. Lawrence Seaway) and the Gulf of Mexico.

Commerce

Gross State Product - \$528 Billion (2004)

Personal income per Capita - \$32,965 (2003)

The round silo for farm storage of silage was first constructed on a farm in Spring Grove.

The world's largest cookie and cracker factory, where Nabisco made 16 billion Oreo cookies in 1995, is located in Chicago.

Illinois is not only the nation's leading pumpkin producer, but also its leading pumpkin processor. Libby's plants 5,000 acres of Dickinson Select pumpkins each year in and around Morton, Illinois. Morton, where 80 percent of the world's canned pumpkin is packed at the Libby's factory, is known as the "Pumpkin Capital of the World." The town hosts an annual Pumpkin Festival to celebrate the start of the pumpkin canning season.

Illinois is a leading producer of soybeans, corn and hogs. The state's climate and varied soil types enable farmers to grow and raise many other agricultural commodities, including cattle, wheat, oats, sorghum, hay, sheep, poultry, fruits and vegetables. Illinois also produces several specialty crops, such as buckwheat, horseradish, ostriches, fish and Christmas trees.

Illinois' 76,000 farms cover more than 28 million acres -- nearly 80 percent of the state's total land area. The large number of farms, coupled with the diversity of commodities produced, makes it difficult to describe a typical operation. However, statistics provide some indication about what it means to farm in Illinois. The average size of an Illinois farm is 368 acres. Most farm acreage is devoted to grain, mainly corn and soybeans. Nearly 10 percent of Illinois farms have swine. Beef cows are found on about 23 percent of farms, while about three percent have dairy cows. Some farms produce specialty crops and

livestock, including alfalfa, canola, nursery products, emus and fish. Many farming operations also support recreational activities, such as hunting and fishing.

Marketing of Illinois' agricultural commodities generates more than \$9 billion annually. Corn accounts for nearly 40 percent of that total. Marketing of soybeans contributes about one-third, with the combined marketings of livestock, dairy and poultry generating about 23 percent.

Billions of dollars flow into the state's economy from ag-related industries, such as farm machinery manufacturing, agricultural real estate and production and sale of value-added food products. Rural Illinois benefits principally from agricultural production, while agricultural processing and manufacturing strengthen urban economies.

With more than 950 food manufacturing companies, Illinois is well-equipped to turn the state's crops and livestock into food and industrial products. Food processing is the state's number-one manufacturing activity, adding almost \$13.4 billion annually to the value of Illinois' raw agricultural commodities.

Illinois' agricultural commodities also provide the base for such products as animal feed, ink, paint, adhesives, clothing, soap, wax, cosmetics, medicines, furniture, paper and lumber. Each year, 274 million bushels of Illinois corn are used to produce more ethanol than any other state -- about 678 million gallons. Illinois also markets other renewable fuels, including soybean-based biodiesel.

Although Illinois' food and fiber industry employs nearly one million people, there are only 76,000 farm operators, down from 164,000 in 1959. During the same time period, the average farm size more than doubled as sophisticated technology made many aspects of the industry less labor-intensive. Illinois farmers are generally more than 50 years old. About 39 percent hold jobs off the farm and consider farming their secondary occupation. Family farms still dominate, though some of these have incorporated.

Illinois has a competitive edge over many other states due to its central location and superior transportation system. More than 2,000 miles of interstate highways and 34,500 miles of other state highways make trucking of goods fast and efficient. Chicago is home to the largest rail gateway in the nation, connecting the eastern and western United States. The state boasts some 1,100 airports, landing areas and heliports, including Chicago's O'Hare International, through which more than 65 million travelers pass annually. Illinois' 1,118 miles of navigable waterways, including the Illinois and Mississippi rivers, make barge traffic an excellent option for shipment of grain to the Gulf of Mexico.

Illinois ranks second nationally in the export of agricultural commodities with nearly \$4 billion worth of goods shipped to other countries each year. Exports from Illinois account for nearly 7 percent of all U.S. agricultural exports. Illinois is the nation's second leading exporter of both soybeans and feed grains and related products. More than 44 percent of grain produced in Illinois is sold for export. The Illinois Department of Agriculture promotes items produced, processed or packaged in Illinois through international and domestic marketing exhibits, trade missions, industry tours, publications, the Illinois Product Logo program and an electronic database for trade leads. Illinois ranks second in food processing. Most processors are located in the Chicago metropolitan area, which contains one of the largest concentrations of food-related businesses in the world.

In 1997, the value of shipments by manufacturers totaled \$205 billion. Major industrial items that Illinois produced in 1999 included construction machinery, farm equipment, cellular phones, electrical house wares, commercial printing, metal coatings, appliances and containers, various industrial machinery, and cooking products.

By far the leading industrial center is Chicago, followed by Rockford, the East St. Louis area, Rock Island and Moline in the Quad Cities region, and Peoria.

As of 1997, there were 39 Fortune 500 companies headquartered in Illinois (the 3rd most in the nation), including some of the world's "100 best managed companies": Abbott Laboratories, Amaco, BP, Baxter International, Caterpillar, Deere & Co., Illinois Tool Works, Morton International, Motorola, and Sarah Lee.

Earnings of persons employed in Illinois increased from \$247.9 billion in 1997 to \$263.4 billion in 1998, an increase of 6.2%. The largest industries in 1998 were services, 28.6% of earnings; durable goods manufacturing, 12.0%; and finance, insurance, and real estate, 9.9%. Of the industries that accounted for at least 5% of earnings in 1998, the slowest growing from 1997 to 1998 was state and local government (9.8% of earnings in 1998), which increased 4.6%; the fastest was finance, insurance, and real estate, which increased 9.0%.

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Road salt saves lives and protects commerce

Road salt saves lives

Every winter, more than 116,000 Americans are injured and over 1,300 are killed on snowy, slushy or icy pavement. It is no wonder, then, that the sight of salt trucks reassures citizens. Road salt saves lives and protects commerce.

A Marquette University study examined highway accidents in snow. Road salt reduced:

- Crashes by 88%.
- Injuries by 85%.
- Accident costs by 85%.

Battling snow and ice comes with a price tag, of course, but the study's cost-benefit analysis shows it is well worth the investment. Deicing pays for itself a mere 25 minutes after salt is spread.

Road salt protects commerce

When broader economic costs are factored in, deicing makes even more sense. That's because road salt protects local and state economies by preventing costly winter shutdowns of the roadways of commerce.

A study of 16 U.S. states and two Canadian provinces conducted by IHS Global Insight for the American Highway Users Alliance found that:

- Snowstorms cost states as much as \$700 million *per day* in both direct and indirect costs if roads are impassable.
- Snow-related shutdowns harm hourly workers the most.
- The negative economic impact of road closures far exceeds the cost of snow and ice removal.

Sources: The Marquette University study, commissioned by the Salt Institute, examined two-lane and four-lane highways in New York, Illinois, Minnesota and Wisconsin.

The IHS Global Insight study, commissioned by the American Highway Users Alliance, examined the economic impact of snowstorms in Illinois, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Utah, Virginia, Wisconsin, Ontario and Quebec.

Last update: 2/15/12



ABOUT THE SALT INSTITUTE: The Salt Institute is a North American based non-profit trade association dedicated to advancing the many benefits of salt, particularly to ensure winter roadway safety, quality water and healthy nutrition. See www.saltinstitute.org or call 703-549-4648.

Exhibit
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Print Story

Printed from ChicagoBusiness.com

Road salt in July? Illinois towns scrambling now for winter supplies

July 28, 2014

(AP) — Nearly 200 Illinois communities are scrambling to find road salt after last winter's record frigid temperatures and snowfall depleted supplies, according to local leaders and state officials who oversee a shared procurement process.

If local public works departments are able to find vendors willing to sell them road salt, the price likely will be much higher — possibly double what they paid last year.

Earlier this month, the Illinois Department of Central Management Services informed many city and county officials in charge buying road salt that no vendors responded to their requests for bids.

More than 560 communities participated in the solicitation for road salt bids, said department spokesman Mike Claffey. Of those, 367 communities received bids from salt vendors and 195 did not. The department offered to seek new bids from vendors, while cautioning public works departments to explore other alternatives.

Demand appears to be driving up prices, state officials said. Municipalities that did get bids from vendors are looking at prices ranging from \$70 to more than \$140 per ton. Last year, the going rate was \$55 to \$65 per ton.

The shortage of salt has some local officials worried about hoarding. In Winnebago County, village of Roscoe President David Krienke told WIFR-TV in Rockford he hopes "everybody purchases the salt they need" and don't "get greedy."

Others are looking for ways to stretch salt supplies. Lee County Engineer Dave Anderson told the (Dixon) Telegraph the county will mix salt with limestone chips.

"The limestone chips will extend the life of the salt and it will add grit on the roads," Anderson said. "It will provide additional traction in the slippery road conditions."

The joint procurement process is a service the state provides to communities that choose to participate.

"We see it as part of our mission to help local governments procure road salt and other supplies, so that they can benefit from the economies of scale that come from buying in bulk," Claffey said.

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Local

Road Salt Will Be Scarce, Expensive This Winter

September 29, 2014 3:23 PM

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DETROIT (AP) — The reward for surviving last winter's frigid temperatures and record snowfall, several states are learning is drastic price increases for road salt — in some cases, five times as expensive as last season.

And that's even if they can get it.

Replenishing stockpiles is proving challenging, especially for some Midwestern states, after salt supplies were depleted to tame icy roads last winter. Price increases of at least 20 percent have been common in several cities, including Boston and Raleigh, North Carolina.

"Everybody is kind of scrambling around right now, contacting anybody they know who may have some salt available," said Fred Pausch, chief of the County Engineers Association of Ohio.

Some local governments are avoiding the problem thanks to multi-year contracts or secured bids. Chicago, for example, used roughly three times more salt last winter — 436,000 tons — than it did in 2012-2013, but the city has locked-in rates based on a contract negotiated a few years ago.

Other states aren't so lucky.

In Ohio, where more than 1 million tons of salt was used on state roads last year — a nearly 60 percent increase over the average — last year's average price was \$35 per ton. This year, 15 counties received bids of more than \$100 per ton, and 10 counties received no bids from suppliers.

Most of Ohio's 88 counties have locked in prices between \$50 and \$80 per ton. To ease the pain for other counties, the state recently secured about 170,000 tons of additional salt.

"The demand for salt is simply outpacing the supply that is available," said Steve Faulkner, spokesman for the Ohio Department of Transportation.

In Michigan, like Ohio, local governments are allowed to join a network for bidding purposes, and the state seeks competitive bids each year from four vendors. But even those efforts couldn't prevent a spike: Michigan has seen prices jump by 46 percent, to \$65 per ton.

On a recent weekday outside Detroit, a massive dump truck backed into a domed building and dropped about 50 tons of road salt onto a growing mound at a facility operated by the Washtenaw

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County Road Commission. The agency is paying \$76 a ton for its pre-season fill-up compared to about \$34 last year, a 120 percent jump.

Part of the problem is that salt mines are being challenged by numerous local governments "trying to replenish their supply at the same time," said Lori Roman, president of the Salt Institute, a trade group based in suburban Washington, D.C.

"It's just a situation where you can't necessarily get all the salt mined and get it where it needs to go as fast as it's demanded," she said, noting that the group doesn't collect information related to prices or production issues.

For road officials, that translates into having to conserve and be creative. In many places, brine is added to salt to boost its effectiveness. Officials also are buying trucks that can, among other things, spread salt in the morning and clean streets later in the day.

North Carolina's capital city, which was left with about 10 percent of its 4,000-ton salt capacity after Raleigh was hit by more storms than usual last winter, recently signed a three-year contract for salt costing about \$110 per ton annually. That's a 25 percent increase, according to city officials. And in Indiana, road salt bids have increased by an average of 57 percent, ranging from nearly \$73 to \$106 per ton.

Boston, however, is among those breathing a sigh of relief.

Mike Dennehy, the city's interim public works commissioner — dubbed Boston's "snow czar" — said Boston bought about 80 percent of its early-season stockpile at last season's cheaper prices of \$45 and \$49 a ton. The city will be charged the coming season's prices, which are about 20 percent higher, for the rest of its supply.

In Ohio, road officials are keeping their fingers crossed.

"We just had the worst winter in Ohio," Faulkner said. "We're preparing for that, but we hope it's like the one we had two winters ago, which was one of the mildest."

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Someone in the home at 601 Rose Dr. called 911 at 6 a.m. to report a medical emergency. When firefighters and paramedics arrived, they found nine people — children and adults — suffering from carbon monoxide poisoning.

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A federal appeals court has thrown out some of the convictions against former Gov. Rod Blagojevich, and tossed out his 14-year prison sentence.

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A pedestrian spotted the body in the water around 6:35 a.m. near 800 North Lake Shore Drive, between Ohio Street Beach and Oak Street Beach, according to police.

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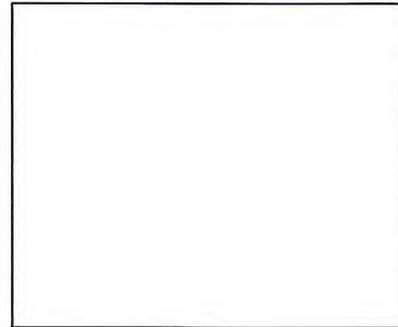
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IN THE APPELLATE COURT OF ILLINOIS
FOR THE FIRST DISTRICT

SALT INSTITUTE,)	
)	
Petitioner,)	Petition for Administrative Review
)	of Rulemaking and Order Issued by
v.)	the Illinois Pollution Control Board
)	R08-9 (Sub-docket D)
ILLINOIS POLLUTION CONTROL)	
BOARD,)	
)	Docket No. _____
)	
Respondent.)	

NOTICE OF FILING

TO: See Proof of Service

You are hereby notified that on July 23, 2015 the Salt Institute filed with the Clerk of the Appellate Court for the First District a Petition for Review and Affidavit in the above entitled action.

True and correct copies of the same are attached hereto and served upon you.

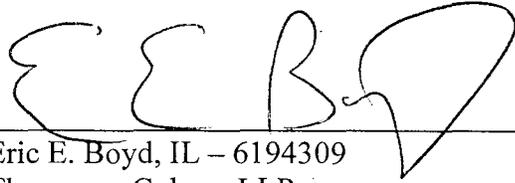
PROOF OF SERVICE

I, the undersigned attorney, state that I have served the Petition for Review, Affidavit and all attachments by mailing a copy of the same by first-class mail, postage prepaid from Chicago, Illinois, this 23rd day of July, 2015, to:

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James R. Thompson Center, Suite 11-500
100 West Randolph Street
Chicago, IL 60601

Illinois Pollution Control Board
1021 North Grand Avenue East
P.O. Box 19274
Springfield, Illinois

Board Chairman Deanna Glosser
Illinois Pollution Control Board
James R. Thompson Center, Suite 11-500
100 West Randolph Street
Chicago, IL 60601

A handwritten signature in black ink, appearing to read 'E E B D', written over a horizontal line.

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