

CREATING AND SUSTAINING INCREASED DEMAND FOR ROAD SALT

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Winston Churchill once declared: "It has been said that democracy is the worst form of government except all the others that have been tried."¹ So is it with salt used for winter roadway maintenance. Our "loyal customers" would rather use another product – if a suitable alternative was available. Salt creates problems for the road and the roadway environment. More than \$2 billion in U.S. roadway user fees are expended each year paying the direct costs of snowfighting (labor, equipment and manpower) beyond the expenditures for the road salt itself. Billions more are required to deal with environmental damage from snow and ice damage.² Yet the benefits derived are so enormous that salt is acknowledged as the best product for this essential task.³ A major research report published by the Transportation Research Board (TRB) in 2007 confirmed salt's superiority for use above 12°F (-11°C).⁴

For three of the past four years, road salt sales in the U.S. have exceeded 20 million tons as American transportation agencies and contractors rely on sodium chloride to keep winter roads safe and reliably available for highway users.⁵ A quarter century ago, only half that much salt was used. Understanding how the market grew over the past 25 years can help the salt industry's efforts to create and sustain future growth.

A quarter century ago, a different philosophy motivated the federal highway program in the U.S. The focus was on building more lane-miles, specifically, completing the 46,000-mile (74,000 km) Interstate System. Today, the philosophy focuses on system performance, on operating the highway infrastructure to realize the benefits of this enormous investment.

The shift explains why road salt sales have increased sharply and helps us in the salt industry prepare for continued future growth.

Instructively, the industry's ability to capitalize on this policy reorientation was established about 40 years ago, when the Salt Institute created its Sensible Salting Program which has been the cornerstone philosophy

¹ Winston S. Churchill. House of Commons speech, Nov. 11, 1947

² NCHRP Synthesis 344: *Winter Highway Operations*. Transportation Research Board. 2005

(http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_syn_344.pdf)

³ TRB Special Report 235. *Highway Deicing: Comparing Salt and Calcium Magnesium Acetate*. Transportation Research Board. 1991. (<http://onlinepubs.trb.org/Onlinepubs/sr/sr235.html>)

⁴ NCHRP Report 577: *Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts*. Transportation Research Board. 2007.

(http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_577.pdf)

⁵ <http://www.saltinstitute.org/Production-industry/Facts-figures/US-production-sales>

⁶ Ibid.

⁷ *The Snowfighters Handbook*. Salt Institute (<http://www.saltinstitute.org/content/download/484/2996>)

since before the first Earth Day. It embodies the two basic principles guiding the program and has positioned the industry well for sustainable growth in road salt sales:

1. Focus on the customer
2. Take a long-term perspective and act with integrity

Salt industry vision

Focus on the customer

Thinking strategically, we need to understand that highway agencies are not our ultimate customer. We owe our allegiance to our real customers, who many would describe as our customers' customers. We need to focus our efforts on satisfying the needs of the driving public, not road maintenance agencies.

For our direct road agency customers, we provide not only salt, but policy leadership in helping them satisfy the public's demands for quality winter maintenance service outcomes that protect the environment. We address their needs through our advocacy of Sensible Salting. We train our customers how to use the least amount of salt to reach the service levels required to meet the public's demand for road safety, economic productivity and environmental protection. We promote their professionalism both by encouraging them to envision their key role in keeping roads safe and available and to promote their professional role to their elected managers and the general public.

Our true customers – their customers, the users of the roadways they operate – want safety and convenience. They want year-round jobs in their communities, jobs that require employers to get workers to factories and offices, shoppers to retail stores and goods delivered on reliable schedules. They want service. And they demand high levels of service, tempered only by sympathy with hard-working snowfighters who are laboring heroically on their behalf. If they have a complaint, it is usually not with the plow operator, but the manager who fails to deliver the quality of service they know is possible. And how do drivers and homeowners know what service levels are possible? The Salt Institute tells them!

Our advocacy on behalf of road salt hardly mentions salt. Our true customers want results. They want the roads cleared. Thoroughly. Quickly. Cost-effectively. And with a sensitivity to reducing corrosion of their cars, browning roadside vegetation, contaminating drinking water wells or poisoning the fish in their streams and rivers. The salt industry wants those same results. The Salt Institute's program is a win-win strategy to deliver winter safety and mobility while protecting the environment. If salt is

the choice of professional snowfighters, our win is all the greater.

Years ago, the public was satisfied with post-winter summary reports on snowfighting inputs like the size of the winter maintenance budget or outputs like number of lane-miles plowed or tons of salt used. Now they want outcomes measures – and as close to real time as they can get them. Delivering road surface conditions and travel time advisories to drivers in their cars is their vision. Our vision is to help them realize theirs.

Take a long-term perspective and act with integrity

Every culture has fads, fashions taken up with great enthusiasm but lasting only a brief time. In 1975, Americans were caught in a craze for "pet rocks." You can probably buy one on eBay today. My point is that rock salt, road salt, is not a "pet rock." Our success in serving and expanding the road salt market has been just the opposite of a fad. While Americans were coddling their pet rocks, the salt industry embarked on a strategy explicitly rejecting the idea that using salt on winter roads was a popular fad to be exploited quickly before popular taste jumps to the next fashion.

Salt is literally as "old as the hills" and salt suppliers have done well to recognize the long-term nature of the road salt marketplace. High quality academic studies are as close as we are likely to get to the "truth" about road salt. As former Yale University president Charles Seymour sagely put it: "We seek the truth and will endure the consequences." If the truth is advantageous, that is, if road salt is the least expensive, most cost-justified, easiest to use treatment for winter roads, we rejoice. If the truth means salt rusts out cars, shorts out electrical transmission lines and discharges pulses of concentrated chlorides into waterways, adopting an ostrich reaction will only deny the industry legitimacy to advocate for balancing costs and benefits and embracing win-win solutions to reduce those costs. We must embrace truth. In fact, we can be proud that we have done so.

For 40-plus years, the Salt Institute has proclaimed the virtues of applying only the minimum amount of salt required to achieve safe and passable roads. When our customers have erred in application rates, it is usually in applying too much. We taught them to use less. We could have sold more salt – at least in the short term. But we would have forfeited the long-term opportunity to build a larger and sustainable

⁸http://en.wikipedia.org/wiki/Charles_Seymour

market for road salt as we became part of the solution, not just the source of the problem.

Salt industry action

The Salt Institute has pursued many interrelated initiatives to improve roadway safety and mobility to meet our ultimate customers' needs. Though these initiatives all have cross-benefits, they can be understood to represent five major themes:

- Accepting responsibility that salt can cause environmental damage
- Promoting proper salt management to mitigate adverse impacts
- Promoting a "salt proof" environment
- Promoting respect for snowfighting as a profession
- Promoting improved overall highway operations

Accepting responsibility

The keystone of the salt industry's constructive engagement on road salt issues has been to accept the fact that sodium chloride can cause significant damage to infrastructure and the environment. While sometimes accused unfairly, salt undeniably facilitates corrosion, contributes to rendering drinking water unpalatable, contributes sodium of possible concern to patients whose physicians have put them on low-salt diets and can reach concentrations toxic to flora and fauna. No amount of denial can change facts. But denial of the facts would deny the industry a place at the table where concerned citizens hammer out solutions. Accepting responsibility is the price of a seat at that table.

That is not to say that promoting sound scientific understanding of these environmental impacts more fully is either inconsistent with accepting responsibility or leading mitigation efforts. In fact, they are complementary. If problems are misunderstood and exaggerated, solutions based on that misinformation are more costly and less necessary. For example, research currently being co-funded by the U.S. Environmental Protection Agency, the State of Iowa Department of Natural Resources, the Salt Institute and others is finding through further testing that higher allowable concentrations of chloride in streams, rivers and lakes afford organisms equivalent environmental protection.

⁹ Richard L. Hanneman, Environmental impact of chlorides, presentation to Environment Canada, April 15, 2009. (<http://www.saltinstitute.org/content/download/8802/47778>)

Promoting proper salt management to mitigate adverse impacts

Accepting responsibility for the environmental threat from road salt must move the salt industry beyond simple acknowledgement and apology. It must precipitate action. And our strategy is to promote improved salt management, by ourselves and those who store and apply road salt. The salt industry cannot simply play word games and posture; it must be an earnest partner in solving the problems society creates in using our product. We must meet the expectations of civil and environmental engineers, but, equally important, convince the public of the environmental acceptability of using road salt. To the extent that salt damage mitigation fails, the foundation of the market for road salt is undermined and cannot achieve sustainability.

Advancing the science of salt management is important if best management practices are to improve the state of the art. The Salt Institute has pioneered the development of salt management techniques and technologies. Salt companies have invested internally trying to develop treatments for salt that reduce its undesirable corrosivity. Their research opens market opportunities.

The Salt Institute, as their agent, joins with groups like the Transportation Research Board¹⁰ and the Transportation Association of Canada¹¹ to fashion a research agenda to address the problems identified by our direct customers and our ultimate customers, the driving public. The same motivation prompted our enlisting in the multi-stakeholders Road Salts Working Group formed by Environment Canada¹² to develop evidence-based salt management guidelines and promote their implementation. The transportation and environmental agencies leading these efforts seek our involvement because of the expertise and commitment to a shared goal of reducing the environmental insult of our product.

The most recent example has been our joint funding, with Environment Ontario, of a half-million dollar research program by the

¹⁰ Transportation Research Board Committee AHD-65-Winter Maintenance (<http://sites.google.com/site/trbcommitteeahd65/Home/discussions-threads/ahd65-wintermaintenance>)

¹¹ <http://www.tac-atc.ca/english/councilsandcommittees/chiefengineers/maintenance.cfm>

¹² <http://www.ec.gc.ca/nopp/roadsalt/en/wg.cfm>

University of Waterloo¹³ to update earlier environmental studies that found salt had created environmental problems. While we felt that assessment report used outdated data and flawed analysis, the way forward was not name-calling, but further research. For an organization our size, a couple hundred thousand dollars is a major commitment.

Our enlistment on behalf of improving the way our customers were impacting the environment with our product, however, is not new. Before the first Earth Day, the Salt Institute had already developed the strategic concept that has guided its road salt issues management strategy ever since: Sensible Salting.

Strategic positioning, however, was only the beginning. The Salt Institute took the lead in promoting adoption of its philosophy. Since the beginning, training supervisors and operators has been the key implementation strategy. Trainers taught simple tasks like calibrating spreaders so the amount being applied can be measured and managed. They urged replacement of manually-controlled salt spreaders with ground-speed controllers that adjust the rate of discharge according to the speed of the vehicle. Recognizing that groundwater contamination was commonplace where storage practices ignored the commonsense placement of the salt under cover and on a pad, proper salt storage has been a key concern from the beginning.

As time rolled on and customer experiences suggested refinements to basic messaging, Sensible Salting embraced new technologies. One of my first tasks as president of the Salt Institute in 1987 was to represent the industry on the highway operations advisory committee of the 5-year, \$150 million Strategic Highway Research Program (SHRP),¹⁴ organized under the National Academy of Sciences. SHRP produced the several paradigm-changing developments of the past 20 years: preventive anti-icing,¹⁵

the use of road weather information systems delivering customized micro-forecasts of pavement surface conditions and the several upgraded management systems to integrate road weather with preventive winter maintenance.¹⁶ The current product of this effort is the Maintenance Decision Support System (MDSS)¹⁷ which is currently being deployed as a best management system. Other noteworthy developments receiving early and strong Salt Institute support have included performance metrics¹⁸ including use of devices to measure the coefficient of friction on roadway surfaces¹⁹ as a management tool and accountability indicator.

But tools and systems don't manage snow and ice. People and equipment do. Salt users must use the new skills and technologies before salt management can be improved. This requires training.

The Institute first produced The Snowfighters Handbook in 1967. The 40th year anniversary edition is its fifth iteration.²⁰ Over time, we've produced other materials including The Snowfighters video,²¹ our now quarterly Salt and Highway Deicing newsletter²² and most recently our Salt

¹³ <http://www.environment.uwaterloo.ca/research/roadsalt/program.html>

¹⁴ A good quick summary is Michael Halliday, "The Strategic Highway Research Program: An Investment That Has Paid Off." *Public Roads*. March/April 1998. (<http://www.tfhr.gov/pubrds/marapr98/shrp.htm>)

¹⁵ Russell G. Alger, et al. *SHRP H-683: Anti-icing study: Controlled chemical treatments*. National Academy of Sciences, (<http://onlinepubs.trb.org/Onlinepubs/shrp/SHRP-H-683.pdf>)

¹⁶ A good quick summary is Tom Kuennen. "High-Tech Helps Tame Road-Weather Woes," *Better Roads*. September 2006 (<http://onlinepubs.trb.org/Onlinepubs/shrp/SHRP-H-683.pdf>)

¹⁷ http://www.ral.ucar.edu/projects/rdwx_mdss/

¹⁸ "Performance metrics will impact snowfighting: a perspective." *Salt and Highway Deicing* newsletter. Salt Institute, Summer 2007 (<http://www.saltinstitute.org/content/download/327/1818>)

¹⁹ Pat Halliday, "Real-time continuous friction measurement has arrived." *Salt and Highway Deicing* newsletter. Salt Institute. Spring 2005 (<http://www.saltinstitute.org/content/download/318/1782>)

²⁰ Op. cit. footnote #7.

²¹ Snowfighters video. <http://www.saltinstitute.org/Education-Center/Snowfighters-training/Snowfighting-training>

²² *Salt and Highway Deicing* newsletter (<http://www.saltinstitute.org/Articles-references/References-on-salt-use/SI-references-on-salt-use/SI-references-on-road-salt>)

Sensibility blog for highway issues.²³ These materials, most of them free, are distributed online and many in hard copy as well.

We have not confined our efforts to producing our own training materials. Read the Salt Management Guide²⁴ produced by the Transportation Association of Canada (TAC) or the training outline for SaltSmart, TAC's snowfighter training program,²⁵ and you'll understand the intellectual foundation is the Salt Institute's Sensible Salting Program. Examine the training materials of the American Public Works Association (APWA)²⁶ or the American Association of State Highway and Transportation Officials (AASHTO)²⁷ and you'll see the common heritage. That could never have happened if the industry hadn't embraced the strategy of authentically promoting the minimum use of salt as a core principle.

And the effect is additive and cumulative. A motivating cause of TAC's development of its Salt Management Guide and more detailed Road Salt Syntheses of Best Practices²⁸ was Environment Canada's pursuit of an environmental assessment that might have resulted in a ban on the use of chloride salts. The good faith efforts by TAC and the good quality of its products persuaded Environment Canada to embrace and reference the Syntheses in its 2004 Road Salt Code of Practice.²⁹ Sensible Salting has been reincarnated, but its soul is unchanged.

Sensible Salting presaged the consensus for salt management: use the minimum amount necessary, applied at the right place at the right time. Consensus of researchers and policy experts is necessary to advance best salt management practices. But it is not enough. Technology transfer and training

are key elements to effect change.

For the first 25 years of Sensible Salting, Salt Institute staff and member company personnel gathered each year in a Sensible Salting School to teach "Sensible Salting Representatives" the "latest and greatest" developments in snowfighting techniques and technologies. These Sensible Salting Representatives conducted more than 100 Sensible Salting Seminars every year, training thousands of supervisors and operators to put down only enough salt to get the job done. These efforts erased the mindset that "if 300 pounds per lane mile (84.5 kg/km) is good, 600 pounds per lane mile (169 kg/km) must be better."

Beginning in 1988, the Salt Institute augmented its Sensible Salting program by adding an Excellence in Storage Award program.³⁰ Most road salt contamination was occurring at customer storage depots. Often salt was simply unloaded outside and left exposed to the elements until used. We taught how simple steps like always storing salt on an asphalt pad and always covering outside piles or putting salt in a storage building could almost entirely eliminate the problems. We reasoned that while inexpensive customer storage reduced the volatility of demand, the offsetting environmental (and operational) costs outweighed our logistics concerns. To stimulate demand for proper storage, the Salt Institute established a program to recognize agencies that employ "excellent" storage practices (e.g. they embrace the Institute's Salt Storage Guidelines³¹). Last year, more than 100 agencies were recognized for their storage excellence.³² One agency has maintained its status every year for the full 22 years of the program.

Public communications bolsters the Salt Institute's educational mission. For years, the Salt Institute has published a newsletter for its customers.³³ In the years before use of the Internet was common, we produced two newsletters a year for about 8,000 customers. We now produce the newsletter quarterly in electronic format while still printing hard copies of two issues a year. The newsletter is a primary conduit for our policy advocacy and valued by customers for its relevance to their operations. As mentioned, all our training materials are also

²³[http://www.saltinstitute.org/News-events-media/Salt-Sensibility/\(tag\)/highway](http://www.saltinstitute.org/News-events-media/Salt-Sensibility/(tag)/highway)

²⁴<https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=18&subcatid=29&prodid=50>

²⁵ SaltSMART consists of a *Learning Guide* (<http://www.tac-atc.ca/english/seminars/learningguide.cfm>) and Train-the-Trainer programs (<http://www.tac-atc.ca/english/seminars/trainthetrainer.cfm>).

²⁶<http://www.apwa.net/About/TechSvcs/Transportation/Winter-Maint/?mode=links>

²⁷https://bookstore.transportation.org/Item_details.aspx?id=1019

²⁸<http://www.tac-atc.ca/english/resourcecentre/readingroom/roadsalt.cfm>

²⁹http://www.ec.gc.ca/nopp/roadsalt/cop/en/rs_main.htm

³⁰<http://www.saltinstitute.org/Education-Center/Snowfighters-training/Salt-storage/Excellence-in-Storage-award>

³¹<http://www.saltinstitute.org/content/download/478/2972>

³² Op. cit. footnote #30.

³³ Op. cit. footnote #22.

part of the educational offerings³⁴ in our communications program.

In 2005, we launched our Web 2.0 program with our Salt Sensibility blog³⁵ which included from the outset a channel for subscribers to subscribe to RSS feeds limited to highway issues³⁶ or read the broader agenda of news and commentary. We also actively monitor – and promote – a hugely active listserv now including more than 800 snow and ice professionals who exchange concerns and experiences in snowfighting.³⁷

In recent years, we have recognized a “blind spot” in our Sensible Salting promotional efforts. All of our materials are geared for roadway maintenance; none for private contractors who clear parking lots at office buildings, factories and shopping malls. Snowfighting, however, is holistic. If crews plow and salt public roads, but parking lots are inaccessible, the system fails. We plan to expand our offerings with instructions on application recommendations expressed in square feet rather than lane-miles. We hope to be integrating our efforts with the Snow and Ice Management Association (SIMA),³⁸ which represents contractors throughout North America.

After the message was agreed and the messengers prepared, the next step was to conduct the training. Guidelines and publications, even training materials, can only inform if their intended target is committed to learning and improving. For years, our Sensible Salting Seminars actively pursued classroom instruction for more than a thousand snowfighters each year. Our efforts did not reach many more thousands more. And the cost-effectiveness was limited. We regularly provided a full week’s training to the Ohio Department of Transportation, an agency that could, and probably would, have provided training using its own resources. For years, we sought some way to leverage our training support to reach more snowfighters. We entered into partnership with groups in the U.S. and Canada whose mission was upgrading the professionalism of the winter operations function.

In the U.S., the Federal Highway Administration of the federal government

³⁴<http://www.saltinstitute.org/Education-Center/Snowfighters-training>

³⁵<http://www.saltinstitute.org/News-events-media/Salt-Sensibility>

³⁶ Op cit. footnote #23.

³⁷<http://leadstates.transportation.org/rwis/listserv/>

³⁸ <http://www.sima.org/>

provides financial support for 57 Local Technology Assistance Programs (LTAPs), at least one in each state.³⁹ Those programs are engaged in technology transfer and training for all transportation functions ranging from operating back-hoes, to laying pavement to operating snow plows and salt spreaders. These LTAP centers have created their own association, the National LTAP Association (NLTAPA),⁴⁰ and the Salt Institute has partnered with the NLTAPA winter maintenance committee to produce a series of trainer-friendly PowerPoint programs, customizable by the trainer.⁴¹ The most recent product is a non-linear PowerPoint program that marries the functions of PowerPoint with Web-like links to provide a powerful new tool for classroom instruction by LTAP trainers. We were instrumental in having NLTAPA create a snowfighter training listserv and we host on our website the trainer handout materials identified as valuable by NLTAPA trainers.⁴²

Other organizations representing roadway agencies share a mission to improve their members’ snowfighting prowess. In the U.S. and Canada, the American Public Works Association well understands this imperative. We have enjoyed a strong relationship with the APWA winter maintenance subcommittee⁴³ which organizes training programs for its members and, itself, is a partner with NLTAPA to engage snowfighting training services for APWA members. APWA organizes the North American Snow Conference⁴⁴ each year, dedicated to training snowfighters.

The North American Snow Conference has spawned regional and state snow expos which now include the Western Snow & Ice Conference⁴⁵ and the Eastern Snow Conference⁴⁶ (begun with a seed grant from the Salt Institute). AASHTO now operates the Eastern Snow Conference as part of its extensive commitment to training. AASHTO has developed, with Salt Institute

³⁹ <http://www.ltapt2.org/>

⁴⁰ <http://www.ltap.org/>

⁴¹ <http://www.saltinstitute.org/Education-Center/Snowfighters-training/Snowfighting-training-g>

⁴² <http://www.saltinstitute.org/Education-Center/Snowfighters-training/Snowfighting-training-g/WINOPS>

⁴³ <http://www.apwa.net/About/TechSvcs/Transportation/Winter-Maint/>

⁴⁴ <http://www.apwa.net/events/eventdetail.asp?ID=5176>

⁴⁵ <http://www.westernsnowandice.com/>

⁴⁶ http://downloads.transportation.org/2009sciop_agenda.pdf

input, a series of computer-based training modules.⁴⁷ The Pacific Northwest Snowfighters (PNS)⁴⁸ has developed material specifications and conducts training at its annual meeting.

In Canada, we have worked with both the Transportation Association of Canada (TAC) and the Ontario Good Roads Association (OGRA)⁴⁹ as they each developed snowfighter training materials which also strongly resembled the Salt Institute's Sensible Salting materials.⁵⁰ We provided some seed money to get their programs off the ground and editorial assistance in honing the messages. Later, OGRA launched a Snow School, a three-day program for intensive training which we also helped get established. And when OGRA wanted to provide its members with a model salt management plan, we provided ours as a template.⁵¹

Improving environmental salt management is an industry priority as well, so Salt Institute efforts extend beyond customer education to upgrading industry practices. The Salt Institute has led the way in developing industry bulk salt stockpile management practices. We have training materials for our members.⁵² And we encourage active company self-auditing to ensure compliance. Although there has never been a recorded problem with hexacyanoferrate⁵³ (yellow prussiate of soda or YPS) since it is a highly stable compound, popular concern about the potential toxicity of the cyanide ion has been among the reasons the salt industry has quietly reduced the amount of this anti-caking

agent in road salts. Our improved salt handling techniques and better storage practices by our members have reduced the concentration of YPS used to keep road salt free flowing by about half.

Promoting a "salt-proof" environment

The obvious fact is that the engineered roadway right-of-way is not pristine wilderness. The roadway environment is a man-made environmental creation designed to facilitate the transportation of people and goods. That does not mean we should short-change the roadway environment – only that we need to remember that its "natural" state is determined as much by highway engineers and their bulldozers and pavers as by Mother Nature. Part of this engineered "natural" condition is the planned use of deicing agents to keep the road functioning in winter months.

While improving salt management practices can reduce the amounts of salt entering the engineered roadway environment, an essential adjunct strategy is to "salt-proof" highway rights-of-way. For years, the Salt Institute has promoted selection of salt-tolerant species of grass, shrubs and trees planted near roadways.⁵⁴ We have worked with highway planners to engineer drainage systems to protect salt vulnerable areas. And our current research project with the University of Guelph aims to develop an innovative way to intercept high-concentration chloride roadway runoff and discharge it later, when chloride levels subside. The Salt Institute serves on the TRB corrosion committee.⁵⁵ We have encouraged bridge engineers to use materials and construction techniques, including use of epoxy-coated reinforcing steel and corrosion-halting cathodic protection systems, to extend bridges' useful lives. We have encouraged American politicians who love to cut ribbons to open new roads, particularly in campaign season, to build roads to higher (European) standards which not only reduce required repair and reconstruction expenses and traffic disruption, but which better resist use of winter maintenance chemicals. Our current research projects with the University of Waterloo raises hopes of developing a plant species for use in roadway rights-of-way that will even extract chlorides from the soil and volatilize them.⁵⁶

We have encouraged "salt-proofing" vehicles as well. Vehicle corrosion is the most

⁴⁷ There are two separate programs. The original Anti-icing/RWIS training (<http://www.apwa.net/bookstore/detail.asp?P C=PB.X407>) and the Clear Roads series on equipment maintenance, plowing, deicing, blowing snow and policy management (<http://www.apwa.net/bookstore/detail.asp?P C=SPR.CLROADSCBT>).

⁴⁸ <http://www.wsdot.wa.gov/partners/pns/default.htm>

⁴⁹ <http://www.ogra.org/home.asp>

⁵⁰ <http://www.ogra.org/lib/db2file.asp?fileid=24002>

⁵¹ http://www.ogra.org/content_details.asp?itemcode=OGRA-MEMSERVICES-MANAGEMENT&itemid=5879

⁵²

<http://www.saltinstitute.org/Education-Center/Salt-industry-guidelines/Stockpile-management-guidelines>

⁵³ <http://www.saltinstitute.org/content/download/470/2932/file/Use%20of%20anticaking%20agents%20in%20road%20salt.pdf>

⁵⁴ <http://www.saltinstitute.org/content/download/480/2980>

⁵⁵ http://www.trb.org/directory/comm_detail.asp?c=AHD45

⁵⁶ Op. cit. footnote #13

visible problem with using road salt, consumers say. And they used to be right! In 1976, the National Association of Corrosion Engineers (now NACE International) found that six-year old American cars almost universally suffered corrosion damage (96%). By 1996, new car-building techniques and materials, combined with extensive automotive use of plastics to reduce weight for fuel efficiency, had changed the situation completely. Model year 1990 cars, NACE International discovered in its tests, after six years' operation in "salty" roadway environments had virtually no corrosion damage (< 1%).⁵⁷ Many carmakers have 10 year warranties for corrosion damage.

Promoting respect for snowfighting as a profession

Two essential elements characterize snowfighting operations: first, they are weather emergencies and, second, they come in a dizzying array of varieties, much like snowflakes: no two completely alike. An effective winter operations program requires year-round professional management and often-heroic, certainly extended hours of deployment by committed operators. The Salt Institute not only recognizes these attributes of successful snowfighting, our strategy builds agency professionalism, helping snowfighting teams secure the resources they need to perform. This is why we promote their professionalism to the public and responsible elected officials.

Surprisingly, many roadway operations agencies, themselves, have needed reminders of the vital nature of the service they provide. In developing tools to help the public understand just how valuable and cost-effective their snowfighting operations are, we learned that operators and even managers sometimes had a low appreciation of their role in saving lives and preserving jobs in their communities. So we hope our efforts also inculcate a pride and professional self-confidence among snowfighters.

To document the benefits provided by using road salt in winter operations, we commissioned quality studies of two basic questions: two related studies by Marquette University into the safety benefits attributable

to salt application^{58,59} and two studies by econometric modelers at what is now Global Insight, Inc. projecting the economic costs that occur when snowfighting efforts fail and winter storms paralyze mobility, shutting stores and factories.⁶⁰

Underscoring the commonality of issues facing the global salt industry in local markets, when the Salt Institute determined the need to provide solid documentation of the magnitude of benefit achieved by using salt for winter maintenance, we asked researchers at Marquette University to replicate the excellent work done at Germany's Darmstadt University.⁶¹ The results were impressive: in the four hours after salt was applied, traffic crashes plummeted 85% and injury crashes even more sharply, 88.3%. The Salt Institute promoted the results, of course, but member company Akzo Nobel Salt took it a step further making television advertisements with a "Salt Saves Lives" tag that were aired on the Weather Channel each time snow was forecast.

In the winter of 1996-97, storms ravaged New England and newspapers turned to Standard and Poor's DRI to estimate the multi-billion losses. The Salt Institute engaged S&P/DRI to use its model to analyze just four variables and to perform the calculations for a dozen major U.S. snowbelt states and the two largest Canadian provinces. Again, the results were impressive. Savings achieved by effective snowfighting that eliminated winter storm immobility for a single day routinely exceeded the total annual cost of snowfighting. The estimate was demonstrably conservative, including only lost blue collar wages, retail sales and foregone tax revenues for federal, state/provincial and local governments. Agencies like the Iowa Department of

⁵⁸ David A. Kuemmel and Rashad M. Hanbali, *Accident Analysis of Ice Control Operations*. 1992.

(<http://www.trc.marquette.edu/publications/IceControl/ice-control-1992.pdf>)

⁵⁹ <http://www.saltinstitute.org/content/download/565/3324/file/Marquette%20Two%20PDF.pdf>

⁶⁰ <http://www.saltinstitute.org/Uses-benefits/Winter-road-safety/Benefits-of-road-salt/Mobility>

⁶¹ Horst Hanke and Christoph Levin, "Influence of Winter Road Maintenance on Traffic Safety and Transport Efficiency," Study by Darmstadt Technical University in German, Research Report, Darmstadt, Germany. 1988.

⁵⁷ "Evaluation of Corrosion Protection on Recent Model Vehicles." NACE International, Paper 741. *Proceedings of the CORROSION/98 Research Topical Symposia*, 1998. (<http://www.normas.com/NACE/pages/37403.html>)

Transportation use these statistics in their quest for budget support for their snowfighting activities. The first study was so popular, the Salt Institute commissioned the group, now-renamed Global Insight, Inc. to conduct a second study of the same states and provinces five years later – with consistent results.

We further extended our assistance to public works agencies in their efforts to secure sufficient budget when we produced a PowerPoint “training” package for use by customer agencies entitled “A Survival Guide for elected public officials.”⁶² I often ask during my snowfighting presentations whether the audience is familiar with the name Michael Bilandic. Bilandic was mayor of Chicago, briefly; he was retired by voters at the first opportunity after he bungled a winter storm response.⁶³ These messages of political risk resonate with elected officials – and are appreciated by our public works agency customers for the leverage they provide in their efforts to showcase the importance of their work.

Finding allies is often the key to securing required resources for any undertaking. The Salt Institute has discovered three: highway user organizations (e.g. American Highway Users Alliance⁶⁴), the auto insurance industry and safety organizations (e.g. Roadway Safety Foundation,⁶⁵ National Safety Council (U.S.)⁶⁶ and Canada Safety Council⁶⁷). The provincial monopolist Insurance Corporation of British Columbia (ICBC)⁶⁸ has invested millions to upgrade snowfighting practices in its province and encouraged budget support from the province, cities and counties. We struggle to keep the issue prioritized by our allies and to spread to American insurance companies the ICBC example.

Our public communications stress that snowfighting is a higher-tech activity than most people expect. Explaining the potential benefits of new technologies and snowfighting techniques serves a dual purpose: it reiterates that snowfighters are professionals deserving of support and operating discretion to use best practices and it educates policymakers and the general

public of how these new technologies and techniques (e.g. anti-icing) make possible higher levels of service, fewer accidents, etc. so that expectations continue to rise. This public benefit obviously assists the sustainability of road salt use. Likewise, we use every opportunity to point out how the North American economy has shifted to “just in time” (JIT) manufacturing and distribution and how JIT requires reliably available roadways. Finally, we’ve used our safety and mobility research, combined with explanations of new anti-icing practices that require lower equipment costs for agencies, to promote the concept of “Sunbelt snowfighting” in cities like Atlanta and Dallas where snow and ice storms hit infrequently but always with devastating consequences for their relatively less prepared agencies.

Promoting improved overall highway operations

Snowfighting is often the biggest piece of the budget of a snowbelt state/provincial transportation department or public works agency. But it is part of a larger picture: the highway infrastructure and its key role in national economic performance and citizens’ quality of life. Thus, the Salt Institute is part of the “highway lobby” in Washington, seeking resources for more and better roads. While many coalition partners are interested in funding capital expenses like building roads, bridges, guardrails and signage, our focus is on highway operations.

We’ve made significant progress in this regard: changing the argument from “how many lane-miles of road do we have and how many vehicle-miles demand is being placed on our roadway system?” to “how can we operate our highways at peak efficiency so that we know whether and when we need to build more roads?” The difference is fundamental.

The U.S. turned away from the old “paving over America” culture with adoption of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).⁶⁹ Full credit goes to Sen. Daniel Patrick Moynihan (D-NY) for his intellectual vision and forceful leadership. For our part, we have lobbied as much with our coalition partners as with lawmakers. We have argued that the “operations” emphasis is “the moral high ground,” representing the public interest. Much as we argue for “health outcomes” in the dietary salt debate, we explain that the public really does not want roads per se; what they want is roadway service. The current U.S. federal transportation statute expires this year and I served on the policymaking board of the American Road and Transportation Builders

⁶² <http://www.saltinstitute.org/content/download/4281/23343>

⁶³ http://en.wikipedia.org/wiki/Michael_Anthony_Bilandic

⁶⁴ <http://www.highways.org/>

⁶⁵ <http://www.roadwaysafety.org/default.htm>
⁶⁶ http://network.nsc.org/index.php/highway_traffic_safety/

⁶⁷ <http://www.safety-council.org/>

⁶⁸ http://www.icbc.com/road_safety/

⁶⁹ <http://ntl.bts.gov/DOCS/ste.html>

Association (ARTBA) which has always been in the forefront of the old-style highway lobbying position. This year, its policy paper⁷⁰ couches its argument for higher highway funding in terms of its necessity to eliminate congestion and related air pollution – real progress.

ISTEA set in motion another wave of change that is still building to a crest: “intelligent transportation systems (ITS).” I serve on the board of directors of the American Highway Users Alliance (AHUA). ISTEA provided funding for AHUA to create a new organization to promote ITS. When that group was up-and-running, AHUA spun it off as a separate group, ITS America.⁷¹ But the advent of ITS extends much further than automating traffic flow and installing heads-up displays in vehicles. It is grounded in the concept of sharing information, real time information, between vehicles on the road and roadway operations centers. “What gets measured gets managed” is a theme popularized by management guru Dr. Peter Drucker.⁷² ITS requires performance measures. Planners have always sought data, but the data were historical. ITS requires real-time data. The U.S. federal government has embraced “operations” and “performance management” with remarkable commendable enthusiasm. The Federal Highway Administration has created a multi-stakeholder National Transportation Operations Coalition (NTOC).⁷³ The Salt Institute is an active member and has recruited AHUA to join as well.

This backdrop of priority and commitment to performance management well serves our efforts to sustain a healthy future market for road salt. In winter maintenance, “performance” means achieving policy-established levels of service. It can be measured by time to recover dry pavement, in terms of pavement coefficient of friction, by measuring and comparing travel times, etc. A key element in meeting public demand for roadway “performance” is the concept of reliability. Road users value not only speedy and safe journeys, but journeys of predictable duration.⁷⁴ Uncertainties weigh heavily on

trucking companies as well as commuters who must get their cargo or themselves to their destination at a predictable time. Developing these measures and putting in place the technology to capture, transmit and analyze these data real-time is the challenge. Real progress is being achieved. Drivers within the next decade will be able to judge with real-time, objective and quantitative data whether the snowfighting efforts on the roads they are driving have achieved the desired safety and mobility goals. My view is that this will lead the driving public to “move the goal posts” and demand more ambitious service goals.

Two specific challenges for snowfighting accompany the unfolding of overall technological progress in highway operations and the swift movement of transportation agencies to embrace performance measures: first, at present, snowfighting plans are not yet integrated with safety planning efforts, leading to, second, snowfighting operations are not integrated with new agency traffic control command centers where all the data will be funneled in and operations decisions undertaken. Left unaddressed, snowfighting efforts uncoordinated with safety operations misses a vital opportunity. The performance management wave will soon crest and carry all before it, including snowfighting, but the salt industry would be well advised to lend its efforts to solidify the close integration of those concerned with highway safety and those delivering vital snowfighting services.

Sustaining road salt markets

The salt industry faces daunting challenges in many areas as it moves forward in the public policy arena to ensure our citizens and society the fullest possible enjoyment of the myriad benefits of salt. In the area of road salt, however, the challenge before the salt industry is to sustain our forward momentum. We can do this by practicing the principles we’ve long understood and strongly advocated. We must remain customer focused. We must keep the public apprised of exciting new technologies and techniques. We must build an aggressive constituency for real-time roadway performance reporting to the public. We can do all this if we also remain science based, integrity-filled and focused on the long-term. That long-term will be a strong and sustainable demand for road salt.

Supported by the Salt Institute

⁷⁰<http://www.artba.org/advocacy/government-affairs/policy-statements/highways/>

⁷¹ <http://www.itsa.org/>

⁷²http://philosophersnotes.com/quotes/by_tea cher/Peter%20Drucker

⁷³ <http://www.ntoctalks.com/>

⁷⁴ Scott Johnson and Joanne Sedor.

“Reliability: critical to freight transportation; Moving commerce efficiently on the nation's highways is vital to the economy, and FHWA is doing its part to help make that happen.” *Public Roads*, Nov-Dec, 2004.

(http://findarticles.com/p/articles/mi_m3724/is_3_68/ai_n11832892/?tag=content;col1).