The price of fighting roadway ice

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Road salt prices are skyrocketing. Cities in the Lower 48 that spray salt on highways to melt away the ice each winter are scrambling. Alaska is too. But first a few cold facts.

There are lots of reasons why it's a bad idea to spray salt on local roadways, state and city officials say. Sodium chloride (standard rock salt) corrodes the metal on cars and trucks. It kills roadside vegetation. It pollutes salmon streams. It attracts salt-deprived moose onto highways.

And it doesn't really work that great either - at least not in Alaska. Sodium chloride melts ice effectively when temperatures are in the 20s by lowering the freezing point of water. But when the thermometer drops into the low teens, all bets are off.

Below 15 degrees, as winter days in Anchorage often are, meltwater mixed with rock salt begins to refreeze into a compound that road crews here call "chemical ice," which enamels itself to asphalt.

"It's even more difficult to get off the road than regular ice," says Jack Fullerton, chief of maintenance and operations for the central region of the state Department of Transportation and Public Facilities. "So we don't use salt products to de-ice the roads. They aren't effective."

However, the state uses sodium chloride to de-ice its sand, which it then sprays on the highways and major arterials it is responsible for in town.

And municipal crews mix smaller amounts of less abrasive forms of salt into the sand they spread on the town's residential and secondary streets.

So the sudden shortages and spiraling costs of road salt that are bedeviling northern cities Outside aren't going unnoticed in Alaska. The price the state pays for sodium chloride - which it uses to keep its outdoor sand piles from freezing solid - has doubled in recent years. Now it's a million-dollar problem.

"If you went over to the Anchorage district maintenance yard and you looked at that great big huge sand pile there, somewhere around 8 to 10 percent of that pile is salt," Fullerton says.

State road operations in Anchorage require about 40,000 tons of sand a year, Fullerton says. To that his crews mix in about 4,000 tons of sodium chloride. This year the salt bill was $439,000.

But that was just for Anchorage. The state uses about 16,000 tons of salt to prep its winter road-sand supply for the entire central region, an area that includes the Mat-Su Borough, the Kenai Peninsula, Kodiak, the Aleutians and southwest Alaska.

Two years ago, at $90 a ton, that much winter salt cost the state $1.3 million. This year it cost $2.4 million. Fullerton expects it will cost even more next spring.
Pity, he says.

All that expense could be eliminated - along with all of the environmental impacts of the salt leaching into streams and storm drains - if the state simply stored its sand inside a heated building. As the Municipality of Anchorage now does.

WARM SAND

When March rolls around, city road czar Alan Czajkowski (officially director of the Anchorage Department of Maintenance and Operations) finds time to visit his boyhood home in the Lake Erie country of upstate New York, where towns still coat streets in salt to melt away the ice.

"They'll put straight 100 percent salt out there if they feel like they're getting an ice storm, and the roads are just white with it," Czajkowski says.

It was never quite that bad in Anchorage, according to longtime road workers here. But until recently, city crews - like state crews - salted the municipal sand pile to keep it malleable enough through winter. Even though they only mixed in about one part sodium chloride to 20 parts sand, the salt still proved to be abrasive.

"The corrosion to our equipment was horrendous," Czajkowski says. "I know what it does to a car back East - it just eats the fenders right off of it. It does the same thing to our equipment."

It did, that is, until last year. That's when the city finally completed construction of a voter-approved $1.2 million sand barn - a heated structure 180 feet long and 40 feet high off International Airport Road - that can shelter about 10,000 tons of sand.

With no more need to warm its outdoor sand with salt, the city now gets to pocket the $35,000 a year it used to spend on sodium chloride (before the prices went up). Still, the new procedure isn't entirely saltless.

Municipal road crew general foreman Paul Van Landingham describes how it works: A city sand-truck driver parks his rig in front of the new barn, walks in, climbs aboard a front-end loader, scoops up a bucket of warm, dry sand, drives outside and positions the bucket under the car-wash-like nozzles of an apparatus that squirts the sand with a small quantity of magnesium chloride. Then he dumps it into his sanding truck.

Magnesium chloride is a form of salt that's less corrosive than sodium chloride and capable of melting ice at temperatures near zero. By using it to "pre-wet" the sand, Van Landingham said, the grains are more prone to stick to the ice when they hit the road.

"We've found that it isn't washing out as much to the sides," he said. "We've actually been able to reduce the amount of sand we put out."

While the city and state are both responsible for roughly the same amount of roadway in Anchorage - about 1,200 "lane miles" each - the city spreads far less sand, since the traffic it addresses travels at slower speeds.

In the downtown business district, city crews don't spread any sand at all. Instead, they spray the intersections there with potassium acetate, a briny liquid that's even less corrosive than magnesium chloride and remains effective well below zero.

Potassium acetate works as an anti-icing agent, preventing ice from ever forming (as opposed to
melting ice after it's formed). Czajkowski says that's what allows city crews to forgo sanding downtown streets, where street parking is dense, where constant sanding and sweeping would cause problems.

"It's just cost-effective for us not to sand there whenever we can use the chemicals," he said. "Plus the other reason it works fairly well Downtown is because we haul the snow from the business district."

ICY HIGHWAYS

The state uses potassium acetate, too - on a few hundred feet of the Glenn Highway at the notorious Knik River bridge, where moisture from the river below often promotes dangerous icing conditions above.

Automatic nozzles on the side of the bridge now spray the anti-icing chemical on the road at specific intervals during winter. It does its job and may even save lives, says Fullerton, the state DOT central region chief. But potassium acetate is also a fairly expensive form of salt, especially now with prices rising.

The state was paying about $24,000 for a 7,500-gallon winter's supply of potassium acetate for the bridge, but this year the cost was over $50,000, Fullerton says.

Elsewhere in the region, state crews battle icy highways the old-fashioned way: They scrape the roads as well as they can with snow plows, then throw on the sand.

But there simply isn't enough sand - or money - to do that everywhere, according to Tom Grman, the state DOT superintendent for the Anchorage district. He often receives calls from commuters who wonder why all of the Glenn Highway isn't sanded.

"They expect to see sand from end to end on it," Grman said. "If we had that philosophy, we couldn't even buy enough sand."

Instead, his crews in Anchorage aim their sand at the four most troublesome areas for icy road conditions: hills, curves, stops (where sliding tires and the exhaust from idling engines polish the snow) and turns, including "suicides," those middle turn lanes open to cars driving in both directions.

Where road crews spray sand you'll also find salt. That's an annual expense the state could avoid, Fullerton said, if the Legislature would approve his department's perennial request to build a state sand storage barn in Anchorage.

Grman agrees. "If we had indoor storage," he said, "I wouldn't be spending $400,000 a year on salt."