




Anti-icing is a proactive approach to winter maintenance. This section will explain many of the basic anti-icing concepts.



Anti-icing: applying a liquid de-icer before the storm or frost

- Proactive
- Speeds up road recovery time
- Less salt needed
- Reduces environmental impacts
- Saves \$

Photo: Portin Consulting

Anti-icing is the application of a liquid de-icer prior to a storm or frost event. Reducing the bonding of the ice/snow with the pavement. Some organizations have tried anti-icing with granular or pre-wet salt and it works if it is applied immediately before the storm but the losses (salt leaving the road) are greater than applying a straight liquid.



Our goal is to get melting between ice and pavement. It is much faster and more efficient to do this by applying the deicer at this interface. Historically we have melted from the top down, is in much less efficient at getting the melting at the interface.

We do not intend to melt everything on the road, it isn't necessary.



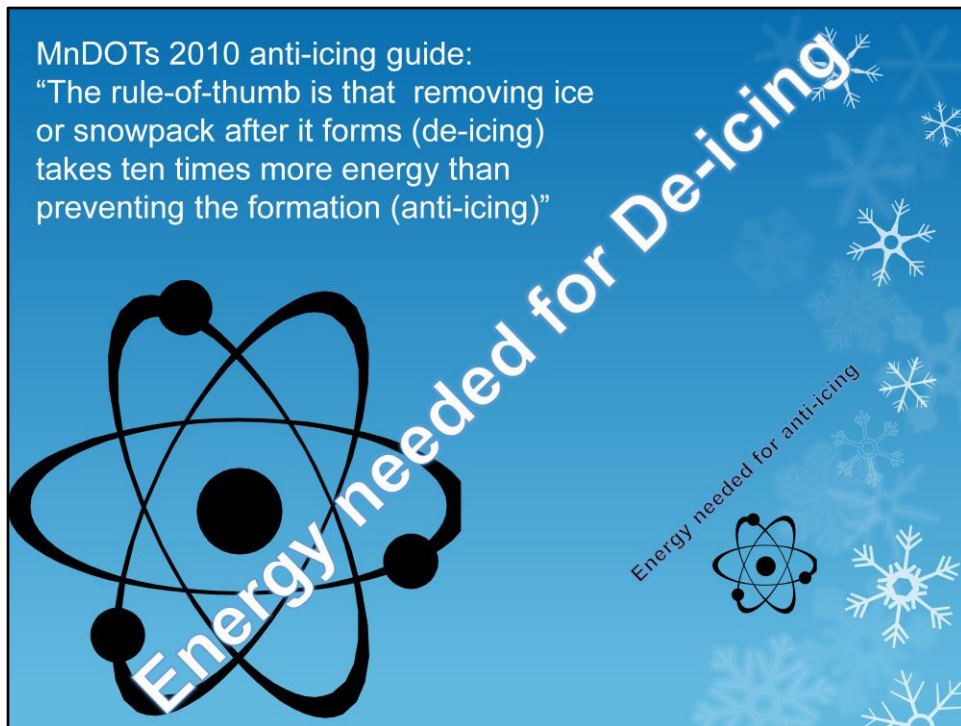
With a weak bond the snow and ice can be physically removed.

Ever fried eggs? Then you can anti-ice!



By adding grease to the pan before frying eggs we can prevent them from sticking to the pan. Thus easy removal.

By anti-icing the road before the storm we can prevent the snow from bonding to the pavement. Thus easy removal



Quote from Mn/DOT Anti-icing Guide 9/13/2010. Page 3



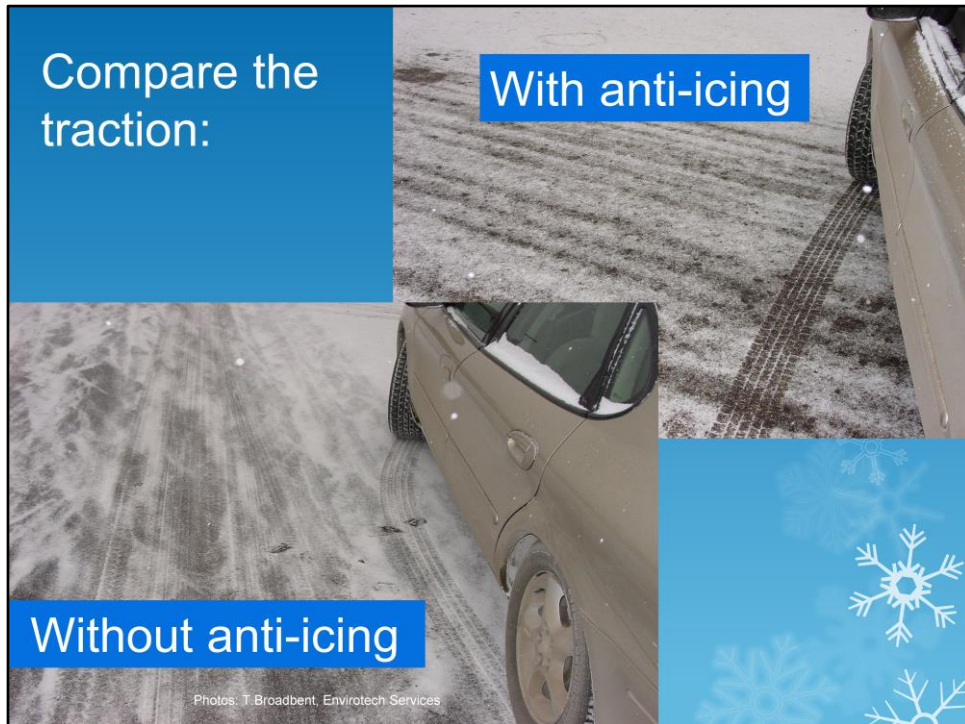
City of Mankato maintenance yard. Anti-icing applied hours before this photo was taken
Dry



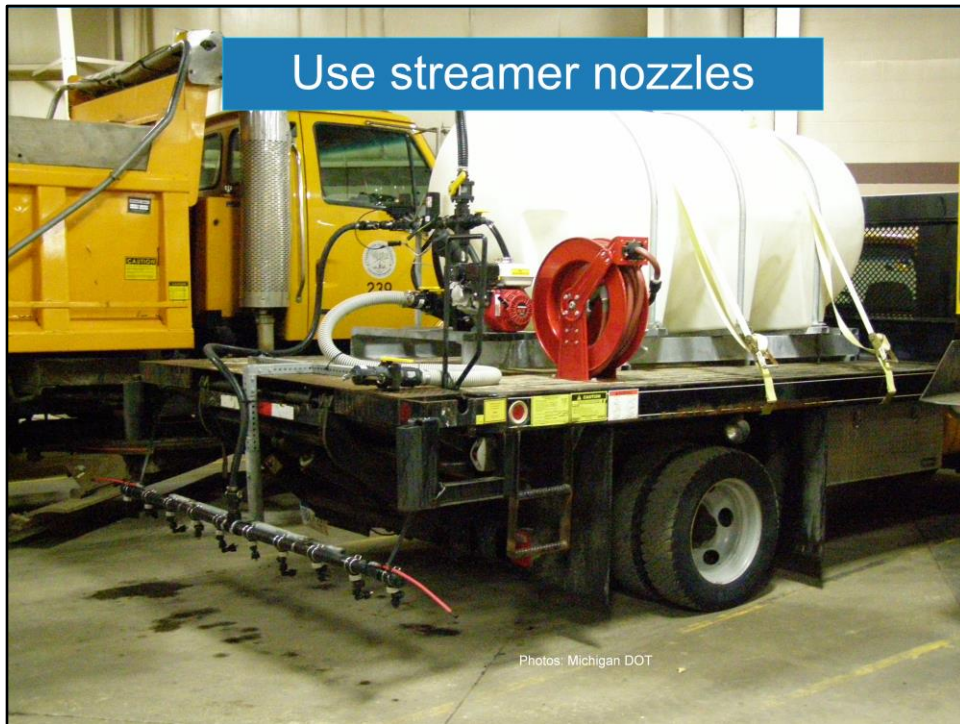
Same LCS Treatment. Pavement temperature have risen to 15 degrees F.
Light snow is falling



LCS Treatment at 15 degrees F pavement temps

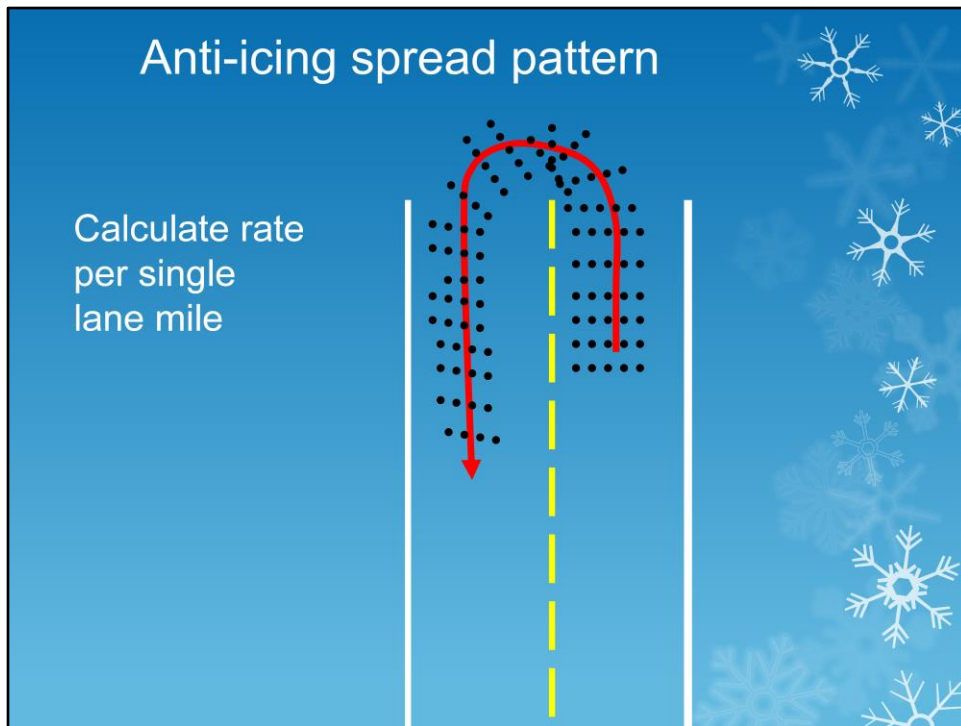


Note the difference between the anti-icing photo and the typical city street photo. Same day, same storm, same time.

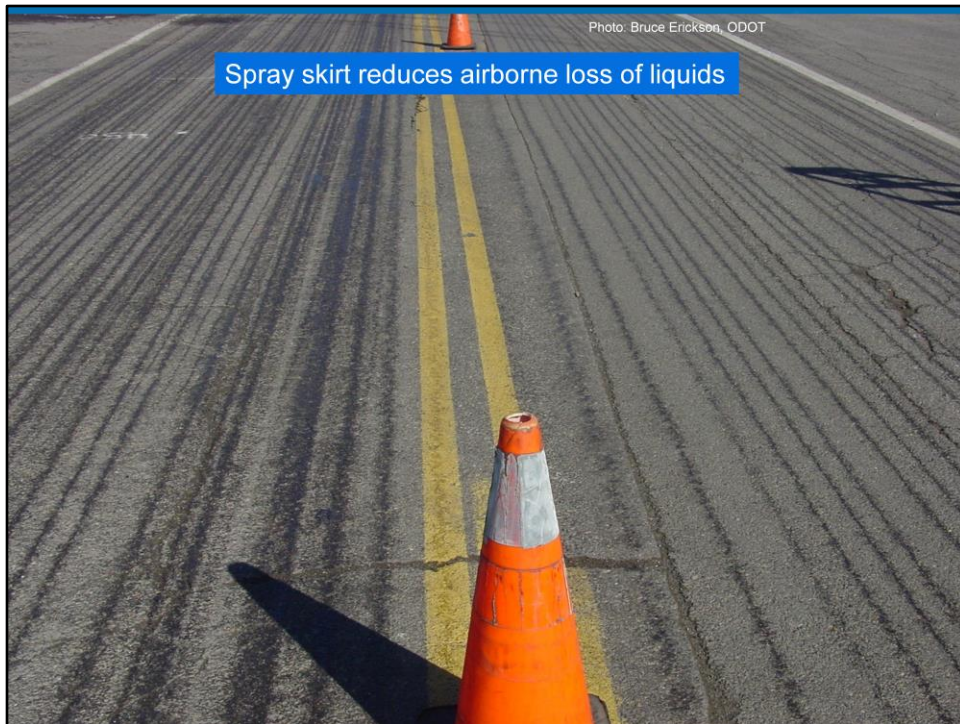


Streamer nozzles give us a wet/dry pattern. This is ideal for anti-icing. We do not want to get the entire road “wet”.

Check nozzles to make sure they are all working. If any are plugged we may be delivering more than the desired amount of liquid from other nozzles.



When applying liquids we apply to the drive lane. This is a different spread pattern than applying dry materials. Therefore the application charts are different. Point out the application rate charts for anti-icing are 1 lane width, 1 mile long.



ODOT OSU De-icer Project Report.pdf

30% more liquid on road by putting spray skirt 18 inches behind nozzles.
Oregon state university study.



Photo: Michigan DOT



Photo: Oregon DOT



Photo: Fortin Consulting

Examples

Oregon DOT says: "You can expect approx. 30% improved coverage using a spray skirt approx. 18" behind the spray bar. The skirt captures the vapor and allows it to drip down onto the ground VS mist off onto the shoulder/vehicles following etc. Several different types of nozzles were tested but the only AH HA moment was the improvement using the spray skirt."

The top 2 photos are DOT trucks that apply liquids at higher speeds.

The bottom photo is an anti icing truck from a small MN city (City of Waconia). They have found that the anti-icing skirts improve the spread pattern even at slow speed applications.



Both public and private winter maintenance professionals agree that anti-icing is a proactive step in winter maintenance



You can rig up something
from the shop

- Anti-icing setup:
- 1 ton flatbed truck
- 125 gal tank
- ½ hp pump
- 8' spray bar
- Cost:
- Tank ~\$ 150.00
- Pump ~\$70.00
- Plumbing > \$100.00
- Total setup <\$400.00



Photos: City of St. Anthony Village, MN

Don't let a big start up cost keep you from experimenting with anti-icing. This small city used material from their shop plus a few extras to rig up their first anti-icing unit.



Don't be stopped by the fact that you have to invest a lot of money to get started. You can start out small, home owners are also anti-icing.

Remember products are not labeled with the ingredients, you may have to look online or give them a call to find out what the ingredients are.

<div>11</div> <div>Anti-icing Application Rates</div>			
Condition	Gallons per lane mile		
	CaCl ₂ or MgCl ₂	Brine	Brine Blends
Regularly scheduled application	15-25	20-40	Ask manufacturer
Prior to frost or black ice	15-25	20-40	Ask manufacturer
Prior to light or moderate snow	15-25	20-50	Ask manufacturer

Page 11 of the manual has the anti-icing application rate chart.

How many gallons of brine to prevent frost?
My route is 5 miles long, one way

Condition	Gallons per lane mile		
	CaCl ₂ or MgCl ₂	Brine	Brine Blends
Regularly scheduled application	15-25	20-40	Ask manufacturer
Prior to frost or black ice	15-25	20-40	Ask manufacturer
Prior to light or moderate snow	15-25	20-50	Ask manufacturer

Page 11 of the manual has the anti-icing application rate chart

Try an example with the class so they are used to looking at the chart and they know how to use it.

20-40 * 5 miles out = 100 – 200 gallons
 20-40 * 5 miles back = 100 - 200 gallons
Total 200 - 400 gallons

Condition	Gallons per lane mile		
	CaCl ₂ or MgCl ₂	Brine	Brine Blends
Regularly scheduled application	15-25	20-40	Ask manufacturer
Prior to frost or black ice	15-25	20-40	Ask manufacturer
Prior to light or moderate snow	15-25	20-50	Ask manufacturer

Point out once again that the application rates are based on a single lane mile not a double lane mile. This causes some confusion because the de-icing chart is for a 2 lane mile.

Regularly scheduled applications ?

MONDAY

WEDNESDAY

FRIDAY

You can do this but:

- Too much can load up the pavements and cause problems
- If you can still see the stripes you don't need more

Better to watch the weather and apply in advance of events

Routine anti-icing is not the most efficient way to anti-ice. It is better to monitor the weather and anti-ice when winter weather or frost is predicted.

If you are determined to anti-ice on a regular schedule, monitor pavements and do not re-apply if prior treatment is still in place.

Not sure how much to use? Use less!

- Don't want to make dry road slippery
- Leave dry stripes as a safety net
- Hygroscopic products use lower rates than brine
- Don't use hygroscopic liquids on warm or humid days. Can get greasy
- Don't apply salt brine on super cold days. May ice on road.

Photo: Fortin Consulting

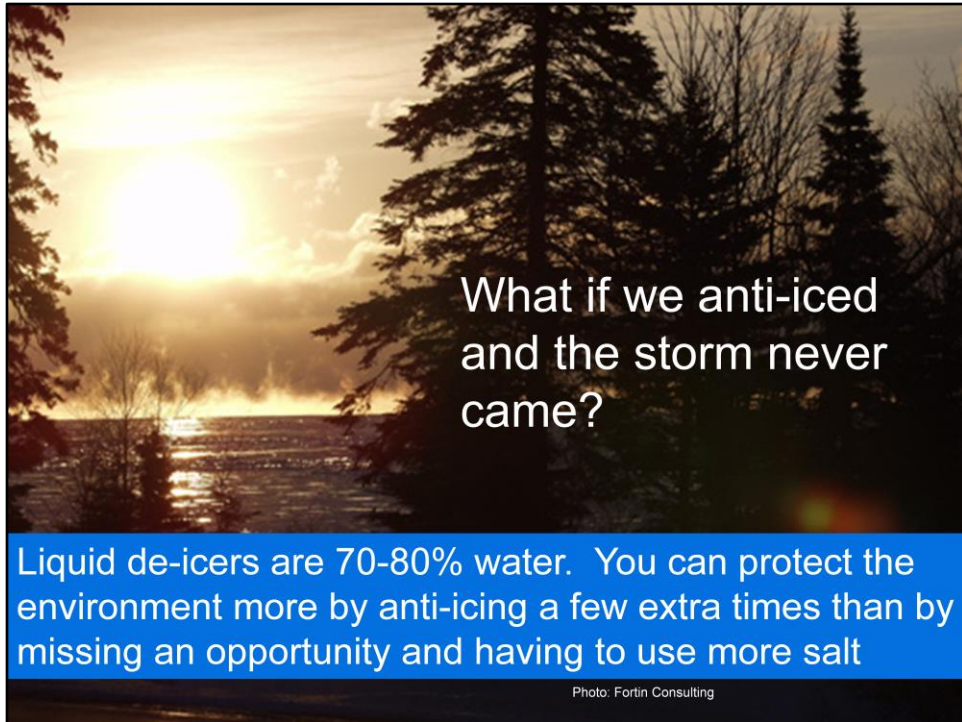
Anti-icing isn't for every situation. Here are a few things to consider. There are many other considerations that may be unique to your operations. The anti-icing flow chart in the appendix of the manual is one organizations way of making smart choices. You can also set up a flow chart for your organization that helps you make good anti-icing decisions.

Track your anti-icing activities

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Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (1 day):				
Observation (After event):				
Observation (Before next application):				
Name:				

Page 34 of the manual, has a form you can use to record your anti-icing efforts. This is in appendix B.



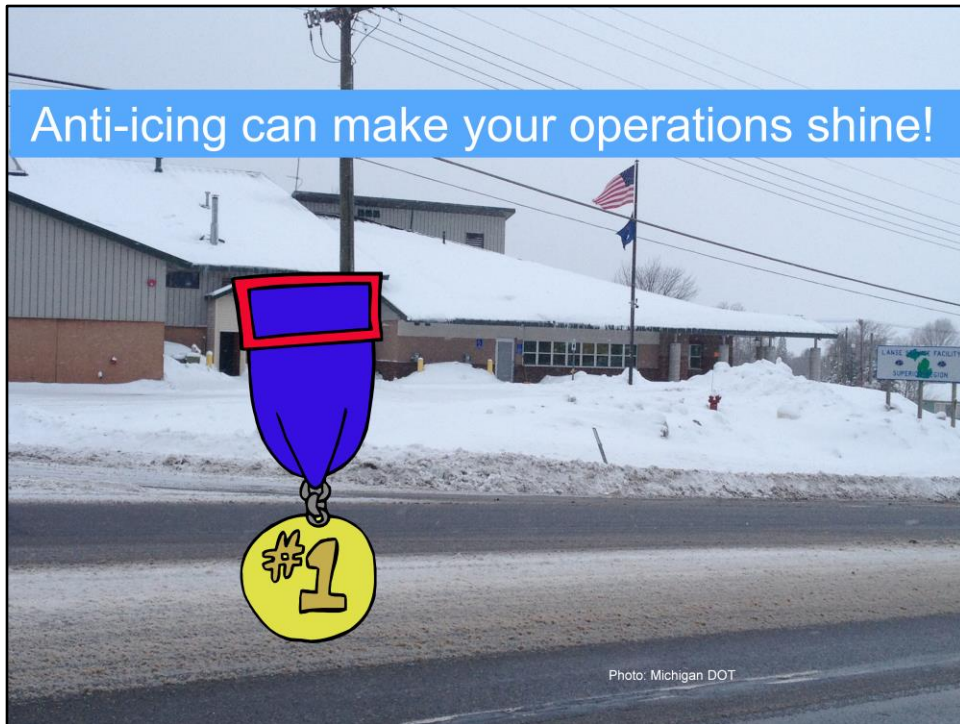
If we use liquids we can reduce the amount of granular salt needed. Liquids have less environmental impact than granular products. However remember this, if you add liquids and don't turn down the granular amount, you have increased your environmental harm.

Could anti-icing have prevented this thin layer of ice & the call out ?



Photo: Fortin Consulting

Example of a poor choice. Dry salt being applied to a microscopic layer of ice on the road. Anti-icing would have prevented this road from icing up. Much better public safety. Much cheaper maintenance. Much less environmental harm.



If you want to be on the “varsity” team for winter maintenance, anti-icing should be part of your operations.