Reducing Road Salt Usage & Winter Maintenance Costs

Calibrating spreaders

- Low cost
- 50% reduction in salt used
- Calibrations should be performed annually or after a spreader is serviced
- Each truck should be calibrated for each material that will be used
- Goal of calibrating: to know how much material is put down for every setting on the truck that is used
- PennDOT: 100 – 300 lbs/lane mile

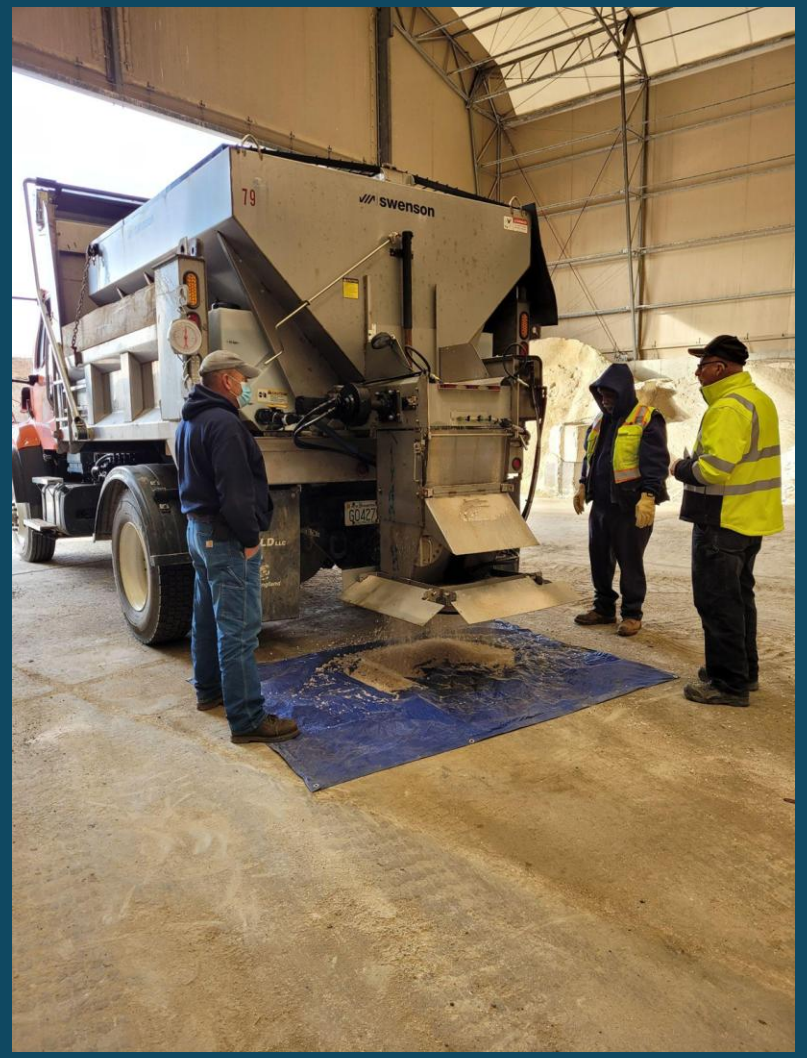


Photo Marilee Ebus

Calibrating spreaders

- Hamilton Township, NJ
- 2004/2005 winter
- Calibrated all equipment twice
- More snow events, 6” more of snow
- Spent $160,00 less on salt

Photo Marilee Ebus

Accurate weather forecasting

- Zip-code
- Increases ability to predict, plan, and respond to changing weather conditions
- Optimized resource planning
- Indicates precisely when and where to de-ice and plow
- Increased efficiency
- Enhanced safety
- Cost savings
- Hyper-local services provide information on:
  - Whether de-icing is necessary
  - Which ratio of additives to use for brining for the current conditions
  - When to de-ice

e

Road condition information systems

- In-road sensors
- Remote sensors
- Truck-mounted sensors
- Detailed real-time data on road conditions
- Better informed decisions
- Cost savings

Images: Permission Vailala

Road condition information systems

Cranberry Township, Butler County, PA

- 140 miles of roads
- 2022/2023
- Installed 7 road sensors
- Monitor air, pavement temperatures, road grip, precipitation
- Prevented 10 - 16 callouts
- Saved township $300,000 in labor and equipment
- Sensors allow township to know precisely when salt applications needed, and when the pavement and sun will do the work

https://www.cbsnews.com/pittsburgh/news/pavement-sensors-help-cranberry-public-works-officials-keep-track-of-road-conditions/

Images: Permission Vailala

Pre-Treatment: Brining

- 23.3% solution of salt and water
- Pre-treatment
- Can be mixed on site or purchased
- Stays in position: no bounce and scatter
- Prevents snow from bonding
- Results in more effective plowing
- 75% reduction in salt use
- Reduces materials/labor/fuel costs

Brine stripes in Allentown, Photo Jennifer Latzgo

Pre-wetting salt

- Spray with brine
- Less bounce and scatter
- Salt activates faster
- 30% reduction in materials
- 78% stayed in center of roadway
- Reuse salt truck wash water to pre-wet salt or make

Automated spreader controls

- Program salt application
- Variable application rates
- Adjust for speed
- Adjust for curves and hills
- Vehicle location sensors target precise locations
- Data allows informed decisions by management
- Allow detailed record keeping

Permission: Hilltip

Segmented/live-edge plow

- Conform to contours of road
- Cleaner scrape
- Wider = faster
- Save $ on labor and fuel
- 50% reduction salt usage

Segmented plow used with permission Metal Pless

Anti-Icing Decision Tree

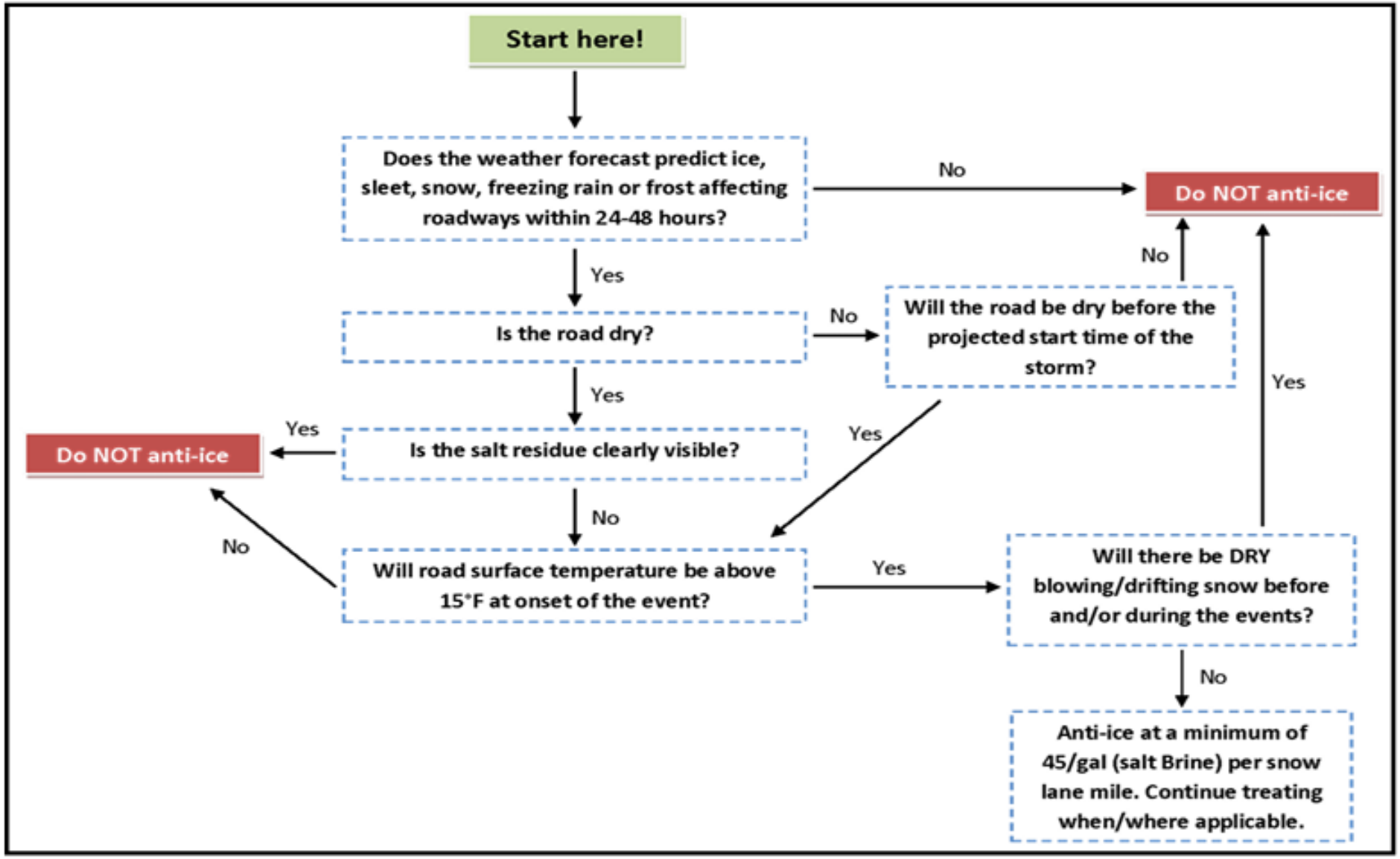


Figure 12: Anti-ice Decision Tree. Source: PennDOT Maintenance Manual

Deicing Application Rate Charts

Table 10. Weather event: Moderate or Heavy Snow Storm

[All application rates are based on a single travel lane, double rate for centerline treatments]

PAVEMENT TEMPERATURE RANGE, AND TREND	INITIAL OPERATION				SUBSEQUENT OPERATIONS			COMMENTS
	Pavement surface at time of initial operation	maintenance action	material spread rate, lbs/snow lane-mi		maintenance action	material spread rate, lbs/snow lane-mi		
			dry	prewet solid		dry	prewet solid	
Above 32°F, steady or rising	Dry, wet, slush, or light snow cover	See comments			See comments			1) Monitor pavement temperature closely for drops toward 32°F and below 2) Treat icy patches if needed with material at 100 lbs/lane-mi; plow if needed
Above 32°F, 32°F or below is imminent;	Dry	Apply dry or prewetted solid material	100	100	Plow accumulation and reapply liquid or solid material as needed	100	100	1) If the desired plowing/ treatment frequency cannot be maintained, the spread rate can be increased to 200 lbs/ lane-mi to accommodate longer operational cycles 2) Do not apply liquid chemical onto heavy snow accumulation or packed snow
ALSO **30 to 32°F**, remaining in range	Wet, slush, or light snow cover	Apply dry or prewetted solid material	100	100				
25 to 30°F, remaining in range	Dry	Apply liquid or prewetted solid material	200	150-200	Plow accumulation and reapply	200	200	1) If the desired plowing/ treatment frequency cannot be maintained, the spread rate can be increased to400 lbs/lane-mi to accommodate longer operational cycles 2) Do not apply liquid chemical onto heavy snow accumulation or packed snow
	Dry, wet, slush, or light snow cover	Apply liquid or solid material	200	150-200	liquid or solid material as needed			
15 to 25°F, remaining in range	Dry, wet, slush, or light snow cover	Apply dry or prewetted solid material	300	200	Plow accumulation and reapply prewetted solid material as needed	300	250	1) If the desired plowing/ treatment frequency cannot be maintained, the spread rate can be increased to 500 lbs/lane-mi to accommodate longer operational cycles 2) If sufficient moisture is present, solid material without prewetting can be applied
Below 15°F, steady or falling	Dry or light snow cover	Plow as needed			Plow as needed			1) It is not recommended that chemicals be applied in this temperature range 2) Abrasives can be applied to enhance traction

PennDOT Publication 23, Chapter 4, Appendix H

Salt storage

- Under cover
- Level site
- Impervious surface
- Outside 100-year floodplain, areas of localized flooding, stormwater facilities
- Drainage controls: prevent runoff
- Clean up spills
- Inspected and maintained regularly

Treatment and recycling of truck wash water

- High levels of sodium, chloride, and other pollutants
- Capture, treat and recycle wash water or storage facility runoff

Permission: Interclean

Training of staff

- PennDOT Local Technical Assistance (LTAP)

Evaluation of performance

- After each snow event
- Annually
- Monitor changes over time

Take-Aways

- Road salt usage is increasing
- Salt contamination is accumulating in our groundwater
- Affects our environment, drinking water, and infrastructure
- Private contractors over apply – liability concerns
- Municipalities over apply – lack of employee training
- PA currently lacks regulations
- BMP’s cost-effective and pay for themselves

Pennsylvania Road Salt Action

Advocacy Partners: take action locally

- Giving presentations
- Talking to EAC's, elected officials, hospitals, educational institutions, HOA's etc.
- Tabling events
- Participate in state-wide calls to action over legislative issues

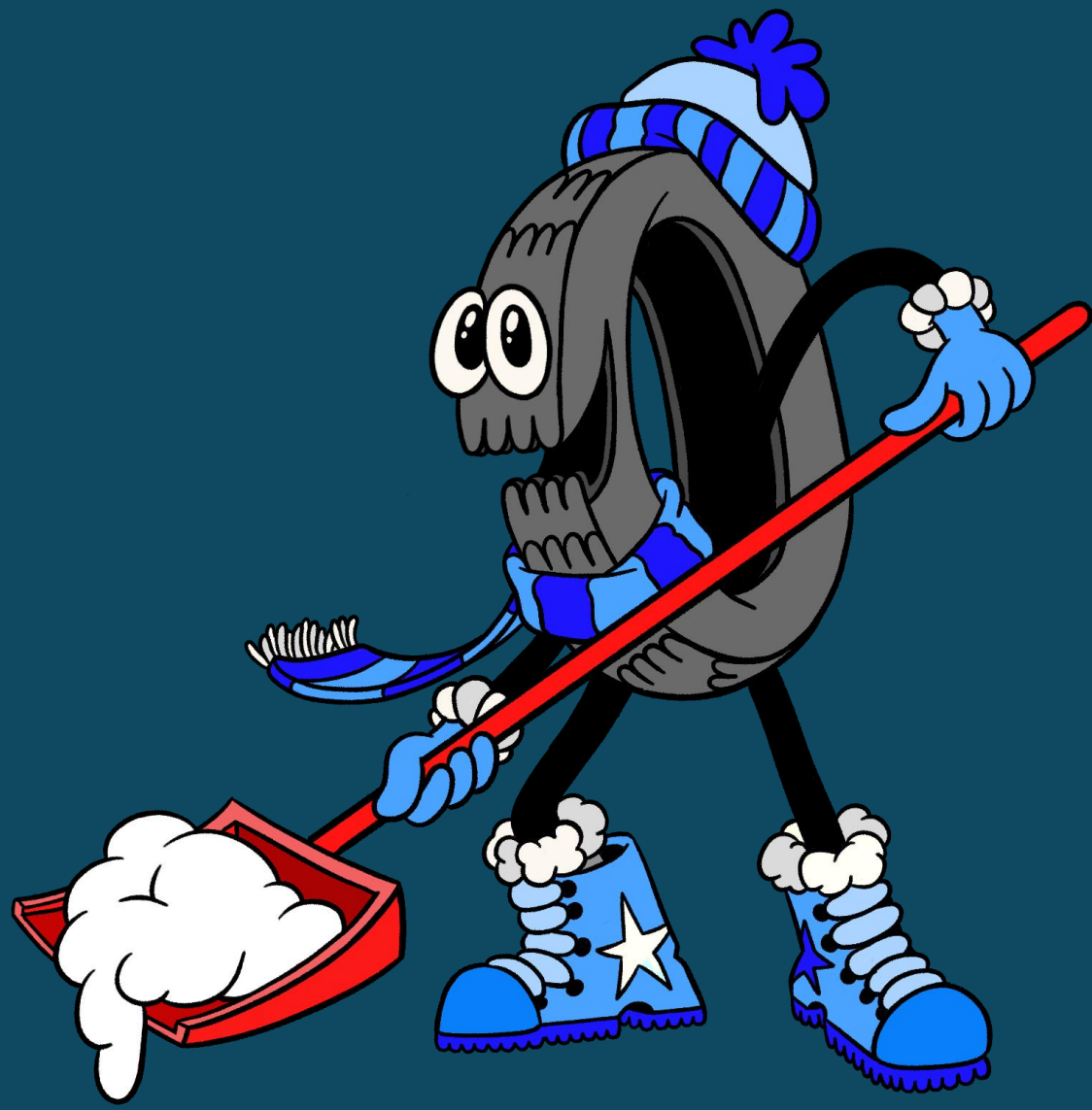
Working Group Members:

- Work on state-wide issues e.g. chloride regulation
- Supporting advocacy partners: resources, expertise
- Meet monthly via Zoom

Please complete our Google Form

Road Salt Deep Dive Page

Questions?



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