Iowa DOT’s Wheel-Track Spread Pattern

Maintaining Mobility with Less Chemical

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Outline

• About us
• Basics of the wheel-path technique -- what and why?
• How to do it -- equipment and techniques
• The special role of brine
• Summary
About Iowa DOT

- 24,500 lane-miles of roadway, 24-hour operation
- 101 maintenance garages
- Approx. 840 full-time operators
- Approx. 500 seasonal operators
- 5-year average material:
  - 156,600 tons salt
  - 31.5 Million gallons brine
  - 21,600 tons sand
Our Areas

Largely rural and agricultural. Mostly flat and open, aside from some wooded river valleys.
Our Areas

- **Williams**
  - 14 Operators
  - 259.54 Lane Miles
  - Rural interstate, rural 4-lane, rural 2-lane

- **Iowa Falls**
  - 9 Operators
  - 241.90 Lane Miles
  - Rural 4-lane, rural 2-lane

- **Boone**
  - 7 Operators
  - 221.18 Miles
  - Commuter 4-lane, rural 2-lane

- **Jefferson**
  - 6 Operators
  - 217.74 Miles
  - Mostly rural 2-lane
The Iowa DOT Wheel-path Technique
• What:
  • Purposely focusing all material to the wheel track
    • Can be right, left, or both
    • Both for anti-icing and deicing
• Why?
  • Very high concentration in a wheel path creates a very ‘quick burn’ down to the pavement
  • Drivers have good grip on at least 2 wheels
  • Mobility restored quickly and with little salt
  • Any bounce and scatter is far from the edge. Will land on the pavement where it can be useful
What About the Rest of the Road?

• Traffic and road crown quickly spread salt to other areas
• Enough to help, but the majority stays in the tracks – where it’s most needed

Notice these fresh, “tight” strips of antiice.

Even before the end of the route these narrow patterns do spread a little
Notice how little melting there is just past the paint lines. Yet the mainline is bare. The salt stayed in place.
For a road like this, it is ok for us to have snow on the paint during a storm. There is often enough salt, migrated by traffic and flowing down the crown, that the snow is unbonded beneath and will clean up easy. For now drivers have good mobility and can easily see their way.
Works well for interstates too, just rates may be a little higher to meet the required Service Level. But not much. Salt rates rarely exceed 250 lbs/Im even on our biggest roads.
This Technique Can be Started Simply...

• First units were cut PVC pipes and reused signs

• Anything that would focus the material and minimize bounce and scatter
Refinements
More Brine!

• Brine use is great for making salt stick regardless of technique

• Especially good for wheel-path since it enables the quick burn and the downhill flow of chemical
Trailer modifications
If we do end up with bonding, a trickle of brine running down the slope can undercut the ice and perhaps allow us to scrape it off without having to melt it top-down.
Notice the brine hoses to all of these spreaders
Drivers will have to consider slope. This driver is approaching a banked left curve and has switched granular drop to the right side to maximize chemical concentration on the uphill side.

Brine is still present at both sides – the left side is the ‘box sprinkler’ type and you can see the brine here.
Once back to straight, it’s back to left side granular (material focused at crown) and brine only right.
Even Anti-Ice Pattern is Modified

Nozzles like these are becoming less common
• Brine sticks great but nozzles still have some spray/drift
• We are often pumping 50+ gal/LM and it creates a lot of droplets that blow
Open ended nozzles don’t create as much spray, even at faster speeds. If you look closely, you can see that there is still some spray, and that will help protect the ‘rest of the road.’ But also very little passing either paint line.
We don’t always need to melt all of the snow. A small layer of salt underneath keeps the snow unbonded. Tire treads can reach the road and it scrapes off easily.
Main Points: Wheel Track Pattern

• Purposely focusing all material to the wheel track(s)
• Very high concentration in a wheel path creates a very quick melt down to the pavement
• Drivers have good grip on at least 2 wheels
• Mobility restored quickly and with little salt
• Any bounce and scatter is far from the edge. Will land on the pavement where it can be useful
• Traffic and road crown quickly spread salt to other areas, enough to help, but the majority stays in the tracks – where it’s most needed
Thanks!

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