

# **Moving Toward a Direct Liquid Application (DLA) Model**

*State & County Highway Winter Maintenance*

**18<sup>th</sup> Annual Road Salt Symposium 2019**

**Plymouth, MN**

# DLA Model

## Jefferson County Highway Department

- \* Located between Madison and Waukesha/Milwaukee
- \* Maintain 520 lane miles of County Highways and 550 lane miles of State Highways (Interstate 94)
- \* Complete \$3-\$5 million dollars in construction and paving work with crews annually
- \* County Population: 85,000 (Rank 20 out of 72 counties)

# DLA Model

## Definitions

- \* Dry Salt - Plow Truck
- \* Dry Salt (with Pre-Wet) Plow Truck
- \* **Liquid Only Plow Truck** (*DLA Method*)
- \* **Liquid Tanker or Liquid Trailer** (*DLA Method*)
- \* **Combination (Dry/Liquid) Plow Truck** (*DLA Method*)

# DLA Model

## Jefferson County Highway Department [10 years]

- 2009 - No Liquid Use
- 2010 to 2014 – Pre-Wet Tanks to all Primary Plow Trucks
- 2015 to 2016 – High Capacity Brine Maker with New Facility, Higher Volume Anti-Icing
- 2017 ‘All Brine’ Plow Route – Pilot Route
- 2017-19 Multiple DLA Pilots - Move County Toward DLA on all Plow Routes

# PHASE I – Liquid Use

## 2010 to 2014

{Pre-Wet, Bridge Deck Phase}

# Bridge Deck [Anti-Icing]

- 500 Gallons used for Anti-Icing bridge decks for Frost



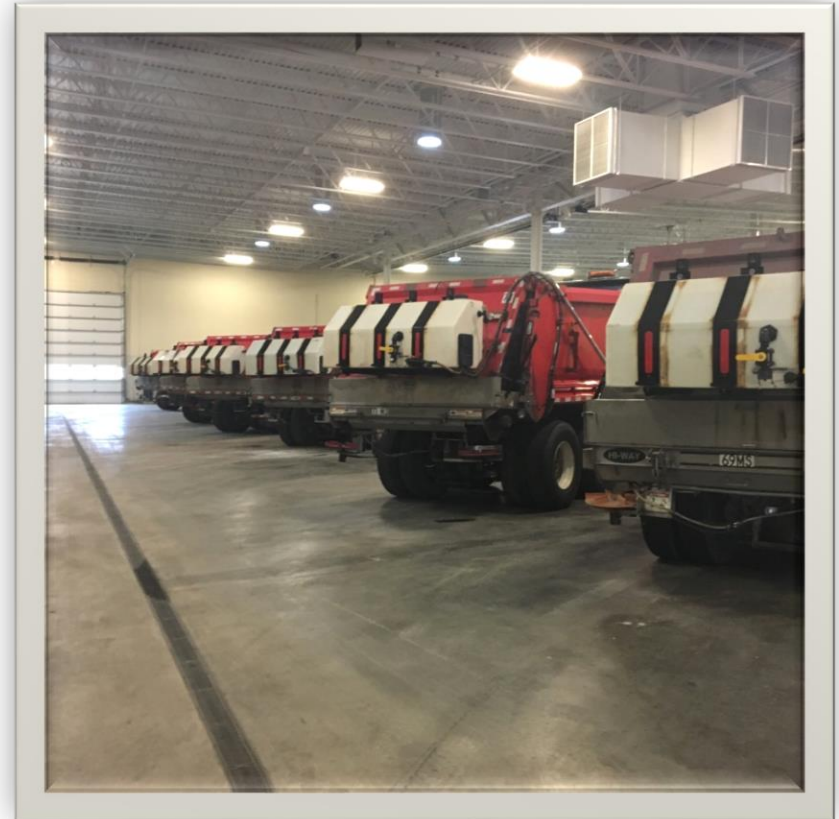
## Single Axle Plow Fleet

- Eight (8) Single-Axle Trucks with 150 Gallon Pre-wet tanks for Primary Routes



## Tri-Axle Plow Fleet

- Twelve (12) Tri-Axle trucks equipped with 200 gallon Pre-wet Tanks





# PHASE II – Liquid Use

2016 to 2017  
{DLA Pilot Phase}

# ‘Liquid Only’ Plow Route

- **Pilot for 2017-18 Winter**
- County plow section near main shop
- 22 lane miles (Short)
- 1,800 gallons of salt brine



# DLA Model

## Pilot Section Data (2017-18)

- \* Tri-Axle Truck with Plow, Wing, 1800 gallon tank insert
- \* County Section 22 lane miles (Short)
- \* Spray nozzles, application rates, centerline option spray bar
- \* Used only liquids for entire winter (31 storms)
- \* **Positives:** 44% less salt, quicker reaction, best with small/dry snow events
- \* **Negatives:** Higher moisture events, higher snow pack, can re-freeze quicker

**Overall Summary:** Move to combination trucks with high liquid capacity (DLA) and dry rock salt capacity

# PHASE III – Liquid Use

2017 to 2019

{DLA Implementation Phase}

# Direct Liquid Pilot STH 26 (North)

- **Pilot for 2018-19 Winter**
- 65 lane miles (4-lane, 70mph)
- 1,800 gallons of salt brine



# Direct Liquid Pilot STH 26 (South)

- **Pilot for 2018-19 Winter**
- 79 lane miles (4-lane, 70mph)
- 3,000 gallons of salt brine



# Direct Liquid Pilot STH 26 (South)

## *Spray Bar Options:*

- Full Lane
- Turning Lanes
- Centerline
- High Pressure



# DLA Tanker (6,200 gal)

- Pilot for 2018-19 Winter on Interstate 94 (4-lane, 70mph)
- Supplement for two plows
- Coverage for 100 lane miles





# Quad-Axle Plow Truck (DLA)

- 900 Gallons of Salt Brine
- Spray bar with Direct Liquid Application (DLA)



# Quad-Axle Plow Truck (DLA)

- Dual 450 Gallon Tanks
- Converting to Dual 750 Gallon Tanks in 2019 (18 plow trucks)
- Direct Application of either liquid or dry salt or combination



# Quad-Axle DLA Spray Bar

- New Trucks can spray on full-lane or just centerline
- New trucks will have 1500 gallons of liquid capacity



# Salt Brine House

- New Facility in 2015
- Liquid Brine Use increasing from 60,000 gallons in 2012 to 600,000 gallons in 2018
- Increased salt brine storage at main facility and two satellite shops to 140,000 gallons in 2018



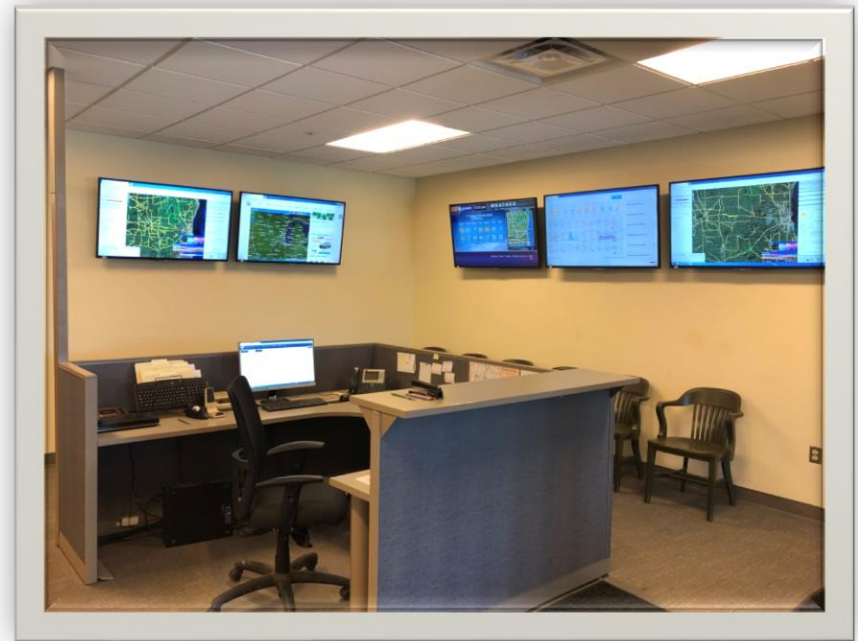
# New Brine Facility (2015)

- High Capacity Salt Brine Equipment (4,000 gal/hr)
- Six Storage Tanks expanded recently to twelve tanks (72,000 gallons)
- Two Fill points (Expanded with a high volume fill point this year)



# DLA Model [Technology]

- Weather Information/MDSS
- Plow Information/AVL/GIS
- Traffic Cameras
- In-Cab Technology



# DLA Model [Employees]

- If management, supervision, and plow drivers are not working together – DLA will fail!
- Communication/Interaction
- Annual Training
- Calibration
- Daily Storm/Data Discussions



# DLA Model

## Summary

- \* Liquid use can reduce overall rock salt use
- \* Quicker reaction, less wasted bounce
- \* Tool for route drivers to fight winter storm events
- \* 2017/2018 Pilot Salt Savings near 44% (Short section)
- \* 2018/2019 Pilot Work – To be determined, good initial data
- \* 2019/2020 – Goal: DLA ability on all Primary Plow Sections



# DLA Model

## Conclusion

- \* Jefferson County Average Salt Use for State and County Highways = 15,000 tons (last 12 years)
- \* Our Goal is to Reduce Salt Use!!! What that would mean in numbers below:
- \* 25% Salt Savings per Winter = 3,750 tons less salt in the environment and a savings of \$282,000.
- \* 35% Salt Savings per Winter = 5,200 tons less salt in the environment and a savings of \$394,000.

## Jefferson County Historical Photo

I think I can hear them saying,  
*‘If we just had salt  
brine, we would not  
be in this mess’*



# Moving Toward a DLA Model

**\* THANK YOU!!!**

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