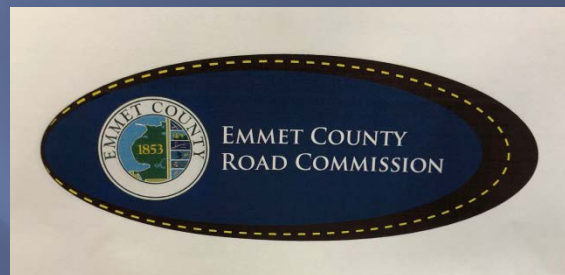


Brine Panel Discussion: Research, Instillation & Implementation October 16, 2019



Image - Courtesy Brett Hodne



TOOLS IN THE TOOL BOX



Versatile
Flexible
Efficient



BEST PRACTICES

Winter Maintenance/Best Practices

- Planning
- Training
- Equipment
- Calibration
- Salt
- Sand
- **Liquids**
- Environment
- Travel Speed
- Infrastructure
- Pavement Temp
- Policy and Procedure
- Communication

Baby Steps



\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$

**25% to 45% of Maintenance Budget
nationally for the average year
for Winter Maintenance**

**Diminishing Return on Investment other than
Public Safety !**



Key Talking Points

**Manufactured Salt Brine
Water Supply**

**Salt Gradation, Inert Ingredients
Cleanout Issues**

**Electrical Infrastructure
Pumps**

Plumbing

Fill Points

Storage-Containment

Your Costs....



Staff



Equipment



Materials

Your Costs....



**H2O & Size/Volume of
Water Supply**



**Electrical
Supply**

CONTAINMENT



Wait - What Did You Say?

Using Liquids/Salt Brine

- If you use less salt you will save \$\$\$
- If you use less salt you do less damage to the infrastructure
- If you use less salt you do less damage to your equipment
- If you use less salt it is better for the environment

Expectations Remain The Same
Level-of-Service should improve

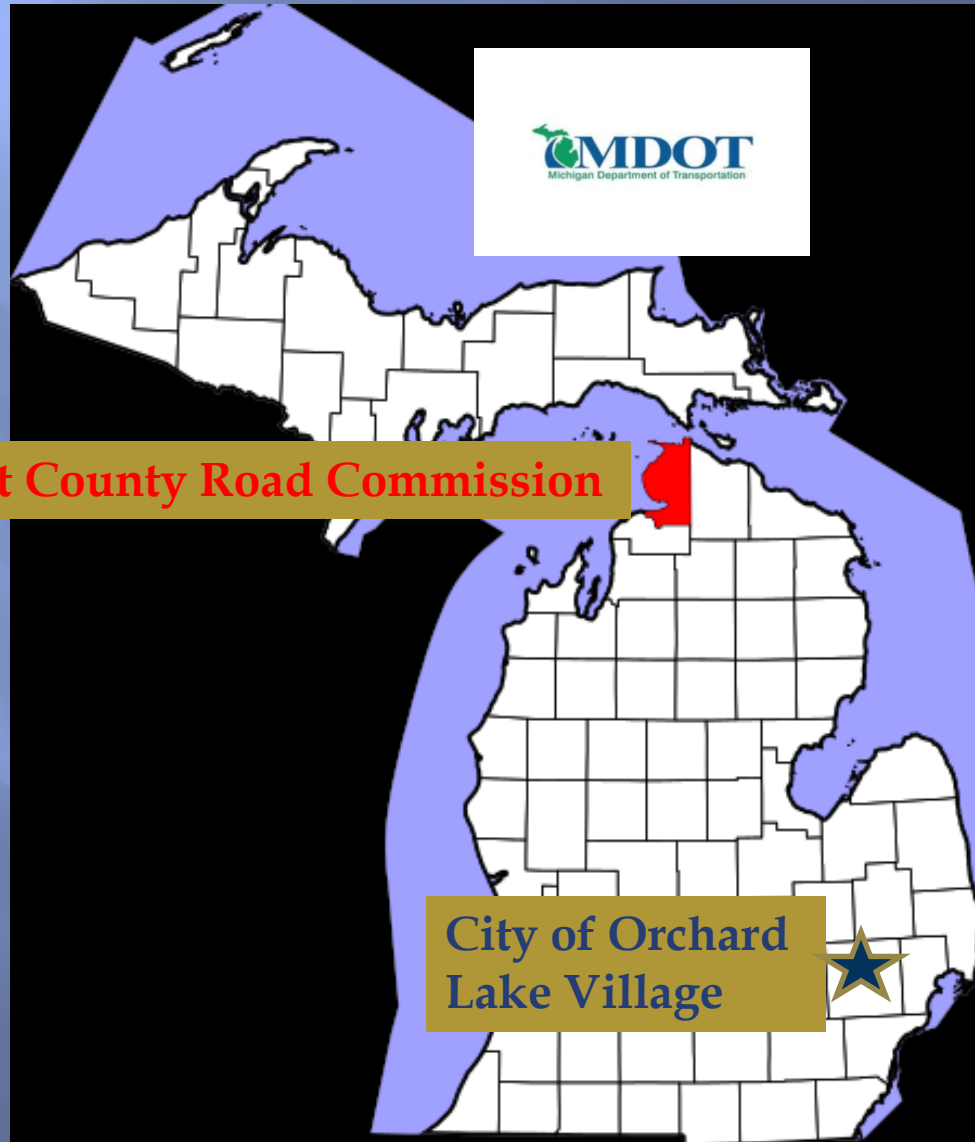


Salt Brine in Winter Maintenance

- **Pre-Wetting**
- **Anti-Icing**
- **Direct Liquid application**
- **All Divisions of Maintenance
(Roadways, Sidewalks &
Parking lots)**



Locations of Agencies on Panel

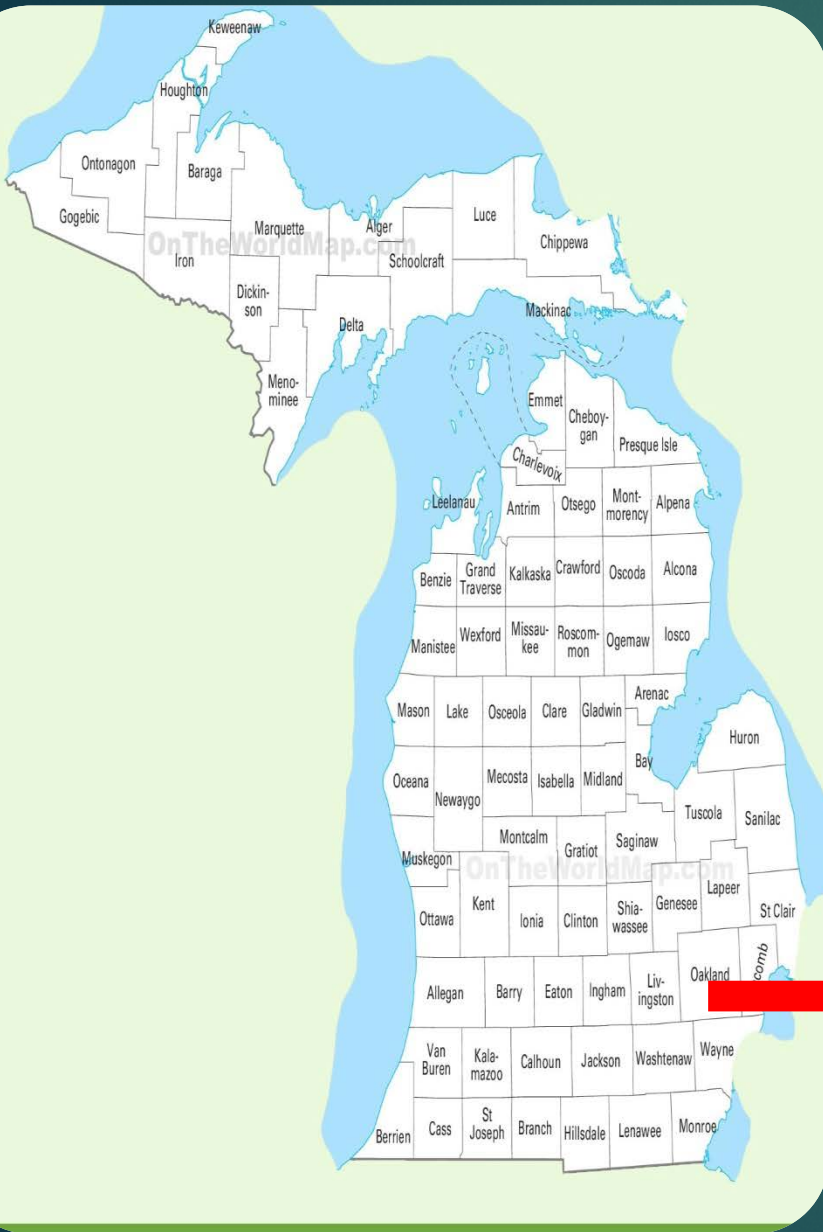


Anti-Icing Operations

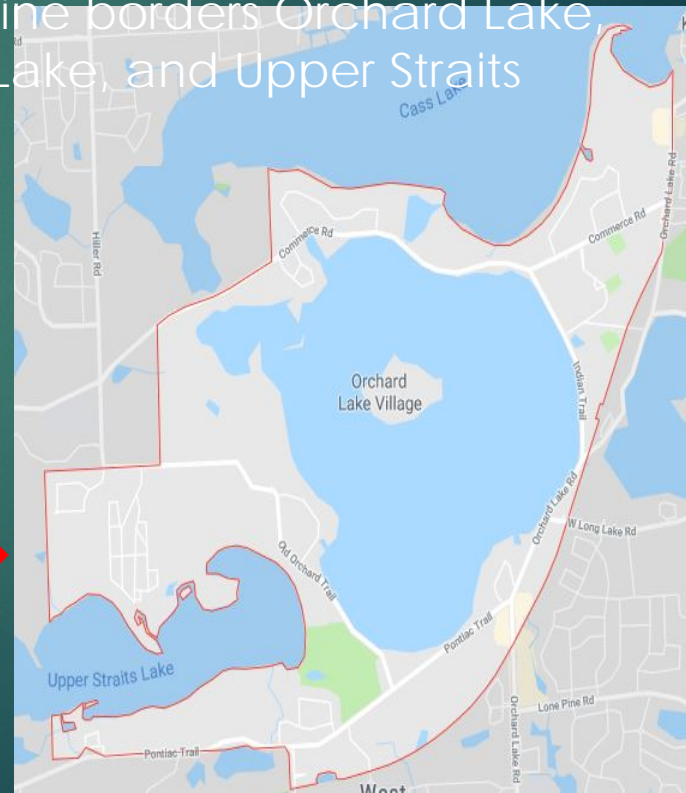
City of Orchard Lake
Village

DIRECTOR OF CITY SERVICES
GERRY MCCALLUM

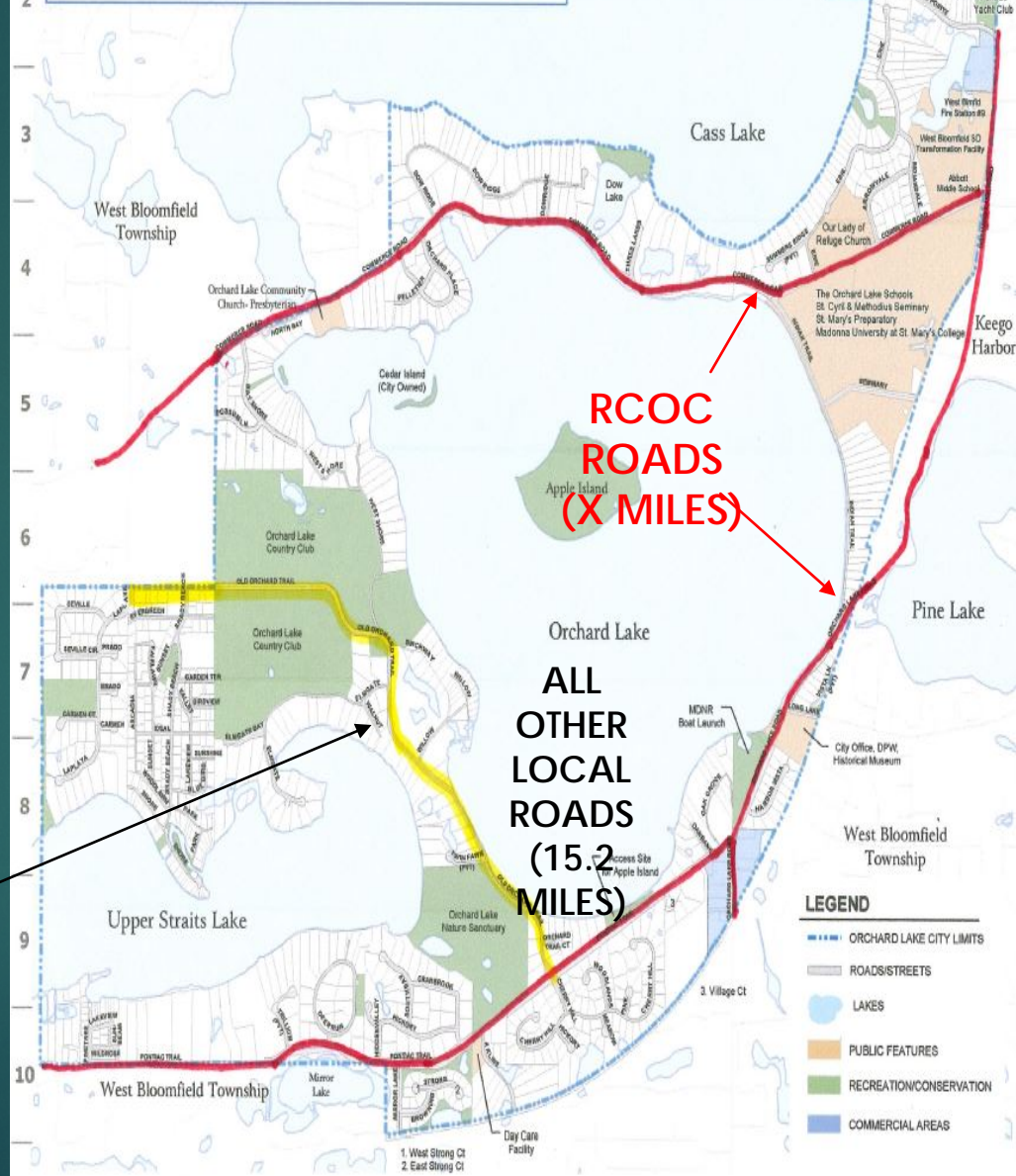




- Orchard Lake was carved out of West Bloomfield as it's own village in 1928 and became a city in 1964. We just had to keep the "Village" though!
- Population of about 2,600
- Orchard Lake is four square miles, but nearly half of that is underwater!
- Orchard Lake's 8.5 miles of shoreline borders Orchard Lake, Cass Lake, and Upper Straits Lake.



City of Orchard Lake Village



**RCOC
ROADS
(X MILES)**

**ALL
OTHER
LOCAL
ROADS
(15.2
MILES)**

**MAJOR
ROAD
(1.8 MILES)**



AIR
LINE

1,000 GAL BRINE-
MAKER TANK

2" TRASH PUMP

WATER
FILL
LINE

2,000
GALLON
STORAGE

2,000
GALLON
STORAGE



WATER
INLET

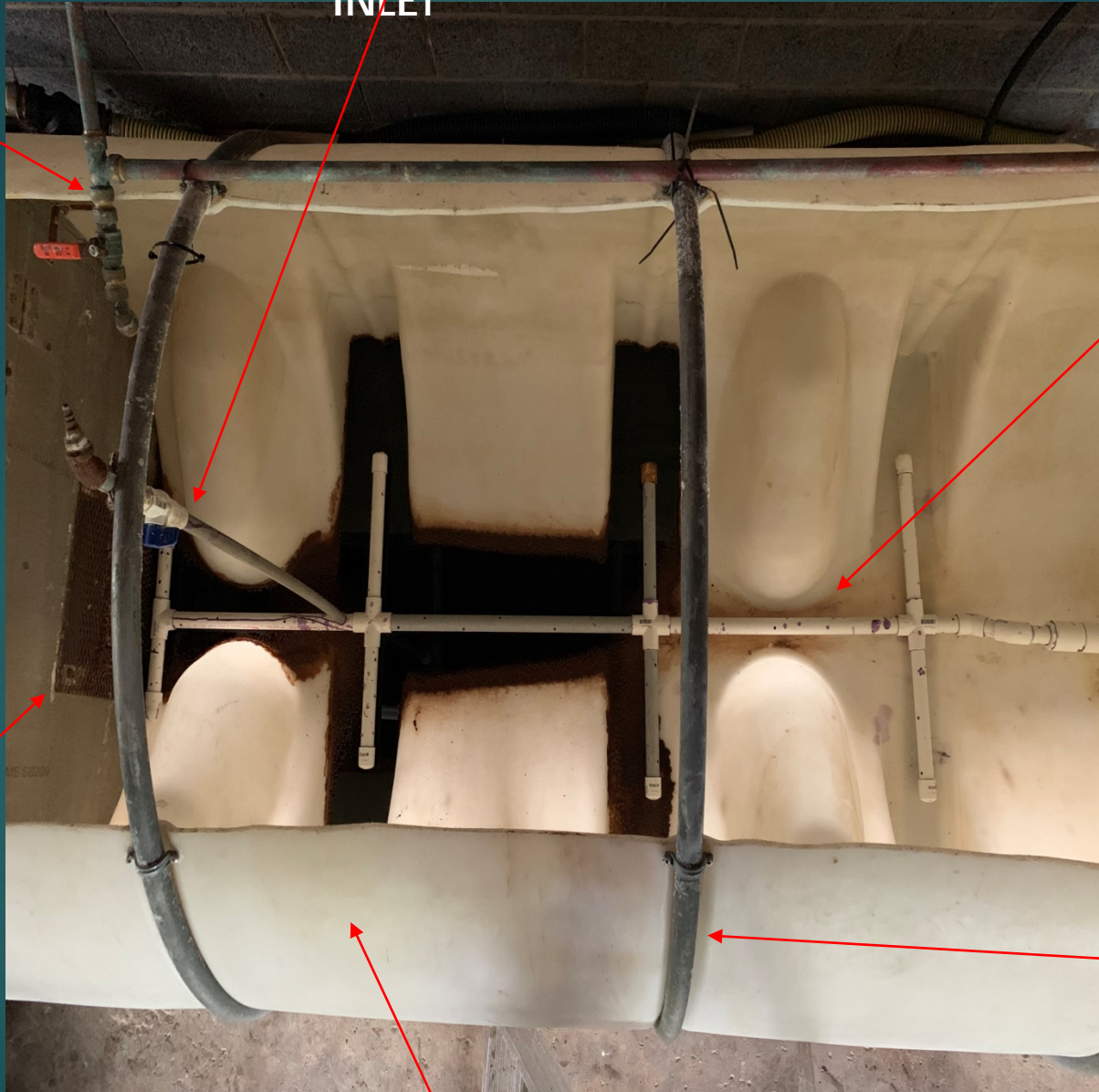
AIR
INLET

AIR &
WATER
PIPING

SCREEN

SUPPORTS

TANK





500 GALLON
TANK

HOSES &
PIPES

CAUTION
ANTI-ICING
STAY BACK
100FT

PUMP

SPRAY BAR







THANK YOU

SPECIAL THANKS

~

CITY OF FARMINGTON HILLS – BRYAN PICKWORTH
&
WEST BLOOMFIELD PARKS AND REC

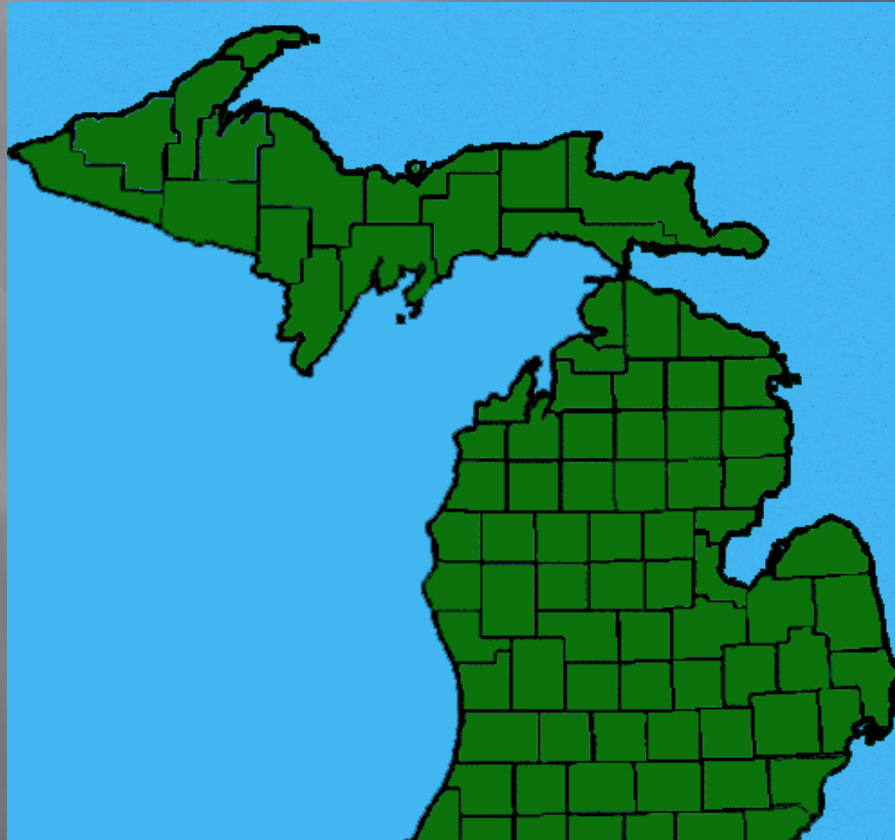
EMMET COUNTY ROAD COMMISSION

NEW BRINE FACILITY

Emmet County Road Commission Facts

833 miles of County Roads (247 primary, 586 local)

216 lane miles of State Highway

















ADD 1

BRINE











BRINE MAKER
PLC







LIQUID USAGE

2017-2018: 59,000 gallons mineral well brine

2018-2019: 93,700 gallons mineral well brine

10,400 gallons organic additive

102,100 gallons





QUESTIONS



- **MDOT**

- Steven Wessels is a Transportation Maintenance Supervisor , Hastings-MI
- Started his career in 1997

Making Liquids Doesn't Have to Be a Multimillion Dollar Project

However automation is nice

BRINE MAKERS



BRINE MAKERS



BRINE MAKERS



BRINE MAKERS



BRINE MAKERS



Brine Cost's Farmington Hills DPW Winter 18/19

Unit Costs

	\$/1000 cft	gal/cft	\$/gal	
Water	\$33.62	7.48	\$0.004	
	\$/ton	gal/ton	\$/gal	
Salt	\$46.51	900	\$0.052	
	\$/gal	\$/gal (15%)	\$/gal (20%)	
Beet	\$1.50	\$0.23	\$0.30	
			\$/gal (32%)	
Liq Calc. Chloride-Delivered			\$0.63	
	\$/hr	gal/hr	\$/gal	
Labor	\$44.11	1000	\$0.044	
Operator 2 – loaded (electrical costs etc.)				

Pure Brine Cost

	\$/gal	\$0.03
85/15 Blended Brine		
	\$/gal	\$0.31
80/20 Blended Brine		
	\$/gal	\$0.38

Farmington Hills' Lessons Learned

- Walk before you run – Shared Services / Vendors
- Careful of over promising clear roads 24/7 –Expectations
- Staff #1 resource – Train, Train, Train, Empower, Buy In
- Network – don't reinvent the wheel, attend webinars, conf's
- You will fail – Learn from your trials & pilot programs
- Brine is the most forgiving- if starting a program or blending. When used with organics can help environment.
- Brine is a cost effective way to start with liquids
- Communicate and take the time to tour other municipalities



THANK YOU –
Questions ???







Single Axle/5 TONS - SALT= \$300+



EVERYTIME YOU
LOAD UP !!





(1) 5 YD cap.
Truck =4k
Gal's BRINE



Tandem Axle - 10 TONS of SALT= \$600+



EVERYTIME
YOU LOAD UP !!



PRE-WET PROGRAM



- The application of brine, calcium, or a mixture directly onto the salt at the spinner .
- Reduces salt bounce and amount required
- Best results are achieved with 10 + gallons per ton applied
- Achieves 'wet pavement' faster
- Accelerates the brine process



PRE-WET PROGRAM

- Overhead spray bar (for older equipment, trucks w/small tanks or pre-wet pump failures)
- Pile treat



Factoid:

It Takes *10 Times* More
Resource to
De-Ice than to Anti-Ice!

**ADD UP ALL THE INTANGIBLES - SAFETY, EQUIP. WEAR &
TEAR, LABOR, SALT, FUEL, etc. \$\$\$**



LIQUIDS IN OUR PROGRAM

- Reduced annual granular salt use (30% - 50%)
- High year before liquid = over 9,000 tons/yr.
- 2013 snow-mageddon only 6,400 tons used
- Avg. annual use about 5,000 tons
- Production of 100,000 gallons of brine/yr. to 1,000,000 gal. of brine now.



DLA- Direct Liquid Application

- Use on Freezing Fog, light snow events
- Use when pavement temps are 20 deg. and rising
- Completed entire routes with DLA
- Water main breaks
- Used instead of benching
- Consider route completion cycle time

