INTERGOVERNMENTAL RISK MANAGEMENT AGENCY

PUBLIC WORKS STEERING COMMITTEE

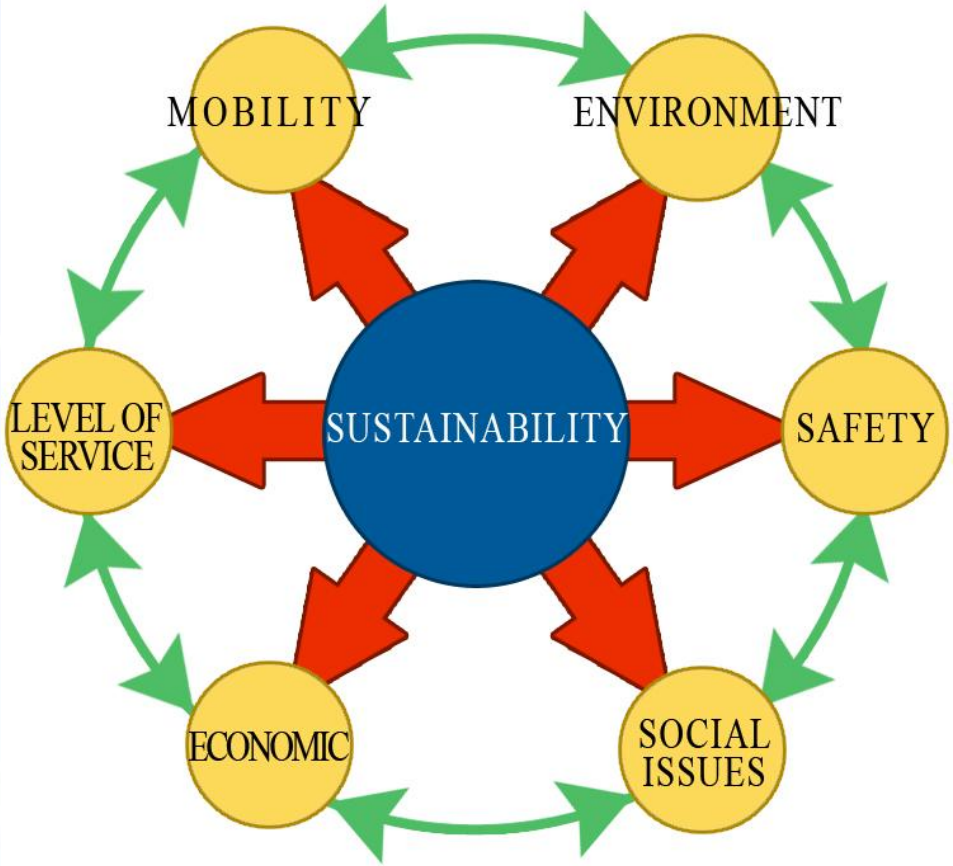
SNOW REMOVAL - CHEMICAL USE AND WINTER OPERATIONS

MARK DE VRIES

IRMA

SUSTAINABILITY

Meeting the needs of the present without compromising the ability of future generations to meet their own needs.


MOBILITY
ENVIRONMENT
LEVEL OF SERVICE
SUSTAINABILITY
SAFETY
ECONOMIC
SOCIAL ISSUES

LOOKING FOR THAT MAGIC BULLET

What if we didn't treat roads?

Salting

Mechanical is still the best method of removing snow

IT TAKES 4 TIMES MORE SALT TO REMOVE ICE THAN PREVENT IT!

Record highway salt sales

- Last year was a record in salt sales
  - 2005 – 20.5 million tons of road salt
  - 2006 – 12.1 million tons
  - 2007 – 20.3 million tons
  - 2008 – 22.2 million tons
- Three of past four years were three of the four largest sales years ever (1996)

SOURCE: Salt Institute

2009/2010 Salt Situation

- Early Bids – all under $80/ton
- McHenry County $148.94/ton last year - $77.61
- Lowest bid I know of $55/ton ($48 last year)

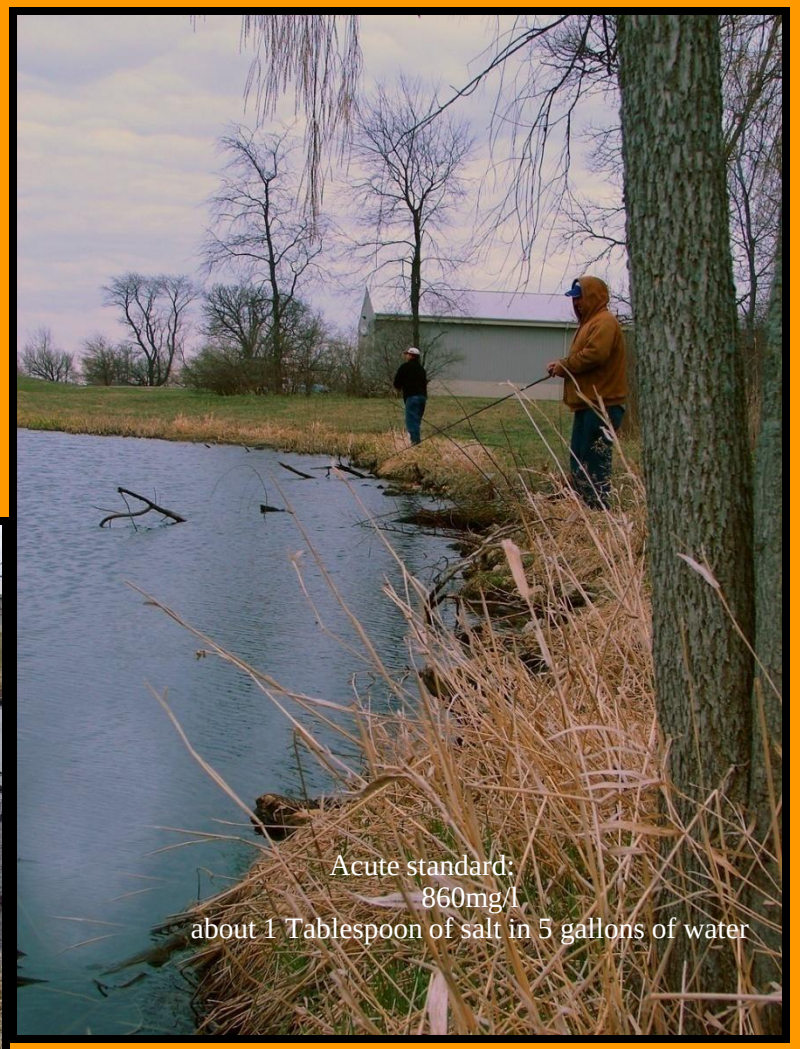
THE PRICE OF SALT SHOULD NOT DICTATE HOW MUCH WE APPLY

SALT & WATER

THE ENVIRONMENTAL IMPACTS OF TREATING ROADS

Once in solution always in solution

SALT'S EFFECT ON OUR WATER SYSTEMS



How much is 1.8 million tons of salt?

Well what if we stored it in solder field?


Salt is heavy, moves cheapest by water

STOCKPILING IS LIMITED BY AVAILABLE SPACE

Sensible Salting

USING ONLY WHAT'S NEEDED!!

Managing Salt Use

- Use mechanical removal -- plowing as the primary tool for snow removal
- Use only the minimum salt necessary
- Monitor salt use and pavement conditions for each storm and each salting/plowing route and adjust salt application rates to match conditions

SALT APPLICATION

- Use Amount Required By Conditions
- 100 to 300 pounds per lane mile in most situations
- Concentrate at high point
- Apply early
- Allow brine to form
- Remove snow by mechanical means -- plowing
- Re-apply as needed

SALT DON'TS

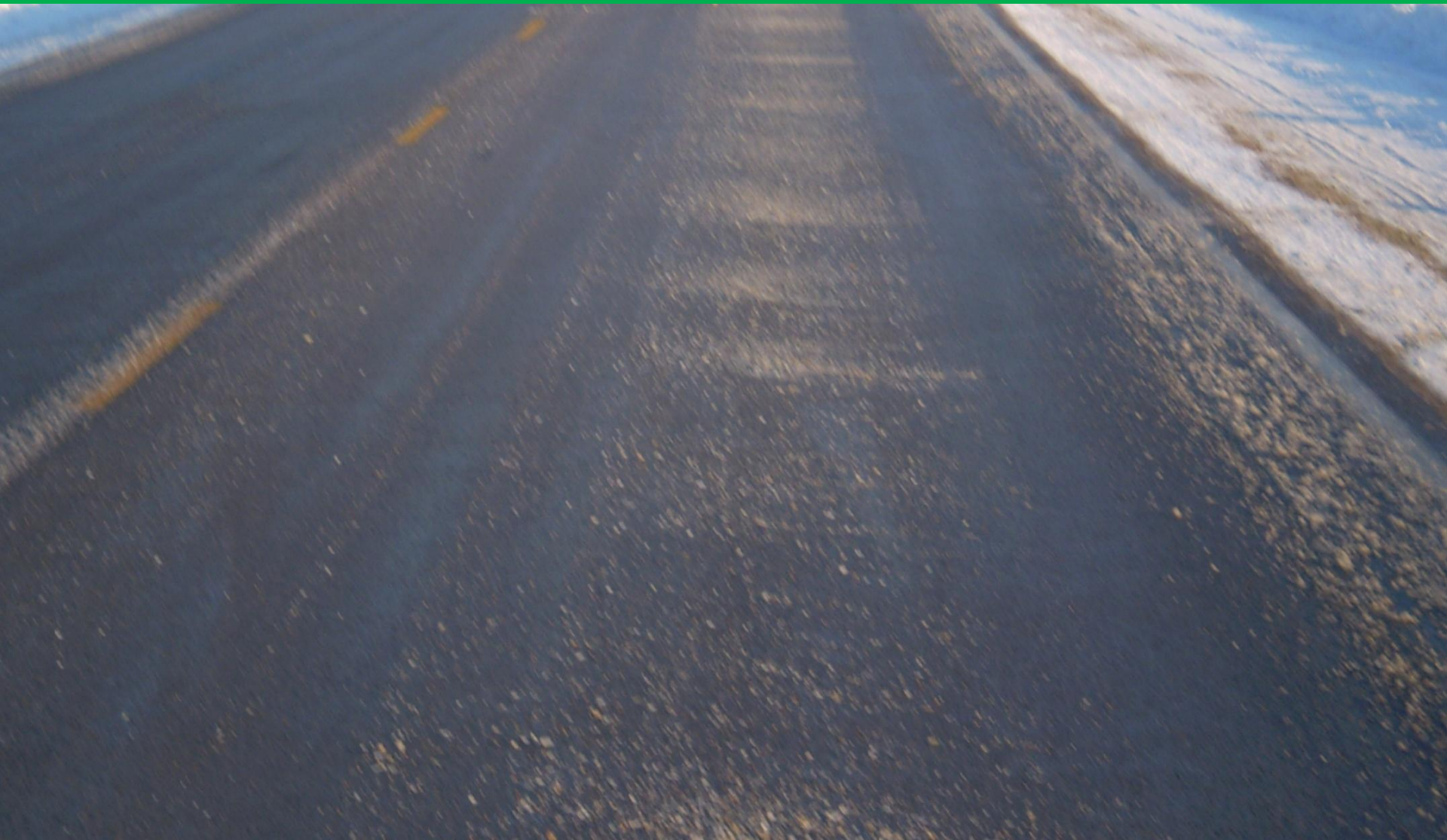
- Do Not Apply When Too Cold
- Do Not Spread beyond Traffic Lane
- Do Not Apply and Plow Off
- Do Not Try To Burn Off Snow and Ice
- Do Not Apply To Cold Dry Pavement

EXCESS SALTING

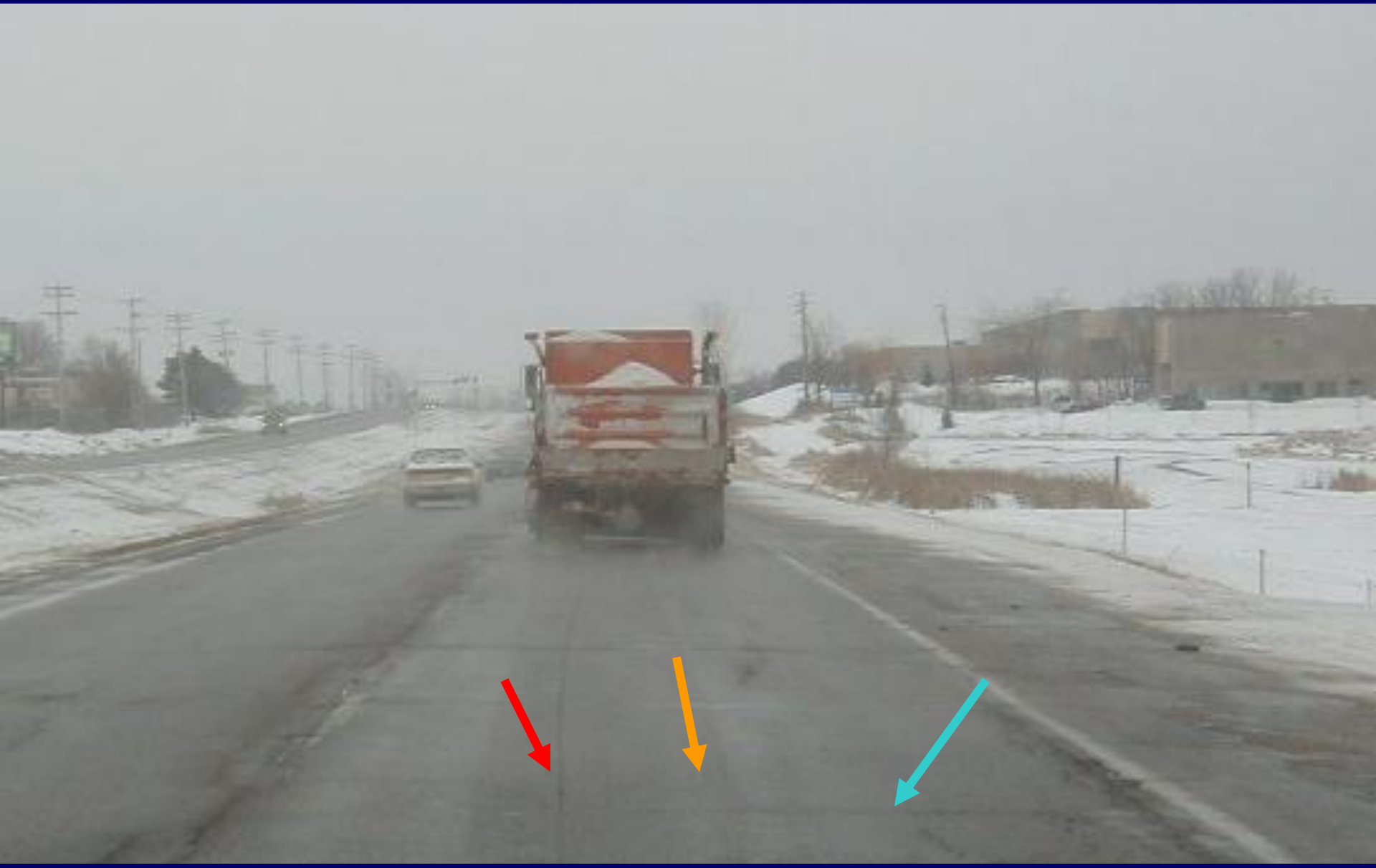

US RTE 14
STOP


It’s not just an environmental or budget issue, it is perception

IF YOU CAME BACK WITH A ½ BUCKET MORE, EACH TIME
HOW MUCH WOULD HAVE SAVED LAST YEAR?
HOW WOULD IT AFFECT THE ENVIRONMENT?
WHAT IF YOUR WHOLE FLEET DID IT?



When the road is wet your job is done



Do not apply any more salt

Managing our Materials

Treatment recommendations

HOW MUCH SHOULD I APPLY?

Deicing Application Rate Guidelines

24' of pavement (typical two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Lbs/ two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted/ Pretreated With Salt Brine	Salt Prewetted/ Pretreated With Other Blends	Dry Salt*	Winter Sand (abrasives)
>30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Frz. rain	Apply chemical	80 – 160	70 – 140	100 – 200*	Not recommended
30° ↓	Snow	Plow & apply chemical	80 – 160	70 – 140	100 – 200*	Not recommended
	Frz. rain	Apply chemical	150 – 200	130 – 180	180 – 240*	Not recommended
25 - 30° ↑	Snow	Plow & apply chemical	120 – 160	100 – 140	150 – 200*	Not recommended
	Frz. rain	Apply chemical	150 – 200	130 – 180	180 – 240*	Not recommended
25 - 30° ↓	Snow	Plow & apply chemical	120 – 160	100 – 140	150 – 200*	Not recommended
	Frz. rain	Apply chemical	160 – 240	140 – 210	200 – 300*	400
20 - 25° ↑	Snow or frz. rain	Plow & apply chemical	160 – 240	140 – 210	200 – 300*	400
20 - 25° ↓	Snow	Plow & apply chemical	200 – 280	175 – 250	250 – 350*	Not recommended
	Frz. rain	Apply chemical	240 – 320	210 – 280	300 – 400*	400
15 - 20° ↑	Snow	Plow & apply chemical	200 – 280	175 – 250	250 – 350*	Not recommended
	Frz. rain	Apply chemical	240 – 320	210 – 280	300 – 400*	400
15 - 20° ↓	Snow or Frz. rain	Plow & apply chemical	240 – 320	210 – 280	300 – 400*	500 for frz. rain
0 to 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 – 400	Not recommended	500 – 750 spot treat as needed
<0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 – 600**	Not recommended	500 – 750 spot treat as needed

*Dry salt is not recommended. It is likely to blow off the road before it melts ice.

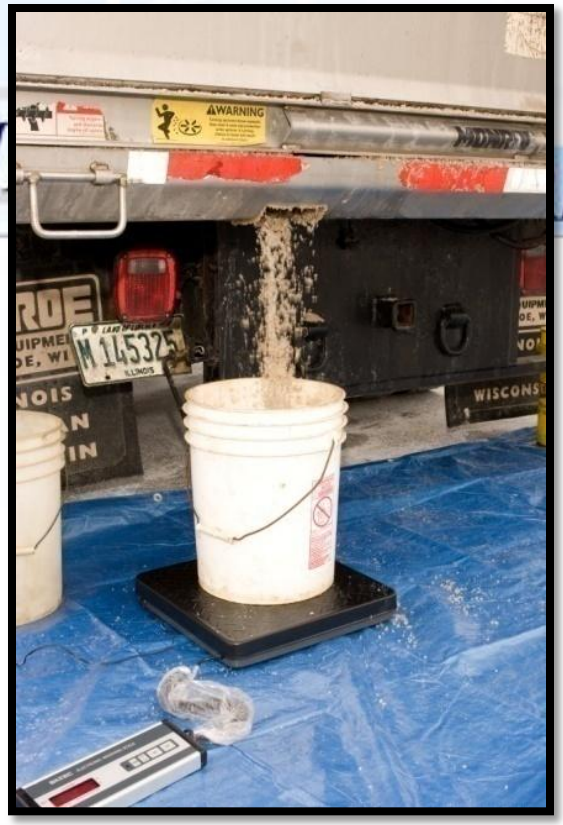
**A blend of 6 – 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Use Pavement temperature in Decision Making

- More meaningful than air temperature
- Could vary 10 to 20 degrees from air temperature
- Pavement type, frozen ground, day/night, sun/shade all influence pavement temperature

Calibrating

Calibration



It's easy to do!
Think "Pounds per minute"

CALIBRATION CHART (US)

Agency: _____

Location: _____

Truck No: _____ Spreader No: _____

Date: _____ By: _____

Gate Opening _____ (inches)

(Hopper Type Spreaders)

	A	B	C	DISCHARGE RATE (pounds discharged per mile)								
				TRAVEL SPEED AND COMPUTATION MULTIPLIER ( )								
Control Setting	Shaft RPM (Loaded)	Discharge per Revolution (pounds)	Discharge per Minute (lb) (A x B)	5 mph (x 12.00)	10 mph (x 6.00)	15 mph (x 4.00)	20 mph (x 3.00)	25 mph (x 2.40)	30 mph (x 2.00)	35 mph (x 1.71)	40 mph (x 1.50)	45 mph (x 1.33)
1			-	-	-	-	-	-	-	-	-	-
2			-	-	-	-	-	-	-	-	-	-
3			-	-	-	-	-	-	-	-	-	-
4			-	-	-	-	-	-	-	-	-	-
5			-	-	-	-	-	-	-	-	-	-
6			-	-	-	-	-	-	-	-	-	-
7			-	-	-	-	-	-	-	-	-	-
8			-	-	-	-	-	-	-	-	-	-
9			-	-	-	-	-	-	-	-	-	-
10			-	-	-	-	-	-	-	-	-	-
11			-	-	-	-	-	-	-	-	-	-

THE ACTUAL APPLICATION RATE (POUNDS PER LANE MILE) **ON THE HIGHWAY**
IS THE DISCHARGE RATE DIVIDED BY THE NUMBER OF LANES BEING TREATED

SPREADER CALIBRATION PROCEDURE

Calibration is simply calculating the pounds per mile discharged for each control setting at various travel speeds by first counting the number of auger or conveyor shaft revolutions per minute, measuring the weight of salt discharged in one revolution, then multiply the two to obtain discharge per minute, and finally multiplying the discharge per minute by the time it takes to travel 1 mile. Most spreaders have multiple gate openings; so you must calibrate for specific gate openings.

Equipment needed:

1. Scale to weigh salt
2. Salt collection device
3. Marking device
4. Watch with second hand

Calibration steps:

1. Remove, by-pass or turn off spinner.
2. Warm truck's hydraulic oil to normal operating temperature with spreader system running.
3. Put partial load of salt on truck.
4. Mark shaft end of auger or conveyor.
5. Dump salt on auger.
6. Rev truck engine to operating RPM.
7. Count number of shaft revolutions per minute at each spreader control setting, record.
8. Collect salt discharged for one revolution, weigh it and deduct the weight of the container. (For greater accuracy, collect salt for several revolutions and divide by that number of revolutions to get the weight for one revolution.)
9. Multiply Column A by Column B to get Column C; then multiply Column C by the number of minutes to travel one mile ( ) at various truck speeds to get pounds Discharged per mile.*

##########

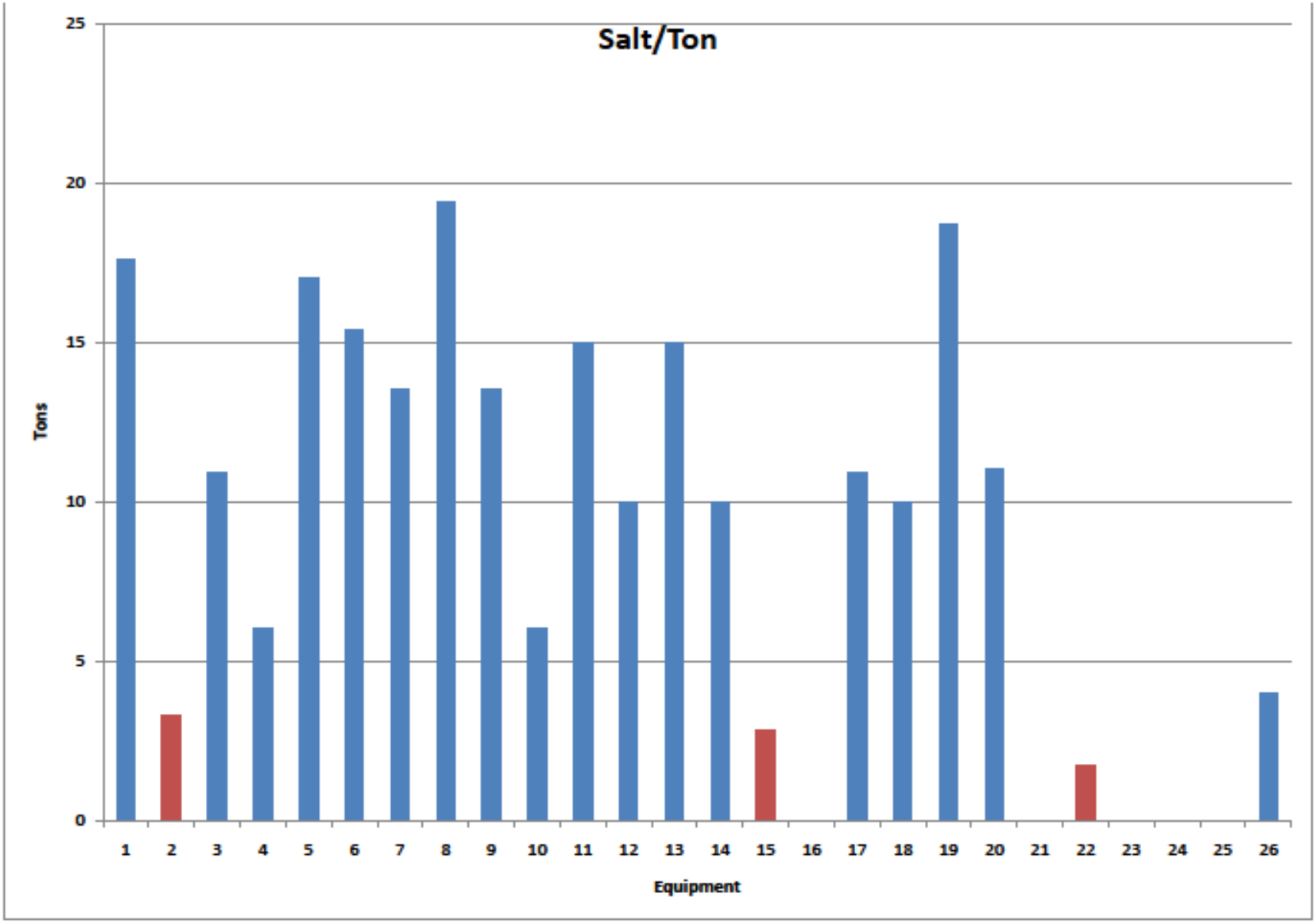
CALIBRATION OF AUTOMATIC CONTROLS

Automatic controls may be calibrated using the following steps:

1. Remove, by-pass or turn of spinner.
2. Set control on given number.
3. Tie sack or heavy canvas under spreader discharge area.
4. Mark specific distance on a highway or other paved area, such as 1000 ft. .
5. Drive that distance with spreader operating.
6. Weigh salt collected.
7. Multiply weight of salt by 5.28 (in case of 1000 ft.).

Answer will be salt discharged per mile which remains constant regardless of speed, but calibration must be done for each control setting. Some automatic control manufacturers have "simulators" which eliminate need for on-road operation for calibration.

REVIEW STAFF PERFORMANCE!!


Salt/Ton
Tons
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
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21
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23
24
25
26
Equipment

SO

CAN LIQUIDS HELP US REDUCE OUR USAGE?

YES

PRE-WETTING

ANTI-ICING

Pre-wetting - a running head start

Prewetting salt can reduce your usage by 30%

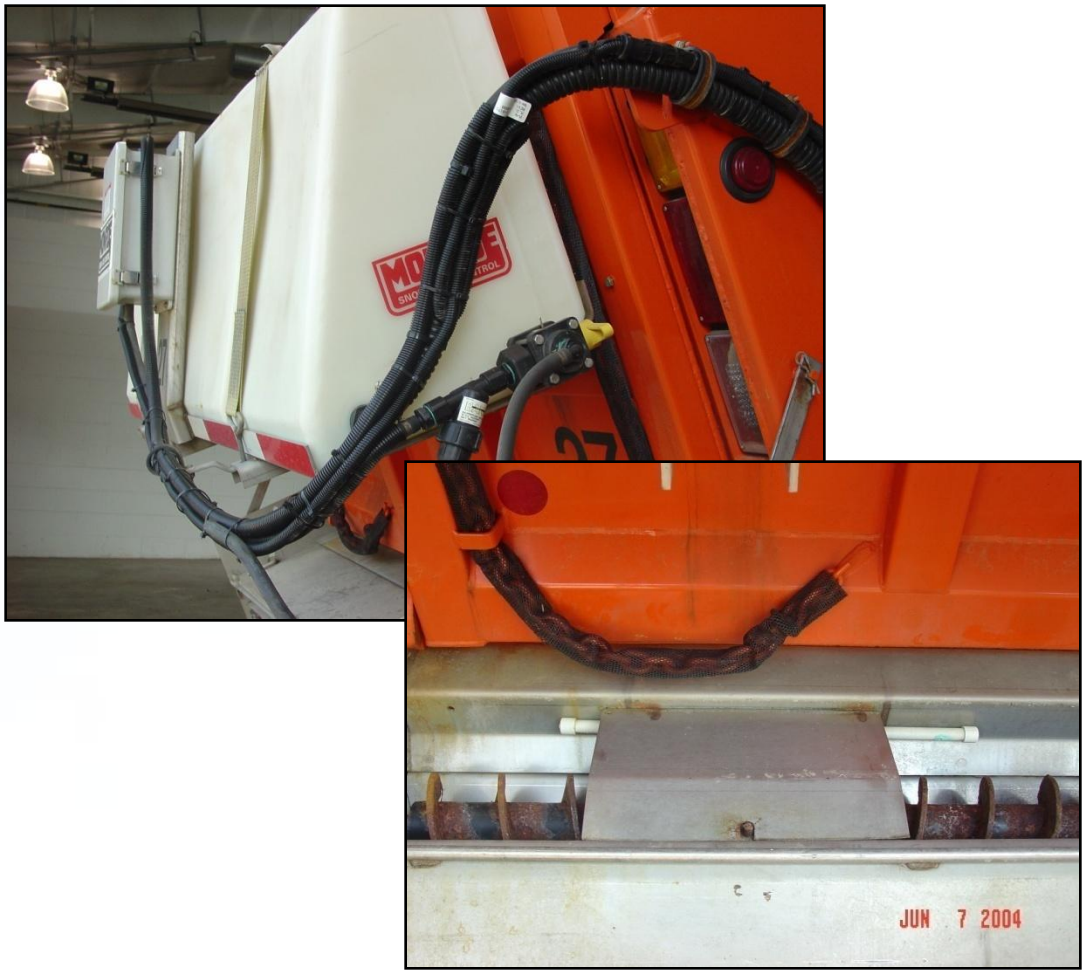
When – during event

Benefit – activates salt, limits bounce, lowers working temps

Limitations – prewet/salt ratio, volume, freeze/clump in pan

What we do – Supermix on every truck, 10 gal Supermix/1 ton salt in auger

More liquid if possible – 20 – 25 gallons per ton



ANTI-ICING

PRO-ACTIVE TREATMENT PRIOR TO AN EVENT

CONDITIONS MUST BE CORRECT TO ANTI-ICE

Bonding Prevention

CAN YOU SEE WHICH SIDE WAS PRE-TREATED?

DE-ICING

DE-ICING 1-4-07

DE-ICING

Anti-icing Using A Blend


LIQUID DEICER
HAWKEYE
TRUCK EQUIP
DES MOINES, IA.
HAWKEYE
TRUCK EQUIP
DES MOINES, IA.
20 01 2006 10:58

SUPER MIX

Components	
Salt Brine	85%
Organic	10%
Calcium Chloride	5%

McHenry County

Winter Snow and Ice Control:
Certified Operator

Expires October 2012

THANK YOU!

Mark DeVries

McHenry County DOT

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