

Butler County Engineers Anti-icing

BCEO Brine Operation

Anti-icing

- De-icing vs. Anti-icing
- Takes place prior to storm
- Jumpstarts the melting process
- Sticks to the roads
- Salt residue remains on the road if storm is delayed
- Can begin treatment prior to storm

Products Available

- Calcium Chloride
- Potassium Acetate
- Calcium Magnesium Acetate
- Sodium Chloride

What are the white lines on the road?



Salt Brine



- Iowa DOT
- ODOT
- Brine is a mixture of water and road salt.
- Concentration of 23% salt
- Freezing point of -6 degrees

How is Brine Made?

- Road Salt is loaded into the 5 ton Hopper
- Takes 2 tons of salt for every 2,000 gallons of brine.
- 3,000 gallons / hour
- Control sump



Storage Tanks



- Automatically transferred to two 6,100 gallon storage tank
- Two Fill Stations
- Three 1,950 gallon Self-loading Direct Application Units
- Takes 30 minutes / truck to fill.

Application to the Road



Multi-lane Application



Application Rate

- Pre-treat estimated 670 lane miles of County Rd. at 40 gallons / lane mile
- Equates to 26,800 gallons.
- Takes more than two days to cover using three trucks
- Brine lasts for up to seven days



Old Method Vs. New Method

Old Method

- Pre-treat with salt just prior to the storm
- Pre-wet the salt with Calcium
- Involves Overtime

New Method

- Pre-treat with brine 7 days prior to the storm
- Pre-wet the salt with Brine
- Regular hours

Benefits

- Safety to the Motorist
- More time to respond
- Easier to plow off
- Less overtime
- Less salt
- Pre-treat in advance of the storm
- Cost savings

Savings (Material)

Pre-treat in advance of storm

- (Old Method) Salt – takes 127 tons of salt to cover the County Roads at \$29.00/ton

	\$3,683
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- (New Method) Brine – takes 26,800 gallons of brine to cover the County Roads at \$0.05/gallon

	\$1,340
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- Savings based on an average 15 events per year

	* \$35,145
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Savings (Material)

Pre-wet Salt during storm

- (Old Method) Calcium \$0.49 / gallon

Calcium used per event	5,286 gallons x 0.49	\$2,590
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- (New Method) Brine \$0.05 / gallon

Brine used per event	5,286 gallons x 0.05	\$264
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- Savings based on an average of 15 events per year

	\$34,890
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Savings (Labor)

- Reduce one additional hour at overtime rate

16 men / event	
■ \$408.00 / event x 15 events =	\$6,120

Estimated Savings / Year

Based on 15 events

Material Savings / Year (pre-wet salt)	\$34,890
Labor savings / Year	<u>\$6,120</u>
	\$41,010
Materials Savings / Year (pre-treat)	
* additional	\$35,145

BCEO Capital Outlay

■ Automatic Brine Maker	\$17,530
■ 3 Self Loading Direct App. Units	\$29,794
■ 6,100 Gallon Storage Tank	<u>\$ 3,486</u>
	\$50,810
· Estimated Incidental Cost	\$10,000
Total Cost	\$60,810

Next Step

- Develop a plan that will benefit the County Engineers office as well as the townships. This could include remote brine processing/storage sites.
- Reduce our expenses driving back to the garage to reload. (estimated to be approximately \$6,000/yr) *labor only*
- Provide even a better level of service to the public

Current Shortfall

- The county is 469 square miles. From the BCEO garage, it is twelve miles in any direction.
- It takes approximately 26,800 gallons of brine to pre-treat the entire county.
- With three brine distributors, it takes us two to three days to cover the entire county.

Concerns Need for Remote sites

- Look for a site on the east and west side of the county to help reduce travel time.
- Find a township on each side of the county that may be interested in purchasing the system and producing brine for the BCEO to pick up

CERTIFIED ROAD MILEAGE BY TOWNSHIP
White House, 1/1/2004

Township	County maintained Roads	Brine needed / lane mile	Township maintained Roads	Brine needed / lane mile
Ashtabula Twp	13.25 miles	1700 gallons	13.25 miles	1700 gallons
Belmont Twp	26.72 miles	3470 gallons	26.72 miles	3470 gallons
Carroll Twp	0 miles		12.2 miles	1580 gallons
Liberty Twp	18.18 miles	2300 gallons	17.12 miles	2200 gallons
Madison Twp	23.65 miles	3050 gallons	13.41 miles	1730 gallons
Millard Twp	20.22 miles	2620 gallons	15.94 miles	2060 gallons
Northway Twp	19.76 miles	2550 gallons	16.81 miles	2180 gallons
Palmer Twp	19.47 miles	2500 gallons	16.2 miles	2100 gallons
Polk Twp	21.29 miles	2750 gallons	13.22 miles	1710 gallons
Rock Twp	14.24 miles	1830 gallons	12.24 miles	1590 gallons
St. Clair Twp	21.28 miles	2750 gallons	13.15 miles	1710 gallons
Wayne Twp	12.15 miles	1550 gallons	18.27 miles	2370 gallons
West Chester Twp	18.18 miles	2300 gallons	15.2 miles	1970 gallons
Total	272.94 miles	34300 gallons	213.37 miles	27600 gallons



Solution

- Added another distributor
- Added another 6100 gallon storage tank at BCEO



Added two remote sites



Purchased a 5000 gallon tanker



Results

- Can now apply more than 26,800 gallons of brine on all county roads in little more than a day
- We can now deliver brine to the remote sites
- We make and sell brine to other agencies such as the townships, City of Hamilton
- We can use our tanker as a third remote site

Points to Consider

- Size of water service
- Fill stations / pump size
- Automatic transfer
- Remote sites
- Clean system regularly
- Need tanker endorsements
- Watch weather forecasts
- Temperatures
- Inform public

Questions

