

The Economics of Best Practice Implementation

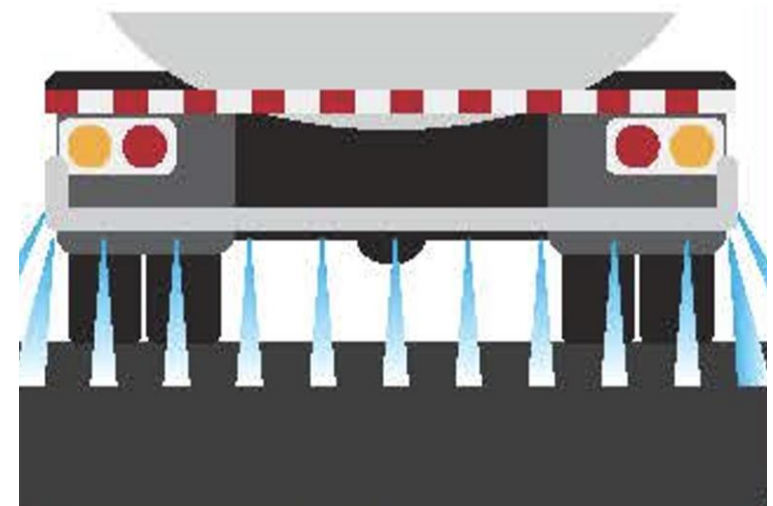
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January 21, 2025

WSSC Salt Summit

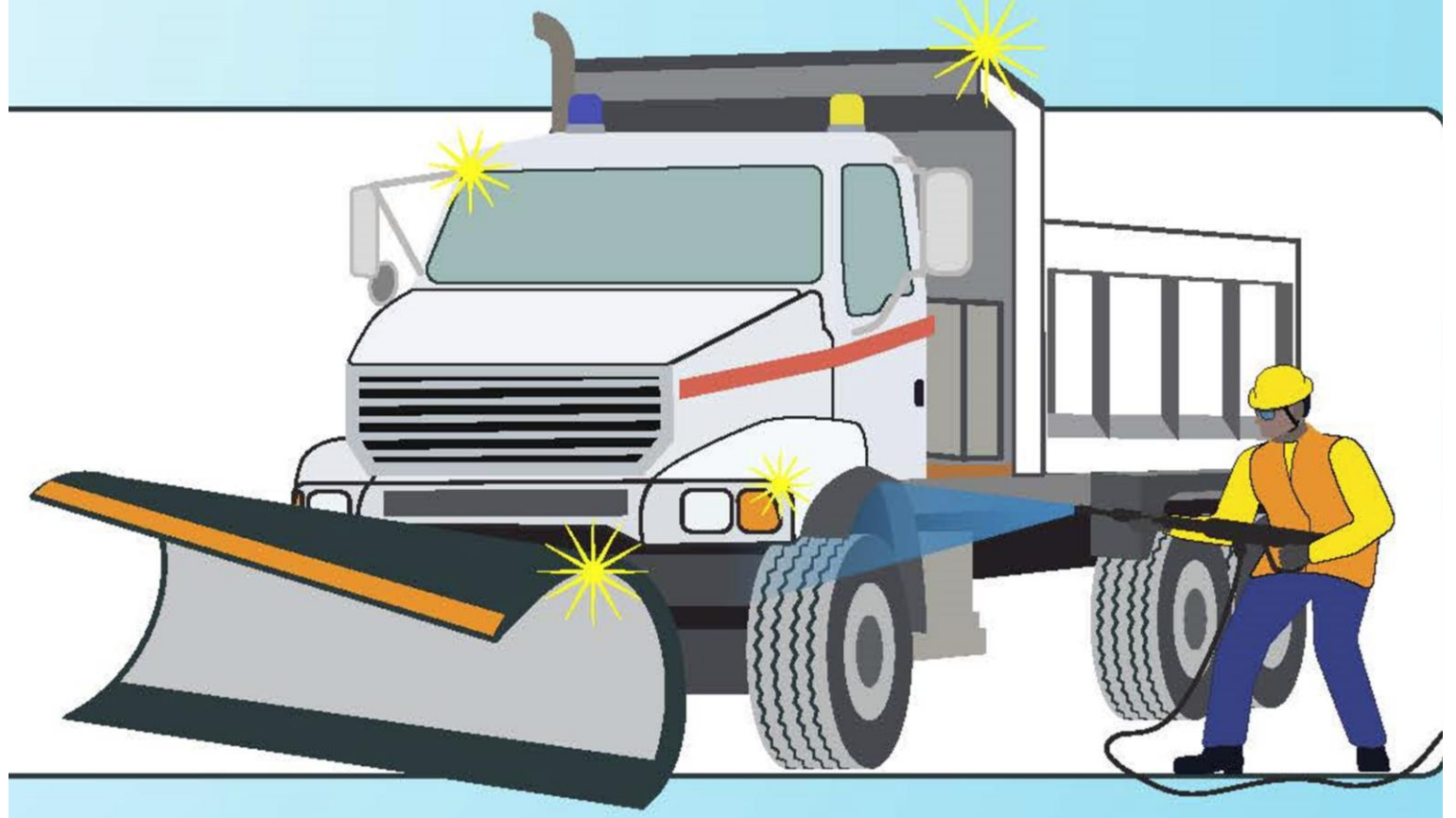
Winter Maintenance Best Management Practices

- Operations



Winter Maintenance Best Management Practices

- Maintenance
- Calibration



What is your motivation?

☐ Cost savings



☐ Regulation

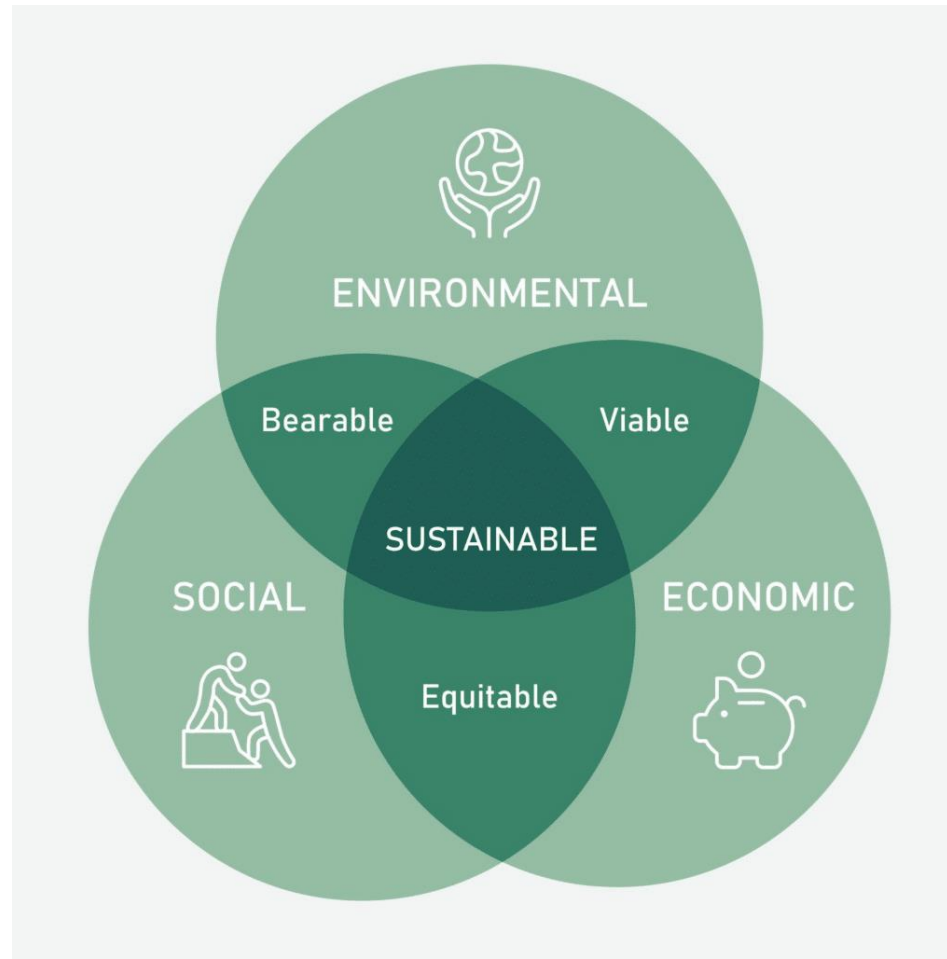


☐ Sustainability



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The Triple Bottom Line



Where do I start?

- Assess your operations
- When you look, you can find opportunities for improvements everywhere.
- Look to your staff for suggestions.
- Start with the low hanging fruit!
 - Doing a lot with a little...
 - Equipment Calibration
 - Plow speed
 - Variable application rates
 - Collect and analyze your data



The Economics of achieving the triple bottom line with BMPs.... Real world examples

- The power of CALIBRATION
- Asked the drivers where they set the knob 500 - 1200 lbs/l-m
- Recommended application rate is 250 lbs/l-m.
- Once calibrated, changing the culture of the operators became apparent.
- **\$75,000** savings in one year

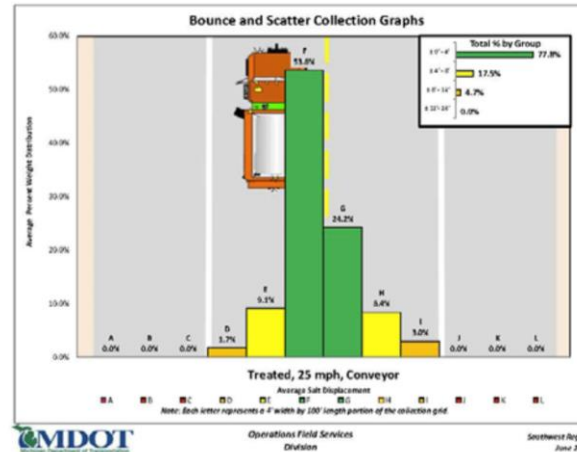
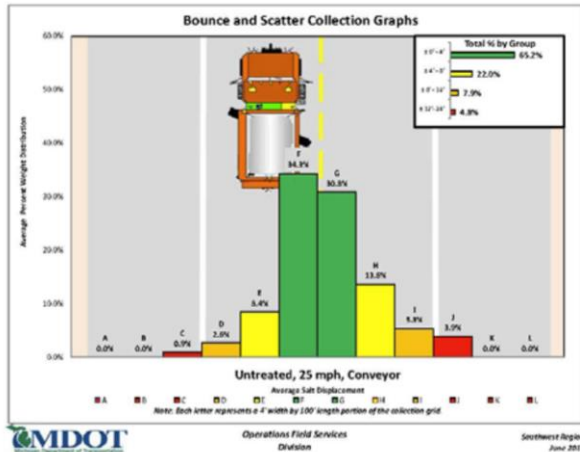
Resources

- Winter Spreader Calibration (Iowa DOT) <https://www.youtube.com/watch?v=IImpblRgdy8>
- Local Government Snowplow Salt and Sand Controller Calibration Guide - <https://mdl.mndot.gov/items/2009RIC08>

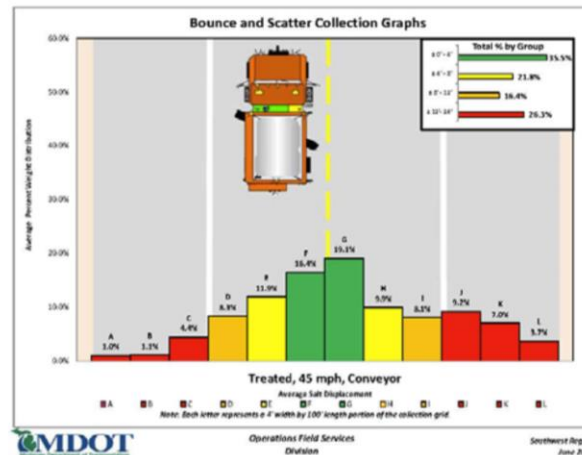
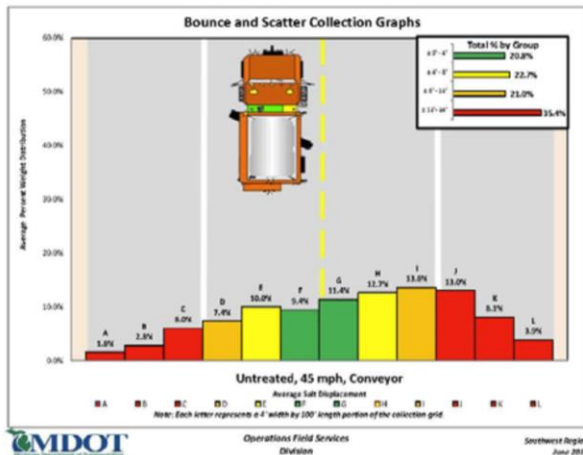
Plow speed study (Michigan DOT, 2012)

Dry

Pre-wet



- 25 mph, Salt on Road (12ft lane)
 - Dry – 90-95%
 - Pre-wet – 100%



- 45 mph, Salt on Road (12ft lane)
 - Dry – 65% [30% LOSS]
 - Pre-wet – 74% [25% LOSS]

Variable Application Rates

Pavement Temperature Range

Storm Type	Above 32°F and constant	Above 32°F and dropping	20°- 32°F	5°- 20°F	Below 5°F
Light Snow	Apply nothing – just monitor	100-150 lbs/lane mile	100-150 lbs/lane mile	150-250 lbs/lane mile	Apply no salt
Light to Moderate Snow	Apply nothing – just monitor	100-200 lbs/lane mile	200-250 lbs/lane mile	250-350 lbs/lane mile	Apply no salt
Moderate to Heavy Snow	Apply nothing – just monitor	100-150 lbs/lane mile	200-250 lbs/lane mile	250-500 lbs/lane mile	Apply no salt
Freezing Rain	Apply nothing – just monitor	75-100 lbs/lane mile	150-300 lbs/lane mile	250-500 lbs/lane mile	Apply no salt

Utah DOT

100 – 500 lbs/l-m

Iowa DOT

100 – 300 lbs/l-m

Pounds per lane mile of prewetted salt.					Assuming: 12-foot lane, 2-hour turn-around, medium service level	
Surface Temperature (F):	Heavy Frost, Light Snow	Medium snow	Heavy Snow	Freezing rain, drizzle, sleet	Blowing Snow	Notes
33-27 F	100	125	150	200	At all temperatures: Plow only if pavement remains dry. If icy wheeltracks/patches develop, use brine alone or with salt and follow-up frequently with additional plowing/brine/salt until pavements dry or blowing stops.	If pavements are already wet before pavement temperatures cool below 33, rates may be increased for first two hours after storm start to prevent bonding.
26-21 F	125	150	200	250		Rates may be lowered after initial round
20-5 F	150	175	250	300 prewet 50/50		Plow only if snow is not sticking. Apply salt below 15F only when conditions are favorable to avoid salt waste or refreeze. If icing occurs below 5F, use prewet sand at 20 gal/lm and 250 lbs.

Note: Salt rates are the combined total of dry salt plus salt in prewet.

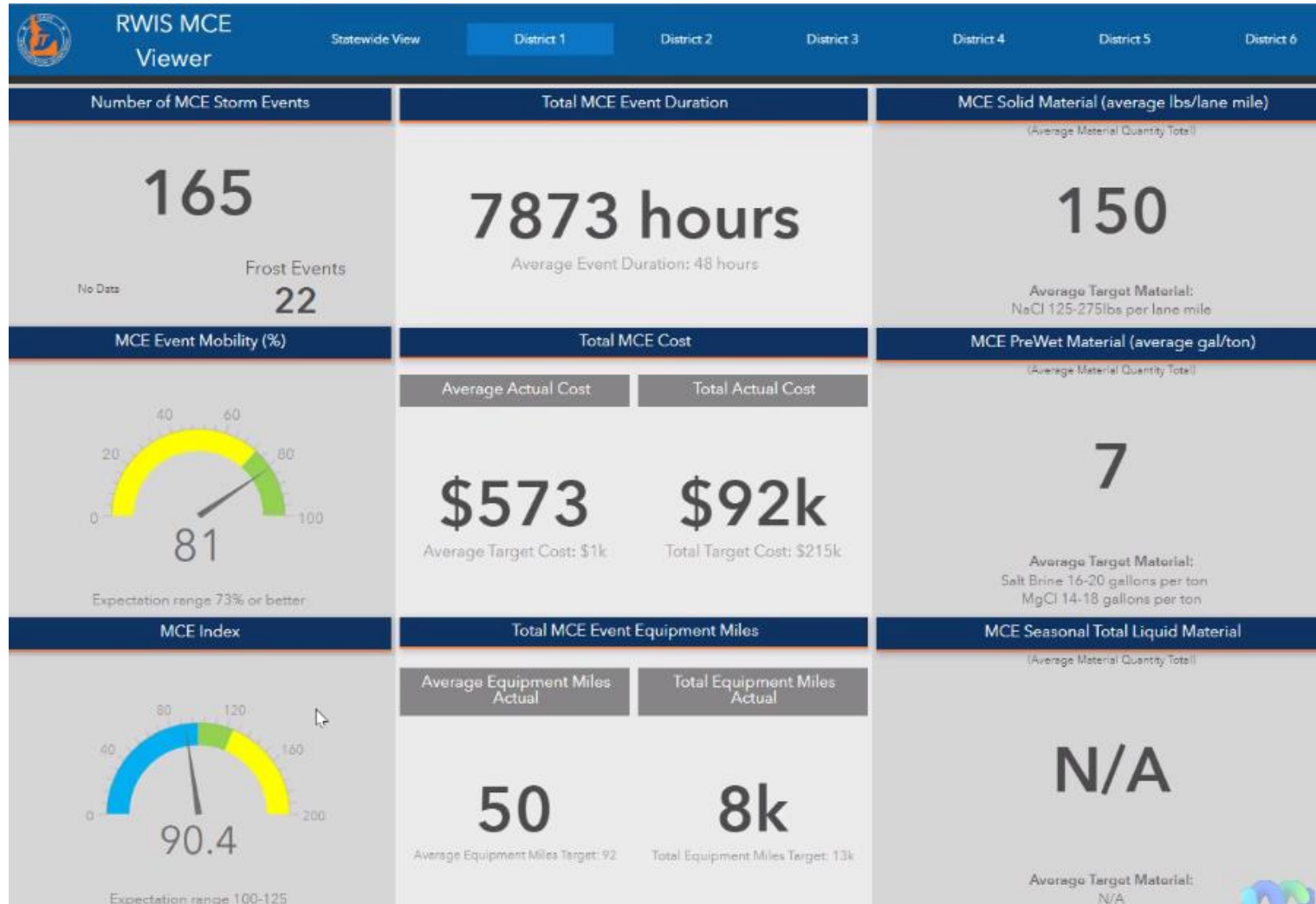
For reference: 1 gallon brine = 2.2 lbs salt. 5 gal/LM = 11 lbs, 10 gal/LM = 22 lbs, 40 gal/LM = 88 lbs

Collect and Analyze your Data

- What data is your agency collecting?
- How are you using this data?



Collect and Analyze your Data



When more is required to realize benefits

- You have tackled the low hanging fruit, no what?
- Make targeted financial investments in equipment and training
- Consider programmatic changes

Larger Investments or Programmatic Changes

- Example – Adding liquids to your operations



When more is required to realize benefits

- Come up with a Plan
- Start Small
- Give it a trial run, test it
- Tweak it to fit your needs
- Reassess costs and requirements compared to benefits
- You can always grow the program if its working



The Economics of achieving the triple bottom line with BMPs.... Real world examples

- DOTs Partnering with Conservation Organizations
 - Why: Elevated chloride levels identified at wastewater treatment facility
 - What: Developed trainings for parking lots and local road organizations
 - Best Practices Implemented:
 - Anti-icing and pre-wetting
 - Calibration
 - Using pavement temperature data to make decisions
 - Reduced plow speeds during applications
 - Economic Improvement: 40% reduction in chloride use each storm
 - 5-year avg. salt price per ton (IL): \$70.61

Your path forward

- Talk to others to see what is working for them
- Attend a conference, make connections
- Send staff to trainings, conferences
- Talk to vendors

