Using Wheel Loader Scales to Measure and Manage Salt Inventory

Joe Steiger, National Sales Manager- Trimble Loadrite & Jake Lewis, Loadrite Midwest

Reaching New Heights

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Abstract

Using Wheel Loaders Scales to Measure and Manage Salt Inventory: Tools for Winter Operations

Salt prices are going up, supply is uncertain, weather events are unpredictable, but citizens still demand safe roads. To respond winter ops teams are leveraging onboard scale technology and web reporting to take control of inventory, track material consumption, improve efficiency and improve health and safety. This presentation will introduce new tools, explain the benefits of a digital workflow, and cite examples of how counties, SHAs, and other municipalities are seeing tangible improvement in their snow/ice fighting operations.

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Learning goals

1. See new tools for loading, stockpiling, managing and reporting
2. Explain the benefits of a digital workflow in salt payload inventory and management
3. Understand the benefits of technology and improvements in snow/ice fighting operations
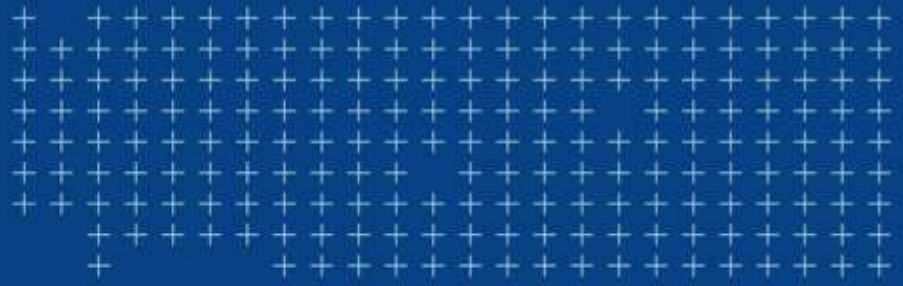
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Using Wheel Loader Scales to Measure & Manage Salt

Today

- Industry trends impacting operations and costs
- Critical municipality concerns
- Actionable data
- Operations
- Process improvement
- Cost reduction
- Risk mitigation
- Questions

Trimble: Trusted by Local Government

And more...

Customer list

Massachusetts

- Town of Pembroke: 1 x L2150, Wi-Fi DataTransfer, Roadboss MMS
- City of Haverhill: 1 x L3180 WLAN InsightHQ
- City of Newton: 2 x L2180 Wi-Fi Data Transfer, Roadboss MMS
- City of Waltham: 1 x L2150, Wi-Fi DataTransfer, Roadboss MMS

Connecticut

- City of Stamford: 3 x L2180, Wi-Fi Data Transfer, Roadboss MMS, InsightHQ
- Town of West Hartford: 2 x L2180, Wi-Fi Data Transfer, Roadboss MMS
- City of Danbury: 1 x L2180, Wi-Fi Data Transfer, Road Boss MMS
- Manchester: 2x Roadboss Indicator, Wi-Fi Data Transfer, Roadboss MMS
- New Milford: 1 x L2150, Wi-Fi Data Transfer, Roadboss MMS
- Fairfield: 1 x Roadboss Indicator, Data Module,Roadboss MMS
- Connecticut DOT: 15 x L2180 w/ LP950 Printer

New Jersey

- NJ Turnpike Authority: 36 (5 more to be added this year) x John Deere L2180, Wi-Fi Data Transfer, MMS –Each district receives data from each site and then all data from the districts are sent to NJTA central office

Maryland

- Maryland Transit Administration (MTA): 13 x L2180 with Printers
- Maryland SHA: 32 x L2180, InsightHQ and MMS

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Customer list

Ohio

- Ohio DOT: 10 x L2180,Wi-Fi Data Transfer and Data modules, MMS
- Ohio Turnpike Authority: 5 x L2180, Wi-Fi Data Transfer and Data modules, MMS
- City of Cincinnati: 6 x L2180, Wi-Fi Data Transfer, MMS
- City of Columbus: 6 x L2180, Wi-Fi Data Transfer, MMS

Kentucky

- Kentucky Transportation Cabinet: 55 x John Deere Ready L2180, John Deere Link Reporting

Michigan

- Michigan DOT/ County Road Commission: 35 x L2180/L2150/Force/EPS, Wi-Fi/Data Module Data Transfer, MMS

Illinois

- City of Chicago: 32 x L2180, 3rd Party Data Transfer, MMS

Maine

- Maine Turnpike Authority: 9 x L2150s, Wi-FI Data Transfer, 7 x Road Boss MMS

Delaware

- Delaware DOT: 23 x L2180, Printers

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Challenges

- Stockpile accountability
- Budgets and funding are tight
- Aggregate, sand, salt, prices are rising
- High demand as citizens expect roads to be open and safe 24/7
- What inventory is at which depot?
- Season start stockpile totals at each depot?
- Any material sent to neighboring districts, other govt agencies or private contractors?
- Mitigating Risk
  - Staff safety
  - public safety
  - department reputation
- Civic care- Environmental concerns

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Salt stress: Road salt prices higher as winter looms

By MICHAEL HILL   November 24, 2018

"Budget-busting road salt prices are leaving municipal officials in the Snow Belt hoping for a mild winter."

"Everybody's got their fingers crossed for good weather," said Rebecca Matsco, an official in western Pennsylvania's Beaver County, where one contract price came in at $109 a ton, 95 percent higher than last year.

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SDG council finalizes winter road maintenance plan

Nick Dunne

More from Nick Dunne

"McGillis was critical over the salt usage, based on the county's increased salt purchases over the a period of time. In 2006, the county had purchased 20,000 tons of road salt. On Monday, council accepted a tender for 30,000 tons. Between then, salt prices have nearly doubled to $105 per ton, as SDG will spend $3.15 million on this year's road salt supply."

"McGillis' concern has as much to do with environment as it does with the budget, and hopes to save taxpayers money while minimizing harm to the environment."

Editor's Notebook: The Flow of Salt

Shipping industry challenges could impact rock salt flowing up waterways to the major snow cities. Could this impact salt prices for commercial contractors?

May 29, 2019

Mike Zawacki, editor

"...shipping issues at the Panama Canal that could impact the cost and flow of rock salt through the canal resulted in some interesting reader feedback about potential transportation problems closer to home. That initial contractor feedback to the Panama Canal story pointed to extensive renovation work planned for the Illinois canal system and Great Lakes traffic that could impact the tonnage of salt brought up through the Illinois/Great Lake Waterways for next winter and beyond."

Salt shortage: What you can expect this winter

Jill Odom | September 18, 2018

"As the 2018/2019 winter approaches, reports of salt shortages are circulating once more."

"This doesn't mean that municipalities are getting off lightly, as cities and counties are reporting noticeably higher bid prices per ton of salt. In Elizabethtown, Kentucky, the lowest bid was from Compass Minerals at $110 per ton. Last year, the price was $54 per ton."

"Building a facility solely for salt storage can run anywhere from $30,000 to $50,000, according to Johnson, but these costs are recovered during the next shortage by having salt on hand before price spikes and the luxury of selling to those who are less prepared."

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Communities grapple with the high cost of road salt, even as mild winter eases demands on road crews

Updated Jan 5, 2019; Posted Jan 5, 2019

"Communities in Greater Cleveland are paying a high price this winter for last year's cold temperatures and snowfall. High demand for road salt last year drove up the price this year to more than double that of a year ago. And communities that didn't get their orders in early, may have trouble finding salt at any price."

"Ohio DOT's District 12...used 20,000 tons more of road salt than in the previous year."

How it works

- Onboard scales record your inventory for each truck loaded.
- InsightHQ reporting tracks stockpile levels
  - Product delivery
  - Less material loaded out
  - Plus unused material returned
- Average +/- 1% margin of error

Hardware

1. **LOADRITE®Pressure Transducers:** The pressure transducers connect to the loader's hydraulic system. They sense the hydraulic pressure in the lift cylinders as the load is lifted.

2. **LOADRITE®Triggers:** Triggers offer precision sensing throughout the lift cycle to ensure reliable and repeatable dynamic weighing.

3. **LOADRITE®Indicator:** Rugged design and programmed with proprietary weighing software, the LOADRITE®indicator provides an intuitive interface to the weighing system.

4. **LOADRITE®Slope Compensation Kit:** Specially designed to compensate for ground slope and enable the indicator to deliver superior accuracy on uneven ground (optional).

5. **LOADRITE®Printer:** See your site's productivity with the ruggedized printer providing hard copy receipts for printing of daily and weekly productivity and performance reports (optional).

6. **LOADRITE® Data Communication:** Data-communication solutions to meet the unique needs of your operation. These options allow your loader to communicate with our Material Management System (MMS™) Software in a secure, paperless manner (optional).

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Hardware

Goals

We enable local government to drive towards streamlined operations by reducing waste and risk across the operation

Industry goals

Inventory

- Track every ton in near real-time
- Manage inventory carrying costs and forecasts
- Account for every (shared inventory) ton in a consortium environment
- Reduce Waste

Fleet optimization

- All trucks at optimized payloads
- Maintenance and repair control

Compliance & Risk Mitigation

- Eliminate overweight loads that risk accidents
- Promote safety culture and equip operators

Data Capture/Reporting

- Forecast integrity
- Continuous Inventory & Procurement Improvement
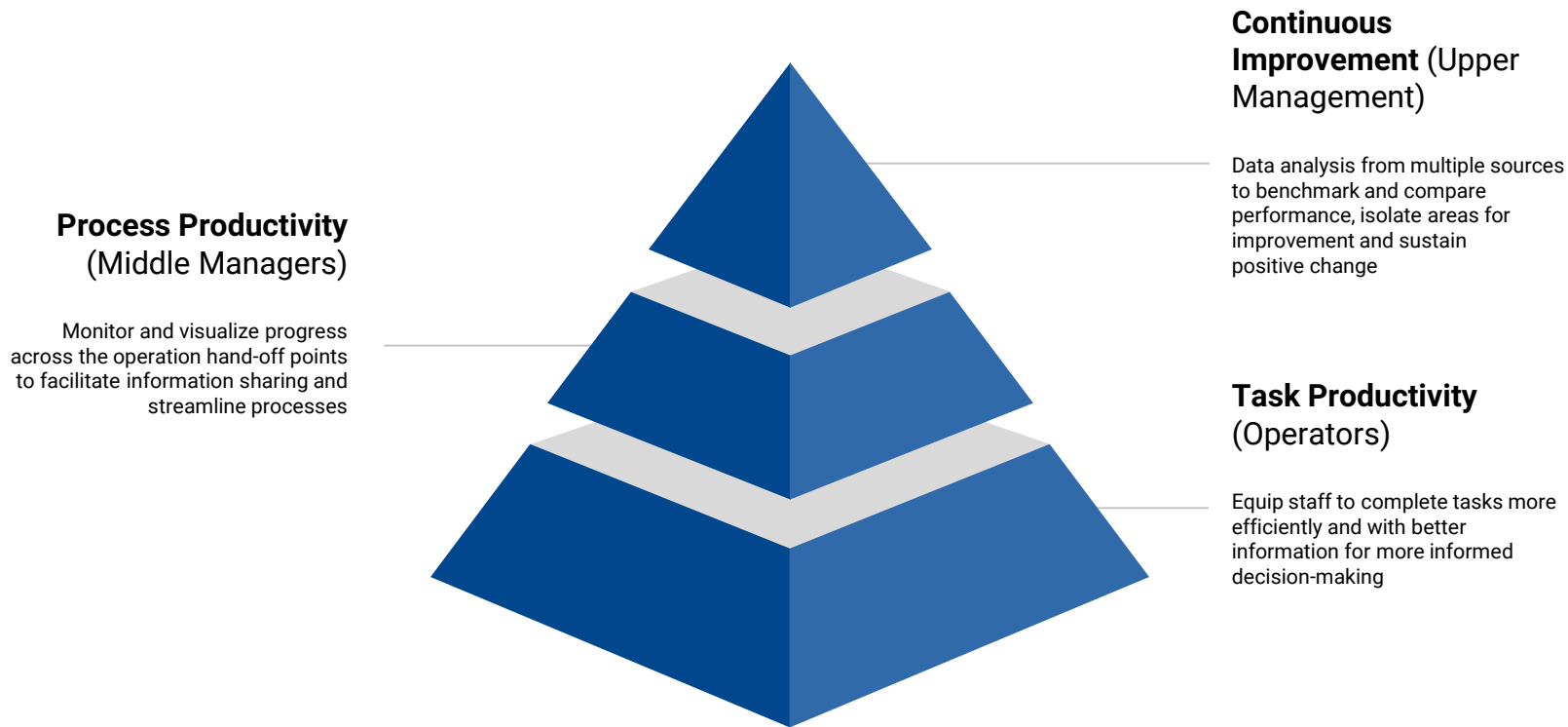
Your goals today?

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Value proposition

- Keep track of every ton of product in your stockpiles
- Know how many tons in every truck, every time
- Track usage by job/storm/event
- Set and manage KPIs for Operators, Managers, Purchasing Authority

Multi-level Benefits

Continuous Improvement (Upper Management)

Data analysis from multiple sources to benchmark and compare performance, isolate areas for improvement and sustain positive change

Process Productivity (Middle Managers)

Monitor and visualize progress across the operation hand-off points to facilitate information sharing and streamline processes

Task Productivity (Operators)

Equip staff to complete tasks more efficiently and with better information for more informed decision-making

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Glacier County, Montana

"As well as the increase in loading efficiency as a result of the system being installed, audits are now trouble-free due to the visibility of all products."

Bill Bandel,
Director of Public Works

LOADRITE

We don't really have a hard and fast price

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Benefits: Stockpile/Inventory management

- Reliable
- Objective
- Repeatable inventory management
- Stockpile inventory to within +/-1% accuracy

Benefits: Improved workflow

- Prevent truck overloading
- Stop overloading fines
- Ensure driver safety
- Avoid under-loading trucks
- Maximize fuel efficiency
- Maximize tire life
- Get more from every operational dollar

Benefits: Improved load out accuracy

- Direct inventory where it is needed most
- Prioritize major highways over low-traffic routes
- Better load-out aligns supply and demand
- Smaller environmental footprint by decreasing excess tons/mile.

Benefits: Better capital plan management

- Improved inventory visibility
- Accurate purchasing and storage
- Reduce excessive stock holding at season-end
- Smoother stock turns
- Easier budget planning for next season
- Smaller capital investments

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Benefits: Performance reporting

- Accurate data for pre/post-event meets
- Data for annual reports
- Objective performance data
- Report to media for local PR
- Reduce public questions and complaints
- Provide partner organizations (park districts, airports, hospitals, and schools) an accurate and accountable report of how much material they used

Benefits: Contractor Management

- Printed tickets/dockets for every load
- Summary reports
- Assign performance data per contractor
- Pay contractors for actual performance
- Manage under-performance

Detailed tracking

- Near real-time stock and replenishment
- Product (Treated salt, brine salt, sand, sand/salt mix…)
- Payload (Tons/lbs)
- Contract (Neighborhood/highway/run)
- Truck (truck number, saline tank, salt/sand mixer)
- Tons taken/returned (out/in)

Empower Operators

- Tools to prevent over/under-loading
- Tell drivers how many tons they are using on each load, for each lane mile or job
- Makes an "ok" loader operator better

Improve visibility and control of material inventory

Tons Out: 1,723 t
Tons In: 51 t
Total consumed today: 1,672 t

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Web-based Reporting

Event Usage Detailled -Municipalities Report

Report period From: 05:00:00
Dec 03 - 23:35:59 Dec 03

Road Salt

Time	Scale	Weight	Direction
Dec 3, 05:12	05	32.230	Out
Dec 3, 05:14	08	32.130	Out
Dec 3, 05:20	08	32.150	Out
Dec 3, 14:32	05	-1.210	In
		95.300	

Sand

Time	Scale	Weight	Direction
Dec 3, 05:23	05	23.930	Out
Dec 3, 05:14	08	23.950	Out
Dec 3, 05:20	08	23.890	Out
Dec 3, 14:32	05	-7.640	In
		64.13	

Northern Nevada Municipality   Generated 2:17:49PM Saturday, September 26, 2015

Event Summary Report - West Dome

Report Period: 9/25/2015 12:00:00AM - 4/1/2016 12:00:00AM

Event: Storm 6

Date	Site	Product	Records	Quantity (ton)
1/6/2016	West Dome	Salt	4	66.83
1/6/2016	West Dome	Sand	3	3.55
1/7/2016	West Dome	Salt	13	84.84
1/8/2016	West Dome	Salt	9	53.25
1/8/2016	West Dome	Sand	3	16.24
1/9/2016	West Dome	Salt	5	122.43
1/9/2016	West Dome	Sand	4	72.38

Totals for Storm 6   **41** Records   **419.52**

Event: Storm 7

Date	Site	Product	Records	Quantity (ton)
1/16/2016	West Dome	Salt	17	151.67
1/16/2016	West Dome	Sand	3	3.55
1/17/2016	West Dome	Salt	22	138.09
1/17/2016	West Dome	Sand	3	16.24
1/18/2016	West Dome	Salt	13	84.84
1/18/2016	West Dome	Salt	9	53.25
1/18/2016	West Dome	Sand	3	16.24
1/19/2016	West Dome	Salt	13	84.84
1/19/2016	West Dome	Salt	5	122.43
1/19/2016	West Dome	Sand	4	72.38

Totals for Storm 7   **92** Records   **743.53**
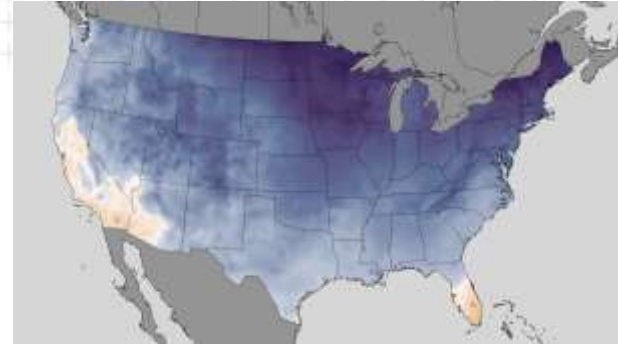
Web-based Reporting

Recent Technology Advances

- eTickets: instant email tickets, midday summary
  - Never lose the ticket, traceable
  - Up to 4 different email addresses
- Multi option communications
  - Radio
  - Wifi
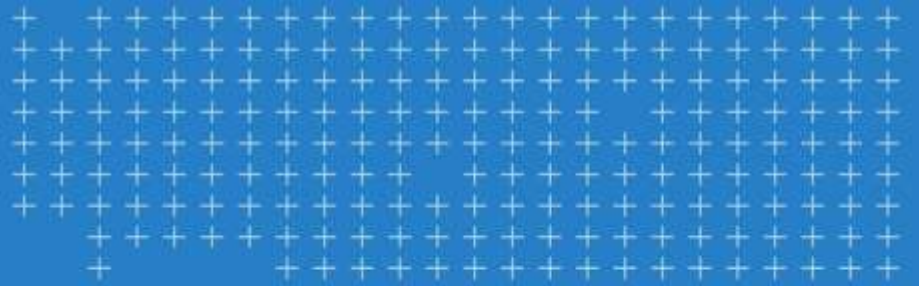 - Cellular
  - Printer

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Conclusion: Our challenges

- Salt prices and supply is unpredictable
- Weather events are unpredictable
- Budgets are tight

But, with onboard scales and reporting tools:

- Accurate loadout is predictable
- Stockpile management is predictable
- Risk is manageable

Every ton is measured, tracked and accountable

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Joe Steiger, Trimble Loadrite & Jake Lewis, Loadrite Midwest

Questions?

Questions or More Information/Resources

- Joe Steiger, Trimble Loadrite

- Jake Lewis, Loadrite Midwest