




Best Management Practices for Road Salt


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1: Salt Institute

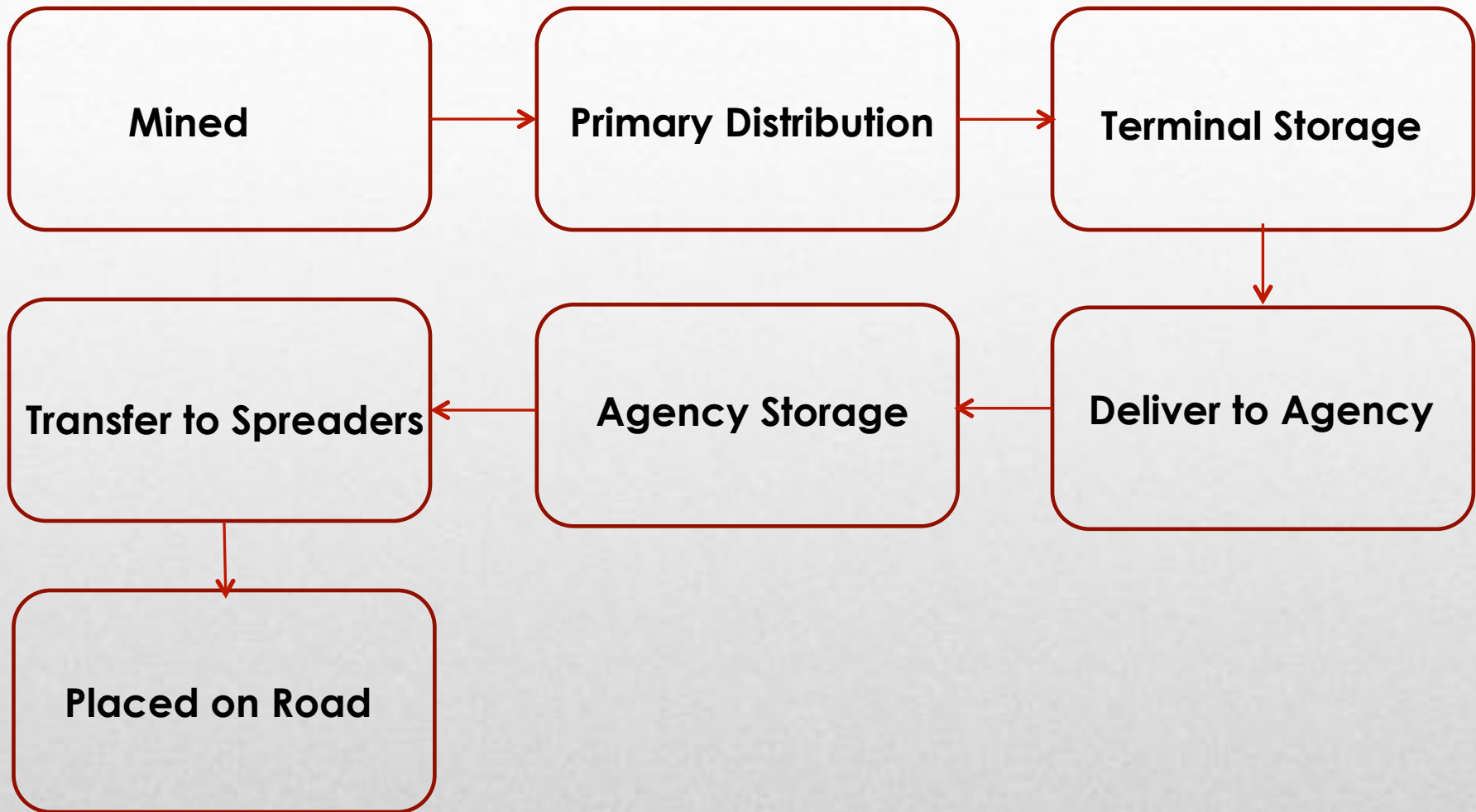
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- What was the goal of the study?
 - What has been achieved to date?
 - When will it be completed?


Map of the Talk

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- Determine best management practices for all stages of the “road salt lifecycle” pertinent to highway agencies.
 - Create a handbook that presents those BMPs in an accessible and effective manner
 - Provide a report detailing the processes by which the BMPs were identified and the handbook created

Study Goals



The Road Salt Lifecycle

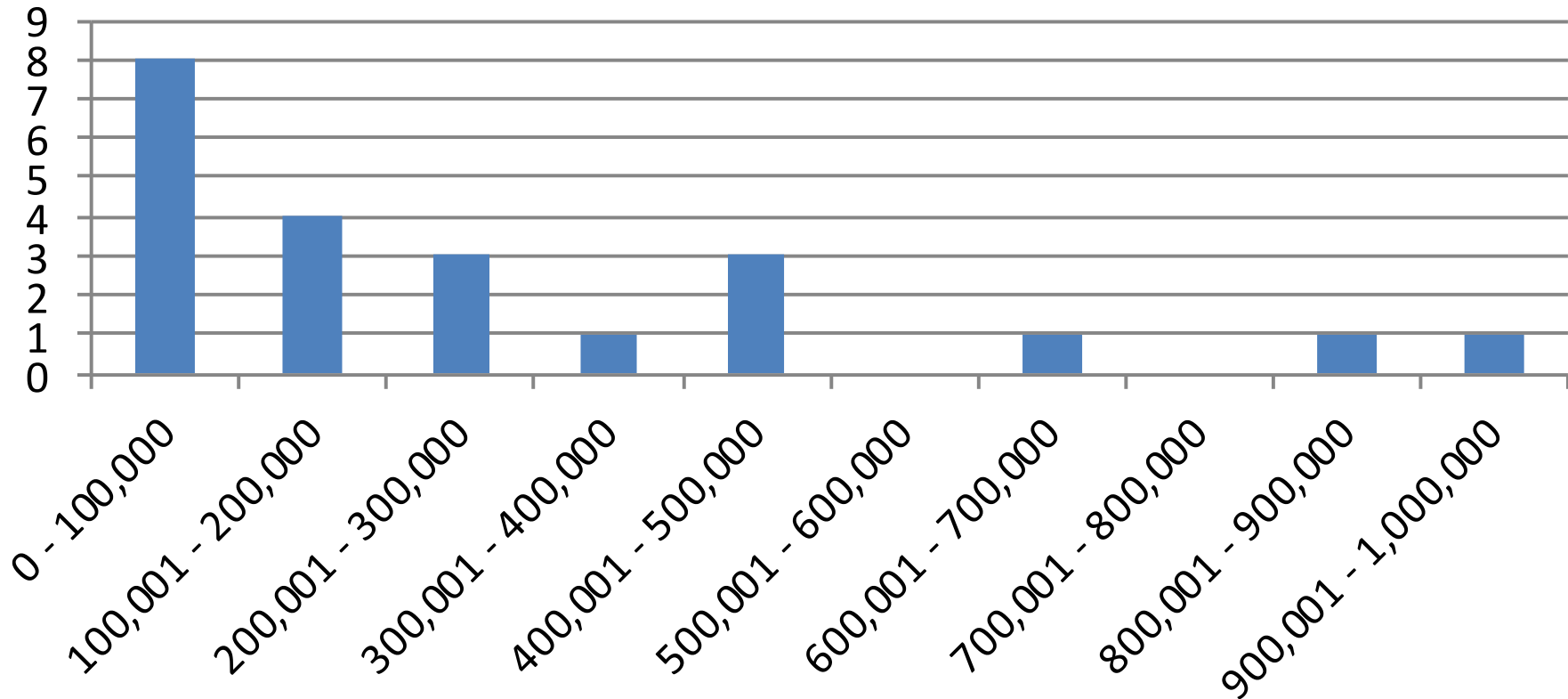
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- Driven by State (or other agency) bidding processes
 - Data collected by phone interviews
 - Interesting findings


First Part - Procurement



Agencies Interviewed		
Virginia Department of Transportation (DOT)	New Hampshire DOT	New York DOT
Montana DOT	Wyoming DOT	Nebraska Department of Roads
Missouri DOT	Oregon DOT	Michigan DOT
South Dakota DOT	Maine DOT	Louisiana DOT
Illinois DOT	Kansas DOT	Minnesota DOT
Colorado DOT	New Jersey DOT	Utah DOT
Wisconsin DOT	Kentucky DOT	Ohio DOT
North Dakota DOT	Iowa DOT	City of Toronto
City of Farmington Hills Michigan		

Average Salt Usage (Tons)




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- 56% had one year contracts that could be renewed for up to a total of 5 years
 - 20% had one year contracts not renewable
 - 24% had contract lengths between 3 and 5 years, with options to extend further


Contract Lengths

- 36% had no limits on the quantity of salt that had to be provided
- 64% had ranges to be supplied
 - 70% to 150%
 - 50% - 120%
 - 90% - 110%
- One agency had recently tightened limits (from 70 – 110 to 80 – 110) and saw an average price drop in response of 3.37% per ton


Quantity Limits

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- Required delivery between 2 and 15 business days from placing of order
 - During normal working hours unless by prior arrangement
 - Penalties for late delivery although not always assessed

Delivery Time Frames

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- Range of capacities from 20% to 150%
 - 44% can store 100% of average annual salt usage
 - 40% can store less than 100% (between 20% and 80% in responses)
 - Even if you can store 100+% may not be in right place
 - But, having storage for 100+% greatly reduces issues with delivery in winter weather


Storage Capacity Issues

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- Everyone is happy with their current process – nobody rated their process lower than 6/10
 - Some working on improvements in process now and expect great things
 - The relationship between costs and risks to vendors may not be well understood by agencies

Other Procurement...

- More storage is better because then there are fewer issues with in-winter delivery and it makes the quantity required less variable
- The tighter the limits on the quantities to be supplied, the lower the price is likely to be
- Anything that eases the delivery process (longer delivery time frames, more delivery pre-season) will likely reduce price


Procurement BMPs

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- The BMPs are fairly well known already (cf. Salt Institute Safe and Sustainable Storage Handbook)
 - While the handbook will reiterate those well tested practices, it will also highlight some newer practices

Salt Storage

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- Safety
 - Accessibility
 - Legality
 - Tidiness
 - Economics
 - Drainage

SALTED

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- Shared Facilities
 - Yard and storage building layouts
 - Need for liquid storage
 - Other

Newer Issues















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- Again, most information is well known
 - Goal is to collect it into one place

Application BMPs

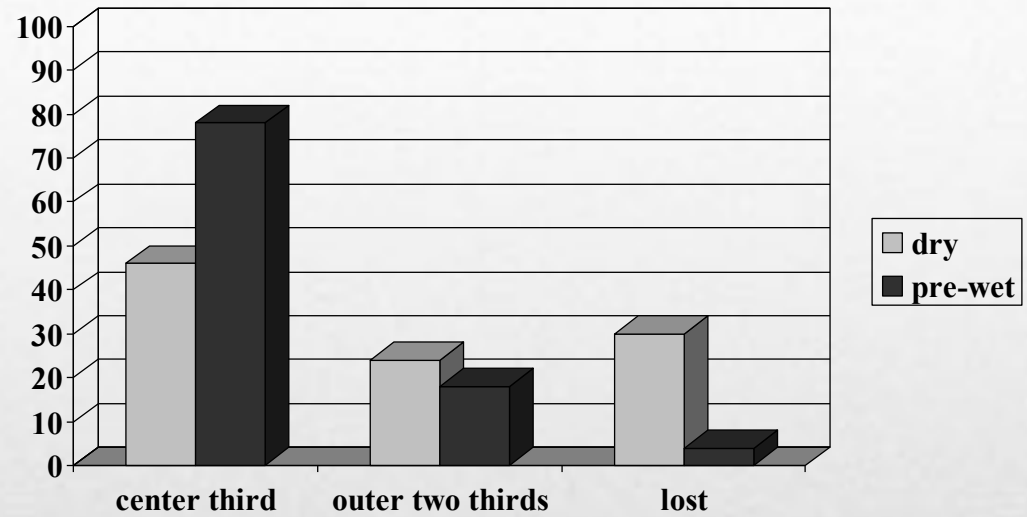
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- You can save up to the following percentages of salt (compared to a standard deicing strategy) by using the following practices
 - Pre-wetting – 30%
 - Anti-icing – 75%
 - Varying application rates to account for pavement temperature, storm type, and cycle time – 50%
 - Calibrating your equipment – unknown but can be big!

How to Save Salt

- Measure what you put down and where you put it
- Hold your organization accountable for the salt it uses (measure it and make sure it is in keeping with what you should have used)
- Use liquids where appropriate – and have a process to determine whether or not their use is appropriate
- Quit using salt when it gets too cold – and define what is too cold for your operations
- Get the best possible forecast you can
- Base your operations off your levels of service, and measure whether you have achieved them relentlessly
- Appropriate and effective training

Other BMPs

Pre-Wet the Material...



Levels of Service...



Salt Application Rate Guidelines

Prewetted salt @ 12' wide lane (assume 2-hr route)

<i>Surface Temperature (° Fahrenheit)</i>		<i>32-30</i>	<i>29-27</i>	<i>26-24</i>	<i>23-21</i>	<i>20-18</i>	<i>17-15</i>
lbs of salt to be applied per lane mile	Heavy Frost, Mist, Light Snow	50	75	95	120	140	170
	Drizzle, Medium Snow 1/2" per hour	75	100	120	145	165	200
	Light Rain, Heavy Snow 1" per hour	100	140	182	250	300	350

Prewetted salt @ 12' wide lane (assume 3-hr route)

<i>Surface Temperature (° Fahrenheit)</i>		<i>32-30</i>	<i>29-27</i>	<i>26-24</i>	<i>23-21</i>	<i>20-18</i>	<i>17-15</i>
lbs of salt to be applied per lane mile	Heavy Frost, Mist, Light Snow	75	115	145	180	210	255
	Drizzle, Medium Snow 1/2" per hour	115	150	180	220	250	300
	Light Rain, Heavy Snow 1" per hour	150	210	275	375	450	525