Advanced Snow Management
Best Practices
How would you best describe your role as it relates to snow & ice management?

A. Self Perform – Manage in house crew
B. Sub Contract – Manage other contractors
C. Mix – Self Perform & Outsource
D. Neither – Just curious about the topic
Who is SIMA?

SIMA is a non-profit international association that provides resources, leadership and support for anyone that deals with snow & ice management

- Established in 1996 by industry professionals
- 1,700 + members including independent contractors, in-house operations, manufactures, suppliers and consumers of the snow & ice industry
- Certified Snow Professional
- Advanced Snow Manager
- Best Practices Checklist
BEST PRACTICES CHECKLIST

Does your snow & ice management plan include these important guidelines?

Environmental Health, Safety, Liability & Risk Management:
- Verify insurance liability coverage to include specific ‘snow rider’ endorsement
- Documented site engineering plan to verify areas to properly locate and stack snow to prevent melt/ refreeze areas and line-of-site issues
- Documented safety program and policies including incident reporting process, on-going education, training and implementation (i.e. tailgate talks, perimeter inspections, safety equipment and PPE)
- Parking lots and sidewalk clearing process includes ADA compliance guidelines
- Awareness of salt's impact on fresh water resources related to proper application rates and storage

Estimating, Planning & Cost Effectiveness:
- Documented snow site engineering plan to verify client and site expectations for proper planning of equipment and capacity utilization (i.e. aerial maps with zone assignments & priority area designations)
- Utilizes a verifiable estimating system/tool to verify capacity related to size of site (e.g., sq. ft.)
- Capacity planning based on estimating system guidelines and cycle time expectations

Execution & Responsiveness:
- Documented snow site engineering plan to verify proper resource capacity has been dedicated related to cycle-time expectations and to identify priority areas to be serviced first
- Documented snow response planning process for variability of storm scenarios
- Minimum required ice control product in inventory at all times necessary for 2-weeks’ worth of average storm activity (average 2-5 storms dependent on geographic market) including product variety for variable temperature requirements (NaCl, MgCl, CaCl)
- Planned reserve equipment & labor capacity

Quality of Service:
- Documented snow site engineering plan to verify priority areas & zones (e.g., handicap zones, fire exits & hydrants, drains, etc.) and areas for snow to be relocated to ensure proper drainage, line of site, etc.
- Utilizes a site inspection process
- Consistent manager assigned to manage quality expectations

Communication, Documentation & Verification:
- Documented verification process (e.g., site visit/work completion logs)
- Technology enabled (e.g., electronic reporting systems)
- Utilizes communication system (e.g., phone tree, electronic notification, centralized call center or contact)
- Documented organizational communication process flow (e.g., Plan > Do > Verify > Re-Do > Invoice)

Certification / Standards & Education:
- Certified Snow Professional (CSP™) on staff
- Advanced Snow Manager (ASM™) on staff
- Attends continuing education seminars, webinars, trade shows, etc.

Expertise & Professionalism:
- Manager/Foreman assigned to manage site(s) has 5 years or more field experience
- Staff assigned to perform work on the site(s) has 2 years or more field experience
- Documented organizational and accountability structure for the company and site(s)
- Company/management is an active member of SIMA

Download this checklist at www.sima.org/bestpractices
Priority ‘Parking Lot’

- Insurance
- Snow Site Engineering
- Cycle Time Rate, Expectations and Capacity Demand
- Communication & Documentation
- Other ‘nuggets’ if we have time
Why Do Best Practices Matter?

• By definition, a best practice is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered.

• There is no industry mandated education, standards or regulations.

• Reduce Risk and Liability.
Beneficiaries of Best Practices

• **Clients / Consumers**
• Employers (Owners, Executives, Managers)
• Employees (Operators, Labor)
• Insurance
Company Insurance coverage verified to include CGL w. proper ‘snow plowing’ endorsement – CAL and / or Personal coverage DO NOT count! Potentially ½ of the industry is underinsured.

Claims?
Where do losses occur?

Statistics from Zurich Insurance North America

- Parking Lot/Garage: 35.00%
- Outside Building/Stairs/Ramps Docks: 25.00%
- Sidewalks: 20.00%
- Lobby/Entrance: 15.00%
- Job site: 5.00%

[Diagram showing the distribution of losses in different areas]
What does it cost?

Statistics from Zurich Insurance North America

Average value of loss by area of property

- Job site
- Lobby/Entrance
- Sidewalks
- Outside Building/Stairs/Ramps Docks
- Parking Lot/Garage

Average Cost

$0.00 $15,000.00 $30,000.00 $45,000.00 $60,000.00 $75,000.00 $90,000.00

Source: www.sima.org
By the Numbers...
Statistics from Zurich Insurance North America

- The average cost of a claim as a result of a slip & fall caused by snow & ice by the member of the public is $15,132; 73% of claims settle for less than $20k – 50% due to lack of verified / documented service

- The average cost of an employee claim as a result of a slip & fall caused by snow & ice is $35,132

- Zurich Insurance North America reserves One Billion dollars annually for snow related claims

- 4% Go To Trial; 53% Settled; 43% of claims are thrown out (frivolous)

- **Over $2 benefits paid out for every $1 of coverage for settled claims**
Safety - PPE

[Image of various PPE items: gloves, earplugs, hard hat, high-visibility jacket, and a man wearing all of it]

ASM
ADVANCED SNOW MANAGER™
Documented and practiced Environmental Health and Safety program including:

- Policies related to PPE
- Safety tools and equipment to be utilized
- Documented ‘tailgate’ safety training program for employees and subcontractors (aka - ‘toolbox talks’)
- Verification and Incident reporting process

Safety Training Kit available at [www.sima.org/resources](http://www.sima.org/resources)
Liability & Risk – ADA

ADA PAR Compliance*:

- Accessibility** of Pedestrian Access Routes (PAR) shall consist of one or more of the following components:
  - Walkways
  - Ramps
  - Curb ramps (excluding flared sides) and landings, blended transitions, crosswalks, pedestrian overpasses and underpasses

*From section R301.2 Components

**Accessibility compliance includes keeping the PAR clear of snow and ice.
Liability & Risk - PROWAG

PROWAG*:

- **Public Right-of-Way Accessibility Guidelines (PROWAG)** are federal guidelines on their way to becoming standards.
- Once they are standards, municipalities or governing bodies can be held legally responsible for these guidelines.
- Many governing bodies including states and large municipalities have already adopted these guidelines in their own standards.
- Applies to sidewalks and parking lots which are owned by a government.
- Canada has started a similar initiative.

*Universal design and compliance of these guidelines is a best practice regardless of the accessibility issues of the pedestrian (i.e. a healthy able-bodied person can still slip on ice)*
Safety, Liability & Risk Management

- Verify areas to properly locate / stack snow to prevent refreeze of melting piles and line of site issues using **Snow Site Engineering Plans**
Safety, Liability & Risk Management

Near Miss: “Snow Forts”
Buried in snow for 7 hours, boys feared death

By Kevin Conlon, CNN
updated 1:06 AM EST, Sun November 30, 2014

(CNN) -- The two boys who were discovered early Thanksgiving morning buried under 5 feet of snow -- and the officer with a hunch...
Near Miss:

Stacking / piling snow under overhead utility wires.

Is operator safe?

What if children play on top of the piles?
Safety, Liability & Risk Management

- Pre-season site visits to include existing condition assessments – locate on a site map
- Pictures to document damage & areas of concern
Safety, Liability & Risk Management

- Awareness of proper salt application rates, storage and salt’s impact on the environment - including landscape plantings and fresh water resources
Chloride Impacts Review

• Salt has hidden infrastructure costs
  – Concrete & Steel Structures Big & Small
• Salt Negatively Impacts Life
  – Plants
  – Fish/Aquatic Life
  – Humans Health (Water)
• Chloride Contamination Exists in Many States
• No Viable Clean Up Solution
Freshwater Resources

Where is Earth’s Water?

- **Freshwater 2.5%**
  - Groundwater 30.1%
  - Surface other freshwater 1.2%
- **Other saline water 0.9%**
- **Oceans 96.5%**
- **Glaciers and ice caps 68.7%**
- **Lakes 20.9%**
- **Ground ice and permafrost 69.0%**

Source: Igor Shiklomanov’s chapter “World fresh water resources” in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World’s Fresh Water Resources. NOTE: Numbers are rounded, so percent summations may not add to 100.
Freshwater Perspective
Snow & Salt Storage

Source: Minnesota Winter Parking Lot & Sidewalk Maintenance Manual
Vegetation Desiccation
Salt Induced Turf Damage & Erosion

Soil hard as concrete!

Resulting Erosion Problems!
Why Anti-Ice / Pretreat?
A Parallel Example:

Would You Ever Do This?

“Stick” Frying Pan
Cook Without Butter or Oil
Effect:
Cleaning Time?
Soap & Water?
Anti-icing (Pre-Treating)

- “A strategy in which a chemical is applied directly to a roadway surface before a storm begins or before any snow or ice has bonded to the pavement.”
- **Proactive** approach to winter maintenance
- Forms a “bond-breaker” between the road surface and the snow/ice layer (*just like greasing a pan before cooking*)
- Jump starts the melting process
Anti-icing

• Reduces the amount of time required to clear pavement

• Up to 75% material reduction

• Up to 90% cost savings

• Improved results because snow/ice bond never forms with the pavement

Source: http://www.icenator.com/liquid-deicer.htm
Effect of Anti-Icing

- Liquids
- Solids
- Total Salts/Abrasives
- Environmental Impact
- Useful Life of infrastructure
- Total Operational Cost
Sidewalk / Road Crew Harmony
"1’ foot / 30 cm Rule"

“No Man’s Land”
Estimating, Planning & Cost Effectiveness

- Snow Site Engineering plan to verify proper equipment allocation and capacity utilization compared with customer/site expectations (i.e. aerial maps with zone assignments & priority areas)
- Utilize an estimating system / tool to verify capacity related to size of site (i.e. square feet of asphalt, sidewalks)
- Plan capacity based on estimating system guidelines and cycle time expectations (sq. ft. production rates per hour) – **Eliminate Trigger Depths**
Snow Site Engineering
Define Priority Areas

Store Entrance
Snow Site Engineering Plans

Color coded site map that includes:

- Property Boundaries
- Areas to be services (Roads, Lots, Walks, Loading Docks)
- Where to properly locate snow piles
- Priority levels for each area
- Drains, Emergency Access Fire Hydrants, Handicap Access
- Patterns to plow or spread salt so the operator can keep moving forward and avoid having to back up (reverse)?
- A picture to communicate and verify expectations to your clients and operators
Virtual Site Inventory

- Total Parking lot Sq.Ft.: 34,000
- Brick paving: 2,000 Sq.ft.
- Special intersection
- Fire hydrant
- Raised catch basin
- Snow Storage

14 Manning St, Derry, NH 03038
Plowing Directions and Storage
Secondary Snow Piles: Only use if Necessary
Questions?
Cycle Time Rate + Expectations = Capacity Demand

**Cycle time expectation**

In order to choose the correct response strategy, you need to consider three things:

- **Cycle time rate**: Calculate the amount of time it takes to complete the work.
- **Client expectation**: Understand what the client expects to be completed and by when.
- **Capacity**: Types and amount of resources you have to complete the work.

Click on the blue boxes to learn more.

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**Cycle Time Rate**

The amount of time (rate) it takes to complete work in a specific area (unit area) with a specific type and size resource (unit resource).

**Client Expectations**

Area(s) which a client requires to be clear of snow and ice by a certain time(s) of day.

**Capacity Demand**

The amount of resources it takes to meet client expectations. The capacity demand for each storm will change depending on the:

1. timing of the storm
2. amount of accumulation
3. snow's density
Cycle time expectation mistake

A common mistake is to determine the cycle time based on your existing capacity. This excludes the client expectation which is an important step in the decision-making process. Click on the client expectation button to see how the process changes when you include the client.
Salt Pickup Locations

Define Priority Areas

Store Entrance
Cycle Time Rate + Expectations = Capacity Demand

Determine cycle time expectation
Click on the boxes below to see the process of determining cycle time expectation for each client and site. Cycle time expectations will be discussed in greater detail with specific examples in the plow, sidewalk and ice management certificates.

**Cycle Time Rate**
How much work can be completed with a specific type and size resource?
1. Unit area example: 1 acre parking lot
2. Unit resource example: standard 8-9 ft. plow
3. Rate/Unit area example: 2 in. or 5 cm/acre cleared in 1 hour

**Client Expectation**
When does the client want specific areas cleared?
1. Time: 7 a.m.
2. Area: 1 acre parking lot

**Capacity Demand**
What resources do you need to meet the demand?
1. Timing of the storm: 3 a.m.-5 a.m.
2. Amount of accumulation: 2 in./hour
3. Snow’s density: light, fluffy

**Sima**
Your source for Snow & Ice Management Education
www.sima.org
Cycle Time Rate + Expectations = Capacity Demand

- Cycle time is simply the amount of time it takes you to meet your client's expectations. A typical expectation is to have primary lots and walks clear by 7:00 a.m.
- **Example:** A snow storm or squall begins at 3:00 a.m. and produces 2” of snow per hour for 2 hours (4” total). A 7:00 a.m. ‘all clear’ expectation in this example requires you (or your vendor) to have the proper capacity of equipment and man power to cycle through the entire parking areas and walkways in 2 hours.
- If you expect to meet the 7:00 a.m. deadline, you have to clear all parking lots and walkways within 1 to 1.5 hours. This also means de-icing operations can only take you about approximately 15 minutes.

**#1:** If this was a 4 acre lot - What capacity of resources would you need? 
**DO THE MATH**

**#2:** How could an anti-icing application help with this scenario?
Time check & Questions?

Priority Parking Lot

- Insurance
- Site Engineering
- Cycle Time Rate, Expectations and Capacity Demand

- Communication & Documentation
- Other ‘Nuggets’ if we have time
Communication, Documentation & Verification

- Documented verification process (Carbon copy site reports, Electronic reporting, GPS, etc.)
- Utilization of communication systems (Call Center, IVR, etc.)
- Documented organizational communication process flow (Phone Tree, Org. Chart)
- Storm response plan
While you are managing a storm, it is important to keep accurate records of performed work. Your company and your client may require this documentation.

- Communication and verification of work completion;
- Estimating future costs for labor and materials usage;
- Provide compliance for licensing and to regulatory agencies; and
- Possible litigation and defending claims by proving due diligence of performing work.

Click the buttons to learn more. The Next button will become active after all buttons are checked.
✓ Start & Stop Times (#1)
✓ Type of storm
✓ Duration of storm
✓ Conditions during and after the storm
✓ Incidents
✓ Verbal summary

Why?

### Snow & Ice Site Documentation Report

<table>
<thead>
<tr>
<th>Account Name:</th>
<th>Address:</th>
<th>Time arrived onsite: am pm</th>
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<tbody>
<tr>
<td>Operator(s):</td>
<td></td>
<td>Time exited site: am pm</td>
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#### Site conditions upon arrival:
- Total accumulation: __________
- Snow moisture: [Dry/powder] [Moderate] [Wet/heavy] [Slush] [Just Plowed]
- Drifting Present: [Y]     [N]       Ice: [Y] [N]
- Traffic: [No]    [Occasional] [Light]   [Moderate] [Heavy]
- Obstructions to note: ___________________

#### Weather Conditions during service:
- Current Precipitation: [None] [Flurries] [Moderate Snow] [Rain] [Sleet] [Heavy Snow/whiteout] [Freezing rain]
- Conditions: [Calm] [Breezy] [Windy]
- Cloud cover: [Sunny/clear] [Cloudy]
- Other extreme/typical weather notes:
  __________________________________

#### Services Performed:

<table>
<thead>
<tr>
<th>Snow Removal and Hauling</th>
<th>Date:</th>
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<tr>
<td>Stacking on-site</td>
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<td>Removal</td>
<td>Hrs:</td>
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<table>
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<th>Ice Management</th>
<th>Roads &amp; Lots</th>
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<td>[Front] [Rear] [Side] [Other]</td>
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<td>Parking Areas</td>
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<td>Loading Docks</td>
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<td>Drive-Thru</td>
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<tr>
<td></td>
<td>Ramps</td>
</tr>
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<td>Delivery Area</td>
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#### Estimated Materials Used:
- Salt: _______ bags _______ lbs.
- Calcium: _______ bags _______ lbs.

No Service Performed – Site Check Only
- Charge
- No Charge
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<tr>
<td>** Snow Captain **</td>
</tr>
<tr>
<td>Office: (000) 000-0000</td>
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<tr>
<td>Home: (000) 000-0000</td>
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<tr>
<td>Mobile: (000) 000-0000</td>
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<td>Home: (315)</td>
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<td>Mobile: (315)</td>
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Why Have a Staking Process?
Staking Process – Color Coding
Sidewalk Prioritization (Ops)
More questions & time for more ‘nuggets?’
Execution & Responsiveness

Full season timeline (provide dates)

- RFI / RFP’s & award 90 days prior to start of season
- Pre-season check completed
- Equipment delivered to site (if necessary)
- Marking/staking of property
- First bill received
- Site cleaned up and marking stakes removed
Execution & Responsiveness

- Documented snow site engineering plan to verify resource capacity
- Documented snow response planning; *‘Double Double’ rule*
- Minimum inventory of required ice control product at all times – enough for 2 week average storm response (2-5 storms) for all types of temperature variables (NaCl, MgCl, CaCl)
Quality of Service

- Define client / site cycle time expectations
- Documented site engineering plan to verify necessary capacity to meet cycle time expectations (How much time do you have to meet minimum expectations?)
- Site inspection process with written results of expectations met or not met (‘curb to curb’)
- Assurance that site management is consistent – Dedicated site / territory manager (POC)
Equipment

- Documentation of equipment; quantity, age and condition to be used on site
- Backup equipment plan; quantity, age and condition – 10% minimum
- Repair plans; Mechanic on staff, on call or sub-contracted
Licensing & Permits

- State and Local licensing & permits as required
- Local municipal regulations (e.g. noise, hours of operation)
- Local / State municipal compliance for salt storage required by Departments of Environmental Protection.
Certification/Standards & Education

- Advanced Snow Manager (ASM) [new offering]
- Certified Snow Professional (CSP)
- Attendance and involvement in equipment and industry training
- New Hampshire Salt Certification – voluntary certification
Differentiate your business with quality training
Make your business more attractive to insurance providers
Deliver better results to customers
Improve safety and reward key performers
Thank You... Thank you very much!

Questions...
Where to find more information

www.sima.org
www.sima.org/resources
www.sima.org/bestpractices
www.goplow.com

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