Winter Maintenance
Snow and Ice Control
– Module 3 –

PRE-SEASON ACTIVITIES

PRESENTED BY:
DELWARE T²/LTAP CENTER
Introduction

In this module:
- Personnel training and refreshers
- Stakeholder briefings
- Contracting and material acquisition
- Storage and handling materials
- Equipment readiness
- Crew and equipment assignments; practice runs
- Snow markers and passive control devices
- Check/clear drainage ways
- Calibrate spreaders and other equipment
- Public service announcements and bulletins
Post Planning, Pre-Season Activities

• You wrote/revised the plan in the summer
• Now it’s fall
• It’s time to start implementing your pre-season tasks
• Don’t wait until December
  • That invites unpleasantness
Personnel Stuff

- **Conferences**
  - North American Snow Conference
  - Eastern Snow Conference
  - Western Snow Conference
  - Western Snow and Ice Conference...

- **Classroom training**
  - Conventional training (like today)
  - Training videos
  - Tailgate meetings
  - Mentoring and peer training
  - Dark hours training
Personnel Stuff

- Certifications
- Rodeos
- Open houses
- Competitions
- Vendor fairs
- Demonstrations
Personnel Stuff

• Work force rules
  ○ Keep abreast of new rules (local, state, federal)
  ○ Start with your personnel experts
  ○ Fair Labor Standards Act, etc.
  ○ Each approach has advantages/disadvantages and implications for pay, comp time, work hour limitations
    ▪ Maximum time to report for duty?
    ▪ Stand-by duty
    ▪ On call
  ○ Minimum pay for call-in, standby, on call, etc.?
  ○ Altered shifts – three 8-hrs; two 12-hrs?
  ○ Briefing – remind everyone of the procedures for the season
Personnel Stuff

- Drug and alcohol refresher
- Personnel logistics
  - Modes of contact for on-call personnel – phones, pagers, email, social media
  - Rest areas at facility for operators?
  - Latitude on take home vehicles and or ability to pick up/drop off employees
- Route familiarization
  - Dry runs, including dark hours
  - Rehearsals
  - Equipment training
Personnel Stuff

Know your route

Video

Plow Power – New England Chapter APWA

Winter Maintenance Training – Delaware T² Center
Personnel Stuff

- **Uniforms and gear**
  - Warm, dry clothing – layers, layers, layers
  - Foul weather personal gear
  - High visibility, retroreflective outwear/vests
  - Hard hats, ear protection, safety glasses
  - Fire extinguishers, emergency flares or triangles
  - First aid kit
  - Flash light
  - Tow chains, tow straps, tire chains, basic tools
  - Window scraper, brush, broom, shovel
  - Route map
Personnel Stuff

- Moral of the story?
  - Layers
  - Layers
  - Layers
Update the World

- **Stakeholder venues**
  - Website postings
  - Press releases
  - Newspaper feature articles
  - Radio public service announcements
  - Public meeting presentations
  - Rotary and Chamber of Commerce presentations
  - Meetings with key institutions like hospitals
  - Briefings to other emergency responders

- **Winter maintenance plan, SOPs, LOSs, chain of command**
Contractors

- Clearly establish scope of work, performance criteria, and what each party provides and when
- Dependability of equipment availability, performance, and safety
- Insurance
- Performance bonding
- CDL certifications
- Training certifications
- Contract payments
- Minimum season payments
Contractors

- Identify routes
- Establish single point of contact between parties
- 24-hour contact information requirement
- When are they called out and by whom?
- Penalties for non-response?
- Receive bids or set hourly rates?
- Mobilization charge? Stand by time? Minimum call out time? Allowance for mechanical repair time?
- Require/allow shotgun rider (second seater)?
- Training or orientation allowance?
Contractors

- Use of your equipment versus theirs
- Who provides abrasives and/or freeze point depressants (FPD)?
- Tell them which FPDs you’ll be using – you don’t want claims that they had no idea you’d be using salt
- Establish LOSs
- Require that all equipment be in good working order (define what that means)
- Normal contract language (severability, availability of funds, payment, safety, claims, etc.)
Material Inventories

- Your stockpile is low, your de-icing and anti-icing tanks are empty, and your material suppliers can’t get to you until next week ... at the earliest!

Where’s the salt?

Oh, there it is!
Salt prices up
  o Fall 2014
  o Not so in our area?
Supply down?
  o Maybe not for us?
Still, all the more reason...
Let’s use salt wisely
  o Planning
  o Good practices
  o Calibration
  o Reading the storm
Material Inventories

- **Inventory**
  - Abrasives
  - Freeze point depressants
  - Cutting edges
  - Other consumables and spare parts

- **Ideally, purchase 100% of expected seasonal need**

- **Store it properly**
  - DNREC – SW General Permit provisions
  - Under cover
  - On impervious slabs
  - Anti-caking provisions

- **Calibrate spreaders**
Open faced storage should include covering of the material face to isolate it from the elements
## Material Inventories

### Tons of Salt Required Per Season
(Based on 4 applications of 500 lb per 2-lane mile per storm)

<table>
<thead>
<tr>
<th>No. of Storms</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
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<td>1600</td>
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<td>1800</td>
<td>2400</td>
<td>3000</td>
<td>3600</td>
<td>4200</td>
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<td>8</td>
<td>800</td>
<td>1600</td>
<td>2400</td>
<td>3200</td>
<td>4000</td>
<td>4800</td>
<td>5600</td>
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<td>4000</td>
<td>5000</td>
<td>6000</td>
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<td>8000</td>
<td>10,000</td>
<td>12,000</td>
<td>14,000</td>
</tr>
</tbody>
</table>

Note: Minimum storage requirement is usually half of annual salt use.
This chart is computed on the basis of one ton of salt per two-lane mile per storm, or four 500 lb applications per storm.
Note: These are average figures. Conditions in some areas require several times the salt needed in some other areas.
## Salt: Gradation

<table>
<thead>
<tr>
<th>Finer</th>
<th>Coarser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster melting</td>
<td>Better penetration</td>
</tr>
<tr>
<td>Sticks to the road</td>
<td>Longer lasting</td>
</tr>
<tr>
<td>Prone to caking</td>
<td>More bounce &amp; scatter</td>
</tr>
<tr>
<td>Sticks to spreader</td>
<td></td>
</tr>
</tbody>
</table>
Material Inventories

“Sensible Salting”
- Materials Specifications
- Storage Facilities
- Material Handling
- Material Spreading
  - Equipment calibration
  - Application rates
- Deicing / Prewetting / Anti-Icing
Equipment Readiness

- Plow and spreader support platforms (aka, trucks, graders, skid steers, loaders, mowers, whatever)
  - Full inspection and service (including fluids, hoses, belts, lights, heating systems, radios, hydraulic systems, etc.)
  - If the platform doesn’t hold up, the plow does you no good
- Install plow supports and verify plow operation
- Install and calibrate spreaders
- Verify operability of other equipment – hydraulic brooms, tow behind spreaders, snow blowers
- Contractor and rental equipment, too
Equipment Readiness

Calibrate spreaders
### Equipment Readiness

**Snowfighter’s Handbook, Salt Institute**

**Winter Maintenance Training – Delaware T° Center**

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**CALIBRATION CHART**

<table>
<thead>
<tr>
<th>Agency:</th>
<th>Location:</th>
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<tbody>
<tr>
<td>Truck No.:</td>
<td>Spread No.:</td>
</tr>
<tr>
<td>Date:</td>
<td>By:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GATE OPENING (HOPPER TYPE SPREADERS)</th>
<th>POUNDS DISCHARGED PER MILE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>Control Setting</td>
<td>Shaft RPM (Loaded)</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
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<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Calibration of spreaders
- Application rate variables
  - Area of the gate opening in hopper box
  - Feed belt or auger speed
  - Truck speed
- Controls
  - None
  - Manual
  - Automatic
  - Computer controlled
- Automatic control
  - Control of rate achieved by ground-speed controllers
  - Operator can achieve a desired application rate at any speed
Calibration of spreaders
- Calibration important regardless of type of spreader
- Even new spreaders
- Settings may change throughout season – recalibrate if in doubt
- Need not be overly complicated
- Calibration – calculating the pounds/mile actually discharged at various spreader rates and truck speeds
  - Count number of auger or conveyor shaft revolutions/minute
  - Measure the salt discharged in one revolution
  - Multiply these two and the rate it takes to travel one mile
Equipment Readiness

- Calibration equipment
  - Tarp
  - Scale
  - Marker, pencil
  - Timer
  - Calculator
  - Calibration card
Equipment Readiness

- Calibration
  - 1. Load the truck
Equipment Readiness

- Calibration
  - 2. Remove the spinner
Equipment Readiness

- Calibration
  - 3. Mark end of the shaft
Equipment Readiness

- **Calibration**
  - On a V-box, calibration is done for each opening of the gate
• Calibration
  ○ 4. Time RPMs of the shaft
Equipment Readiness

- Calibration
  - 5. Catch material from one revolution of the shaft
Equipment Readiness

- Calibration
  - 6. Weigh material
Equipment Readiness

- Calibration
  - 7. Fill in the chart
    - Copy in truck
    - Copy in office

![Calibration Chart](image)

Winter Maintenance Equipment – LTAP and Salt Institute
Equipment Readiness

Calibration process
Equipment Readiness

- Automatic controls
- Computer operated systems
Equipment and Crew Assignments

- Circulate route maps
- Including contractors
- Holiday and vacation schedules
- Other leave time
  - Training
  - Conferences
- Identify gaps in equipment or personnel
  - Attempt to arrange contingency personnel from sister agencies
- Verify communication trees
Drainage Systems

- **Closed drainage systems**
  - Inspect drain inlets and clear them of debris and silt
  - Inspect drainage pipes and clear them
  - Remove sources of new blockages (leaf piles, trash)
- **Open drainage systems**
  - Inspect ditches, re-point as necessary
  - Dress shoulders to ensure positive drainage into ditches
- **Cross culverts**
  - Inspect for upstream debris that may dislodge and block
- **Anticipate snow melt**
Seasonal Aids

- **Snow markers**
  - Hydrants
  - Inlets
  - Median curb markers
  - Pavement markers
- **Adopt a hydrant programs**
- **Winter signage**
- **Snow fence**
- **Self help systems**
- **Automated de-icing systems**
You’re Ready

- All the pre-season prep is done?
- Sit back and wait for cold weather
- Or get back to the backlog of maintenance work that never ends
- Monitor the weather
- Relax – you’re ready

- On to Module 4 - Operations
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