Winter Maintenance
Snow and Ice Control
– Module 3 –

PRE-SEASON
ACTIVITIES

PRESENTED BY:
DELAWARE T² 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 just 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

Video
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

1. Use of your equipment versus theirs
2. Who provides abrasives and/or freeze point depressants (FPD)?
3. Tell them which FPDs you’ll be using – you don’t want claims that they had no idea you’d be using salt
4. Establish LOSs
5. Require that all equipment be in good working order (define what that means)
6. 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!
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**
Material Inventories

- Open faced storage should include covering of the material face to isolate it from the elements.
## 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>Miles of Two-lane Highway on Clear Pavement Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>6</td>
<td>600</td>
</tr>
<tr>
<td>8</td>
<td>800</td>
</tr>
<tr>
<td>10</td>
<td>1000</td>
</tr>
<tr>
<td>12</td>
<td>1200</td>
</tr>
<tr>
<td>14</td>
<td>1400</td>
</tr>
<tr>
<td>16</td>
<td>1600</td>
</tr>
<tr>
<td>18</td>
<td>1800</td>
</tr>
<tr>
<td>20</td>
<td>2000</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.*
<table>
<thead>
<tr>
<th>Salt: Gradation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Finer</strong></td>
<td><strong>Coarser</strong></td>
</tr>
<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
### CALIBRATION CHART

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

#### GATE OPENING
(HOPPER TYPE SPREADERS)

<table>
<thead>
<tr>
<th>Control Setting</th>
<th>Shaft RPM (Loaded)</th>
<th>Discharge Per Revolution (Pounds)</th>
<th>Discharge Rate (Lbs/Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### POUNDS DISCHARGED PER MILE

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mph x 12.00</td>
</tr>
<tr>
<td>10 mph x 8.00</td>
</tr>
<tr>
<td>15 mph x 4.00</td>
</tr>
<tr>
<td>20 mph x 3.00</td>
</tr>
<tr>
<td>25 mph x 2.40</td>
</tr>
<tr>
<td>30 mph x 2.00</td>
</tr>
<tr>
<td>35 mph x 1.71</td>
</tr>
<tr>
<td>40 mph x 1.50</td>
</tr>
<tr>
<td>45 mph x 1.33</td>
</tr>
</tbody>
</table>

#### MINUTES TO TRAVEL ONE MILE

- 5 mph: 12.00
- 10 mph: 8.00
- 15 mph: 4.00
- 20 mph: 3.00
- 25 mph: 2.40
- 30 mph: 2.00
- 35 mph: 1.71
- 40 mph: 1.50
- 45 mph: 1.33
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
What is/are in the Other Modules?

- **Module 1 – Introduction**
  - General objectives of snow and ice control
  - Weather basics
  - Importance of training
  - Innovation and evolution
  - Safety, risk management, liability
What is/are in the Other Modules?

- **Module 2 – Planning and Program Development**
  - Snow and ice removal plan
  - Standard operating procedures
  - Route maps/assignments
  - Review and updating plans periodically
  - Budgeting
  - Acquiring and renting equipment
  - Recordkeeping
  - Preparing elected officials
  - Preparing the public
What is/are in the Other Modules?

- **Module 4 – Operations/In-Season Activities**
  - Chain of command
  - Inspect road conditions
  - Safety meetings
  - Plowing techniques
  - Abrasives and freeze point depressants
  - Weather information
  - Recordkeeping
  - Special areas

- **Worst case weather scenarios**
- **Disabled, inoperative, abandoned vehicles**
- **Disposal of snow/environmental concerns**
- **Safety**
- **Day versus night operations**
- **Meals**
- **Dealing with the public**
What is/are in the Other Modules?

- **Module 5 – Post Storm Activities**
  - Push back shoulders
  - Clear drainage ways
  - Refreezing
  - Maintain and clean equipment
  - Restoring safety features and sight distances
  - Removal of snow
  - Asset inventory
  - Interim pavement repairs
  - Assess performance and debrief
What is/are in the Other Modules?

- Module 6 – Post Season Activities
  - Inventory equipment and materials
  - Clean and repair equipment
  - Store equipment
  - Review of performance and safety statistics
  - Brief elected officials and bean counters
  - Plan for replenishment of materials
  - Road and shoulder repairs
  - Assess the season
  - Calibrate plan accordingly
Winter Maintenance Training – Delaware T² Center

The Technology Transfer (T²) or Local Technical Assistance Program is a partnership among state universities, state departments of transportation, and the Federal Highway Administration. There are 58 centers throughout the United States with primary missions to promote training, technology transfer, and research project implementation at state and local transportation agencies. This document and/or its attachments may contain analyses or other technical information. These are prepared as an Information Service of the Delaware T² Center and are provided "as is" without warranty of any kind, either expressed or implied. The Delaware T² Center, and its funding agencies (e.g., DelDOT, FHWA, University of Delaware) shall not be responsible for the use of this information. The products and technologies discussed herein (some of which are proprietary) are not endorsed by the author or the Delaware T² Center. Except where noted, all content herein, including photographs and tables, were developed and produced by the Delaware T² Center and may not be reprinted or otherwise used without written permission.