CONNECTICUT
DEPARTMENT
OF
TRANSPORTATION
2013-2014
APPROACH TO
SNOW AND ICE
CONTROL
Snow and Ice Control

Administrative Guidance
Snow Season

• **Starts:** November 1
• **Ends:** April 30

All employees, equipment and contractors should be ready for the winter season *before* November 1.
Leaves Time

• **Vacation**
  – Single Days
    • Requires Maintenance General Supervisors authorization
  – Less than 3 days
    • Requires Transportation Maintenance Managers authorization
REST BREAKS

• 3 hours of rest

• Should be taken out of the truck

• Generally taken between the 17\textsuperscript{th} and 21\textsuperscript{st} hours
STORM WARNING DISCUSSION:

A LARGE AND DANGEROUS NOR'EASTER IS IMMINENT, WHICH WILL RESULT FROM THE PHASING OF A NORTHERN-STREAM SYSTEM APPROACHING FROM THE GREAT LAKES AND A SOUTHERN-STREAM SYSTEM MOVING UP THE ATLANTIC COAST. SPOTTY LIGHT SNOW IS EXPECTED TO OCCUR SOON, IN ADVANCE OF THE MORE MAJOR IMPACTS FRIDAY INTO SATURDAY. GENERALLY, A COATING UP TO 1" IS POSSIBLE STATEWIDE BY SUNRISE FRIDAY. EXPECT CONDITIONS TO STEADILY DETERIORATE THROUGH THE DA' FRIDAY AND INTO FRIDAY NIGHT AS THE NOR'EASTER RAPIDLY STRENGTHENS AND SPREADS PRECIP OVER THE STATE. SNOW MAY MIX WITH RAIN AND SLEET OVER ZONES 3 – 6 ON FRIDAY (BEST CHANCE SOUTH) WHICH WOULD CUT DOWN ON TOTALS SLIGHTLY. HOWEVER, ANY MIX WILL QUICKLY TURN BACK TO SNOW FRIDAY LATE AFTERNOON/EARLY EVENING AS THE LOW MOVES EAST AND COLD AIR RUSHES IN.

THE WORST OF THE STORM LOOKS TO BE FRIDAY NIGHT INTO EARLY SATURDAY, WHERE PERIODS OF HEAVY SNOW WILL COMBINE WITH STRONG GUSTY WINDS TO PRODUCE BLIZZARD/WHITEOUT CONDITIONS (WORST IMPACTS OVER EASTERN HALF OF THE STATE). THE STRONG WINDS WILL CAUSE BLOWING AND DRIFTING OF SNOW AS WELL AS THE POTENTIAL FOR DOWNEARED TREES AND POWERLINES SNOW SHOULD GRADUALLY DIMINISH AND END WEST TO EAST FROM THE LATE MORNING TO EARLY AFTERNOON SATURDAY, THOUGH IT WILL STILL REMAIN BREEZY.

EXPECTED STORM TOTAL ACCUMULATION:

ZONE 5 & 6: 10 – 20 INCHES (highest east)
ZONE 7: 12 – 20 INCHES
ZONE 1: 15 – 25 INCHES (highest east)
ZONE 2 & 3: 18 – 30 INCHES
ZONE 4: 15 – 30 INCHES

ZONE 1 (CENTRAL VALLEY):
Start Time: Friday 2 – 5 AM  End Time: Saturday 10 AM – 1 PM
Description: Scattered areas of light snow developing thru the pre-dawn hours, becoming a bit steadier towards daybreak. Meanwhile, expect it to become windy and precip to become moderate in intensity towards evening, and heavy at times thru daybreak. Blizzard conditions will be likely Friday night/early Saturday. Snow should lighten up and taper off 10 am – 1 pm on Saturday.
Winds: Thu 7 am: Easterly increasing to 10 – 20 mph; 7am – 4pm becoming NE 12 – 25 mph with gusts to 35 mph; 4pm Fri – Noon Sat: Northeast to Northwest 20 – 30 mph, gusts to 45 mph
Snowfall: Thu 7am: Coating – 1"; 7am – 4pm Fri: 3 – 6"; 4pm Fri – Noon Sat: 10-20"+
Total Snowfall: 15 – 25" (highest totals in eastern half of zone)
Temperatures: Thu 7am: 22 – 25; Warming to 28 – 32 Friday; Low 18 – 23 Fri Night; High mid-20s Saturday

ZONE 2 (NE HILLS):
Start Time: Friday 2 – 5 AM  End Time: Saturday 11 AM – 2 PM
Description: Scattered areas of light snow developing thru the pre-dawn hours, becoming a bit steadier towards daybreak. Meanwhile, expect it to become windy and precip to become moderate in intensity towards evening, and heavy at times thru daybreak. Blizzard conditions will be likely Friday night/early Saturday. Snow should lighten up and taper off 11 am – 2 pm on Saturday.
Winds: Thu 7 am: Easterly increasing to 10 – 20 mph; 7am – 4pm becoming NE 12 – 25 mph with gusts to 40 mph; 4pm Fri – Noon Sat: Northeast to Northwest 20 – 30 mph, gusts to 50 mph
Snowfall: Thu 7am: Coating – 1"; 7am – 4pm Fri: 3 – 6"; 4pm Fri – Noon Sat: 15-20"+
Total Snowfall: 20 – 30"+
Temperatures: Thu 7am: 22 – 25; Warming to 28 – 32 Friday; Low 18 – 23 Fri Night; High mid-20s Saturday
ConnDOT Weather Zones

ZONE 1: CENTRAL VALLEY
ZONE 2: NE HILLS
ZONE 3: SE HILLS
ZONE 4: E. COASTAL PLAIN
ZONE 5: W. COASTAL PLAIN
ZONE 6: SW HILLS
ZONE 7: NW HILLS
Highway Operation Centers
Newington & Bridgeport
Pre-Treating
Ice Control Chemicals

✓ Sodium Chloride
Ice Control Chemicals
Magnesium Chloride

CAUTION
Corrosive material
Avoid contact with eyes and skin

CAUTION
Wear goggles and rubber gloves when handling chemicals
# Salt vs. Sand Mix (2008)

## Cost to treat one lane–mile Salt vs. Sand (approximately)

<table>
<thead>
<tr>
<th>Salt</th>
<th>Cost Factors</th>
<th>Abrasives</th>
</tr>
</thead>
<tbody>
<tr>
<td>$56.00</td>
<td>A  Purchase Cost/ton, $</td>
<td>$60.00</td>
</tr>
<tr>
<td>---</td>
<td>B  Cost of added salt/ton(14%)</td>
<td>$8.40</td>
</tr>
<tr>
<td>---</td>
<td>C  Mixing cost, $</td>
<td>$1.00</td>
</tr>
<tr>
<td>$56.00</td>
<td>D  Total Cost (per ton), $</td>
<td>$69.40</td>
</tr>
<tr>
<td>300</td>
<td>E  Pounds per lane mile</td>
<td>750</td>
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<tr>
<td>$9.00</td>
<td><strong>Cost / lane mile, $</strong></td>
<td><strong>$26.00</strong></td>
</tr>
</tbody>
</table>

Does not include spring clean up
Snow and Ice Control

Protective Equipment
Personal Protective Equipment

- Goggles
- Face Shield
Personal Protective Equipment

• Rubber Apron
Personal Protective Equipment

- Boots
- Gloves
Storage
Storage Tanks
Rexroth Ground Speed System
Ground Speed Control Panel
Application Rates

• Snow & ice control materials will be applied at the approved rates as soon as there is sufficient accumulation to prevent the material from being blown off.

*Timing is crucial*
Application Rates

Additional applications will be made every 3 to 4 hours after the initial application or as required.

Salt shall be applied at the rate of 200 pounds per lane mile.
Pre-Wetting Techniques

• **On board systems**
  – VariTech
  – Rexroth/Reed
  – Rexroth Ground Speed

• **Anti- Icing systems**
  – Salt brine trucks
Rexroth/Reed System
VariTech System
Anti-Icing Strategy

This is what we should be trying to achieve
Level of Service

Balance

✓ Cost
✓ Safety
✓ Environmental responsibility
Snow and Ice Control Treatment

Pavement temperature and ice/pavement bond are key
Ice/Pavement Bond

- Character of material cast or displaced by traffic
- Appearance of road as viewed in mirrors
- Noise of plow(s)
- Pavement temperature
Accurate Weather Information is Essential to an Effective Snow and Ice Plan.

- A. Private Weather Forecasting Services
- B. Road Weather Information System (RWIS)
- C. Our Knowledge and Experience
Pavement Temperature
Truck mounted radiometers
RWIS
Road Weather Information Systems
RWIS
Road Weather Information Systems

Pavement Sensors
Our state highway system should remain *reasonably safe* and in a *passable* condition by *continuous plowing* and *judicious use* of snow and ice materials.
Conn DOT Does NOT Have a Bare Road Policy
Tandem Plowing
600 to 800 feet apart
Close Echelon Plowing
Plowing Speeds

• Plowing speeds will be monitored!
• Distance snow is cast
  – Excessive distances from shoulder
  – Pedestrians
  – Sidewalks
  – Buildings
  – Overpasses
  – Narrow medians onto opposing lanes
  – Signs

  The last truck in echelon should be the Crew Leader or Competent Person to maintain a overall view of the Plowing operation
Application of Snow and Ice Control Materials
Typical Scatter of Road Salt

15% off road

46% in center

12%

100% salt spread in center 1/3 of road
Typical Scatter of Prewetted Road Salt

100% prewetted salt spread in center 1/3 of road

2% off road

78% in center

9%
Snow and ice control materials will be **Closely** monitored by:

- Pay Loader operators
- Crew Leaders
- General Supervisors
- Managers
- Directors
- Staff Maintenance
# TRUCK OPERATOR ACTIVITY LOG

**Connecticut Department of Transportation**

<table>
<thead>
<tr>
<th>Date</th>
<th>Garage</th>
<th>Operator Name</th>
<th>Ground Speed Control</th>
<th>Echelon</th>
<th>Call Out</th>
<th>Truck No.</th>
<th>SHIFT MILEAGE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Midnight</td>
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</tbody>
</table>

**Snow & Ice Route Description**

<table>
<thead>
<tr>
<th>Routes:</th>
<th>Contractor Name and Truck #</th>
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<tbody>
<tr>
<td>ROUND</td>
<td></td>
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</table>

**Start Time (24 hour clock):**

**End Time (24 hour clock):**

**Loading Location**

<table>
<thead>
<tr>
<th>Material</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>On Board From Previous Driver</td>
<td>Returned</td>
<td>Left on Board</td>
<td>USAGE</td>
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<tr>
<td>SOLID CHEMICAL</td>
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</tr>
<tr>
<td>Buckets</td>
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<td>LIQUID CHEMICAL</td>
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**Precipitation Type**

*See List To The Right*

**Precipitation Intensity**

<table>
<thead>
<tr>
<th>Type</th>
<th>Intensity</th>
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<tbody>
<tr>
<td>FF - Freezing Fog</td>
<td>L - Light</td>
</tr>
<tr>
<td>FR - Freezing Rain</td>
<td>M - Moderate</td>
</tr>
<tr>
<td>HS - Heavy (Wet) Snow</td>
<td>H - Heavy</td>
</tr>
<tr>
<td>LS - Light (Powder) Snow</td>
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</tr>
<tr>
<td>BL - Blowing Snow</td>
<td></td>
</tr>
<tr>
<td>S - (Ordinary) Snow</td>
<td></td>
</tr>
<tr>
<td>SL - Sleet</td>
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<tr>
<td>R - Rain</td>
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**Road Conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Snow</th>
<th>Slush/Mealy</th>
<th>Ice/Pack</th>
<th>Wet</th>
<th>Dry</th>
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<tr>
<td>Patrol</td>
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<tr>
<td>Solid Chemical</td>
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<tr>
<td>Liquid Chemical</td>
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</tr>
<tr>
<td>Abrasives</td>
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**Material Application**

<table>
<thead>
<tr>
<th>Material</th>
<th>Pavement Temperature (°F)</th>
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</thead>
<tbody>
<tr>
<td>Lanes Treated</td>
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<tr>
<td>Solid Rate (Lbs./Mile)</td>
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</tr>
<tr>
<td>Liquid Rate (Gal./Ton)</td>
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</tr>
<tr>
<td>Spinner Control Setting</td>
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</tbody>
</table>

**Comments:** If more space is needed use back of page.
## Snow and Ice Control
### Material Report

#### Storm Type
- **Two Lane - Act 330**
- **Multi Lane - Act 330**
- **Ramps - Act 330**
- **Total Post Storm - Act 331**

#### Worksheet

<table>
<thead>
<tr>
<th>District</th>
<th>Date</th>
<th>Storm No.</th>
<th>File No.</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### District Summary

#### Total Cubic Yards Salt
- 0.00

#### Total Cubic Yards 10/1
- 0.00

#### Total Gallons Calcium Chloride
- -

#### Total Gallons Magnesium Chloride
- -

#### Total Gallons Salt Brine
- -

#### Cubic Yards

<table>
<thead>
<tr>
<th>Area or Section</th>
<th>Salt 10/1</th>
<th>Calcium Chloride</th>
<th>Magnesium Chloride</th>
<th>Salt Brine</th>
<th>Cubic Yards</th>
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</thead>
<tbody>
<tr>
<td>Two Lane - Act 330</td>
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<tr>
<td>Multi Lane - Act 330</td>
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<tr>
<td>Ramps - Act 330</td>
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</table>

### Storm to Date

<table>
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<th>Area or Section</th>
<th>Salt 10/1</th>
<th>Calcium Chloride</th>
<th>Magnesium Chloride</th>
<th>Salt Brine</th>
<th>Tons</th>
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</thead>
<tbody>
<tr>
<td>Two Lane - Act 330</td>
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<td></td>
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<tr>
<td>Multi Lane - Act 330</td>
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<tr>
<td>Ramps - Act 330</td>
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</table>

### Total to Date

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<tr>
<th>Area or Section</th>
<th>Salt 10/1</th>
<th>Calcium Chloride</th>
<th>Magnesium Chloride</th>
<th>Salt Brine</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Lane - Act 330</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Multi Lane - Act 330</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ramps - Act 330</td>
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</tbody>
</table>

### Grand Total

<table>
<thead>
<tr>
<th>SALT TO DATE</th>
<th>TOTAL</th>
</tr>
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<tbody>
<tr>
<td>SALT</td>
<td>0.00</td>
</tr>
<tr>
<td>ROTATED TOTAL</td>
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**State of Connecticut**

**Department of Transportation**

**Document No.**

**REV 11/2000**
Worst Case Scenarios:
Blizzard Conditions / Black Ice
BLACK ICE
Snow and Ice Control

NEW EQUIPMENT
Exclusive Manufacturer of The Salt Slurry Generator

The Salt Slurry Generator will:
- Save you money!
- Reduce the amount of salt usage per lane mile
- Maximize the efficiency of your road salt
- Reduce residual salt build-up on roadways

BEFORE Salt Slurry Generator  AFTER Salt Slurry Generator

- Increases salt volume by 25%
- More grains per square foot
- Brine process activates faster, thus melting snow & ice faster
- More material stays on the road surface
- Helps create safer roads faster

The roller mill operates at approximately 500-600 RPMs which quickly refines granular material.

Spreads more particles per square foot.
SALT SLURRY GENERATOR
HAVE A SAFE SNOW AND ICE SEASON

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