



**The Maryland Department of Transportation’s State Highway Administration
(SHA) -- Winter Operations Facts And Figures
2015-2016 Winter Season**

SHA maintains most interstate, U.S. and numbered state routes in Maryland’s 23 counties. The Maryland Transportation Authority (MDTA) maintains Maryland’s eight toll facilities such as the Bay Bridge, the Intercounty Connector and the Baltimore Harbor and Ft. McHenry tunnels. In addition MDTA maintains I-95 from Baltimore City to the Delaware line and I-395 in Baltimore City.

Statewide Quantities of Materials Available at Start of 2015-2016 Winter Season

- **Rock salt in 95 salt domes/barns** 380,000 tons
- **Salt brine at 77 sites** 837,000 gallons
- **Abrasives (statewide) – sand and crushed stone** 40,000 tons
- **Magnesium chloride at 16 sites** 100,000 gallons

Budget for winter 2015/2016: \$56 million

Lane Miles Maintained by SHA and MDTA: 17,842 miles
(Length of roadway times the number of lanes, including ramps)

Pieces of Equipment Available to Fight Winter Storms: Up To 2,700
(Including SHA, MDTA and contract forces)

Number of People Available to Fight Winter Storms: Up To 2,700
(Including SHA, MDTA and contract forces)

SHA’s Baltimore Regional Capacities

Anne Arundel County

6 Barns/Domes
20, 400 tons of salt
48,000 gallons of salt brine
18,000 gallons of Liquid Magnesium

Baltimore County

10 Barns/Domes
53,600 tons of salt
85,000 gallons of salt brine
44,400 gallons of Liquid Magnesium

Carroll County

5 Barns/Domes
20,500 tons of salt
50,000gallons of salt brine
13,000 gallons of Liquid Magnesium

Harford County

5 Barns/Domes
21,400 tons of salt
2,900 gallons of salt brine
11,600 gallons of Liquid Magnesium

Howard County

5 Barns/Domes
21,600 tons of salt
30,000 gallons of salt brine
24,000 gallons of Liquid Magnesium

Winter Operations Expenditures and Salt Usage (5 year period)

| <u>Fiscal Year</u> | <u>Expenditures</u> | <u>Salt Used</u> |
|--------------------|---------------------|------------------|
| FY 2011 | \$70,449,052 | 258,923 tons |
| FY 2012 | \$37,666,746 | 85,411 tons |
| FY 2013 | \$65,240,773 | 205,212 tons |
| FY 2014 | \$149,681,835 | 551,443 tons |
| FY 2015 | \$116,338,268 | 339,005 tons |

Materials Available for 2015-2016 Winter Season

- **Salt** is the principal winter material used by SHA. It is effective at pavement temperatures of 20° F and above.
- **Salt brine** is a solution that can be used as an anti-icer on highways prior to the onset of storms, or as a deicer on highways during a storm. Salt brine is 27 percent salt and 73 percent water. SHA makes extensive use of this material. It has a freeze point of -6° F. Salt brine will be produced and used at SHA's 14 brine making facilities.
- **Magnesium chloride** (mag) is a liquid winter material used in deicing operations. The material has a freeze point of approximately -26° F. It is used in the colder regions of the state, primarily in the northern and western counties.
- **Abrasives** including sand and crushed stone are used to increase traction for motorists during storms. This is mostly used in Western Maryland.

Almanac Data

Average Number of Winter Snow Storms per Year Since 2000 (Does not include the numerous maintenance shop activations for frost, black ice, and post-storm blowing and drifting snow)

| | |
|------------------------------------|----|
| Eastern Shore | 7 |
| Southern Maryland | 7 |
| Baltimore/Washington DC Metro Area | 8 |
| Western Maryland | 30 |

| | |
|---|-------------------|
| Date of <u>Earliest Metro Area Winter Storm since 2000</u> | 10/29/2011 |
| Date of <u>Latest Metro Area Winter Storm since 2000</u> | 4/9/2000 |

Strategies for Winter Operations

- **Anti-icing** - Proactive preventive winter strategy of applying salt brine prior to the onset of a snow storm to prevent snow and from bonding to pavement. SHA is expanding its anti-icing operations in an attempt to lessen salt usage throughout Maryland. Salt brine is produced at 14 SHA maintenance facilities. SHA will not pre-treat highways with salt brine if a storm is forecasted to start as rain as this will wash the salt brine solution off of the pavement. Additionally, SHA will not apply salt brine in temperatures 20 degrees or colder because the application can freeze on contact.
- **Deicing** - Traditional winter maintenance strategy of salting. It requires more material to break the bond than to prevent it. Salt is the primary material used to treat pavement in snow or ice operations. In colder areas or for a thicker snow pack on the road, crews can add magnesium chloride or "Liquid Mag" to salt during extremely cold temperatures to enhance salt's effectiveness.

Technology Available for 2015-2016 Winter Season

In addition to its fleet of salt spreading/snow plowing dump trucks, SHA will deploy:

- **550 truck-mounted saddle tanks:** This equipment is used to pre-wet salt with salt brine or liquid magnesium as the salt is spread on highways. Pre-wetting salt helps it adhere to the pavement (reducing waste), dilute into a brine solution quicker (making salt more effective) and work at lower temperatures. Nearly all of SHA's fleet of single axle dump trucks is equipped with this technology.
- **205 wing plows:** A wing plow is an additional plow mounted on the right side of a plow truck or grader. The extra plow allows crews to clear more snow from the road and shoulder in one pass, increasing efficiency while reducing the need for extra trucks and our carbon footprint.
- **14 truck/trailer-mounted liquid applicator spray tanks:** These units are used for anti-icing operations and liquid only routes (spraying salt brine on roads and bridges prior to precipitation to prevent snow and ice from bonding to the pavement).
- **14 salt brine makers:** These 14 salt brine makers are strategically placed around the state to fill and replenish up to 77 different locations throughout Maryland. SHA is also piloting an automated portable brine maker which may help ease the burden of brine tank replenishment by being able to make the solution at multiple sites while producing a perfectly blended solution.
- **2 tow plows:** A tow plow is a separate plow that is towed behind an SHA salt/plow truck and will clear an extra highway travel lane. Tow plows will be used in conjunction with snow plow trains (several trucks driving in tandem). The introduction of the tow plow into SHA's fleet will help enhance highway snow clearing operations with fewer passes and less trucks on the highway.
- **4 Dual-Wing plows:** SHA is employing three dual-wing plows in Allegany, Frederick, Garrett and Montgomery counties. The extra wing plow can clear a two-lane highway in one pass.
- **9 Quad Axle trucks:** SHA is employing trucks with enhanced material carrying capacity in order to treat longer sections of road. The enhanced capacity will allow the plow trucks to apply anti-icing material to more lane miles thus allowing better clearing results.
- **40 Non Invasive Road Sensors:** Non invasive sensors mounted to overhead signs or poles and can detect the thickness of water, snow or ice within 1 mm of accuracy. It also measures surface temperature, road condition, and freeze point/salt concentration on the road surface. This type of unit eliminates the need to install a sensor in the pavement.

Salt Reduction

SHA maintenance personnel are very conscious of salt usage during winter storms. Equipment is carefully calibrated to control salt application rates to prevent over-salting and is uniform in distribution.

Through careful pre-storm planning, SHA can minimize salting and still provide a safe and efficient road surface for our customers. Crews continue anti-icing operations (pre-treating roads with salt brine) in advance of storms. The brine prevents snow and ice from bonding or "packing" on the surface of the highway, which helps SHA to more efficiently remove snow. This pre-event operation also allows for a delay in the first granular salt application resulting in lower usage rates.

SHA is increasing its use of pre-wetted salt this winter. Pre-wetting salt with salt brine or magnesium chloride helps salt better adhere to the road surface. It helps prevent typical "bounce and scatter" of salt applications. Studies have shown that pre-wetting can lead to a reduction in salt usage.

Contacting SHA

Citizens can also log onto www.roads.maryland.gov and click "Contact us." There is an online submission form to report any issues pertaining to SHA-maintained highways for non-emergencies. Free local traveler information can be obtained by calling 5-1-1. For real-time travel information, log onto www.md511.org.

Partners

Maryland State Police



CHART (Coordinated Highway Action Response Team)



I-95 Corridor Coalition



I-81 Corridor Coalition



American Association of State Highway and Transportation Officials (AASHTO)

