The Maryland Department of Transportation's State Highway Administration (SHA) -- Winter Operations Facts And Figures 2016-2017 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/MD 200 and the harbor tunnels. In addition MDTA maintains I-95 from Baltimore City to the Delaware line and I-395 in Baltimore City.

SHA's Statewide Capacities

Budget for winter 2016/2017:	**$61 million**
Salt available for 2016/2017:	**380,000 tons**
Salt Barns/Domes in Maryland:	**95 structures**
Lane Miles Maintained by SHA and MDTA: (Length of roadway times the number of lanes, including ramps)	**17,950 miles**
Pieces of Equipment Available to Fight Winter Storms: (Including SHA, MDTA and contract forces)	**Up To 2,700**
Number of People Available to Fight Winter Storms: (Including SHA, MDTA and contract forces)	**Up To 2,700**

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	6
Southern Maryland	6
Baltimore/Washington DC Metro Area	7
Western Maryland	28

Date of Earliest Metro Area Winter Storm since 2000	**10/29/2011**
Date of Latest Metro Area Winter Storm since 2000	**4/9/2000**

Winter Operations Expenditures and Salt Usage (5 year period)

Fiscal Year	Expenditures	Salt Used
FY 2012	$37,666,746	85,150 tons
FY 2013	$65,240,773	205,171 tons
FY 2014	$149,681,835	551,443 tons
FY 2015	$116,338,268	339,005 tons
FY 2016	$100,176,147	137,307 tons

Strategies for Winter Operations

- **Anti-Icing -** proactive preventive winter maintenance strategy of applying materials prior to or at the onset of precipitation to prevent snow and from bonding to pavement. SHA is expanding its anti-icing operations in an attempt to lessen overall salt usage throughout Maryland. Salt Brine is used in advance of a storm that is forecasted to begin as snow. Salt brine is produced at 15 SHA maintenance facilities. It is also transported to SHA satellite facilities and stored in large tanks for rapid deployment. 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 breaking the snow/ice/pavement bond after it has occurred. 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 but salt brine has become very popular in the last few years. In colder areas or for a thicker snow pack on the road, crews can pre-treat salt with magnesium chloride or “Liquid Mag” that is highly effective in colder temperatures.

Materials Available for 2016-2017 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. and costs approximately 14.8 cents per gallon to produce and transport. Salt brine will be produced and used at SHA’s 15 brine making facilities. In addition, salt brine will be transported to other SHA maintenance facilities throughout the state for their use.

- **Magnesium chloride** (mag) is a liquid winter material used by SHA 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. Abrasives have no snow melting capability. SHA uses a limited amount of this material, concentrating its efforts on melting and plowing snow and ice from the pavement.

Quantities of Materials Available at Start of 2016-2017 Winter Season

- **Rock and solar salt in 95 salt domes/barns** 380,000 tons
- **Salt brine at 77 sites** 1,000,000 gallons
- **Abrasives (statewide) – sand and crushed stone** 40,000 tons
- **Magnesium chloride at 16 sites** 100,000 gallons

Technology Available for 2016-2017 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).

- **15 salt brine makers:** These 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.

- **42 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.

SHA has designated at least one "liquid only" snow route in most of its seven engineering districts. Meeting the standard criteria for salt brine application, SHA will use only salt brine in the actual treatment of these roads during a snow storm. Using salt brine reduces overall salt usage, which is less intrusive to the environment. SHA has strategically placed an additional 196,000 gallons of salt brine in key areas across Maryland.

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.

###

CHANGING Maryland *for the Better*

ICE & SNOW TAKE IT SLOW