

Salt Application and Storage SC-16

Description

The Application and storage of deicing materials, most commonly salts such as sodium chloride, can lead to water quality problems for surrounding areas. Salts, gravel, sand, and other materials are applied to highways and roads to reduce the amount of ice during winter storm events. Salts lower the melting point of ice, allowing roadways to stay free of ice buildup during cold winters. Sand and gravel increase traction on the road, making travel safer.

Approach

During road salt application, certain best management practices can produce significant environmental benefits. The amount of road salt applied should be regulated to prevent over-salting of motorways and increasing runoff concentrations. The amount of salt applied should be varied to reflect site-specific characteristics, such as road width and design, traffic concentration, and proximity to surface waters. Calibration devices for spreaders in trucks aid maintenance workers in the proper application of road salts. Alternative materials, such as sand or gravel, should be used in especially sensitive areas

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

- Sediment ✓
- Nutrients ✓
- Trash
- Metals ✓
- Bacteria
- Oil and Grease
- Organics ✓
- Oxygen Demanding ✓

Pollution Prevention

- Use the minimum amount of salt needed to get the job done.
- Establish “low salt” near sensitive environments. Salt can impact water supply wells.
- Establish "low salt and/or sand areas" near sensitive environments. Sand may be detrimental in areas sensitive to sedimentation, such as streams, and salt can impact water supply wells.
- Remove snow manually from driveways and sidewalks.
- Limit toxic metals in specifications for deicers.
- Cleanup road grit as soon as possible.
- Consider pre-wetting of salt or use brine solution as a way to reduce and better control salt applications.
- Use less harmful deicers such as calcium magnesium acetate, potassium acetate, or organic deicers.

- Consider road temperatures when determining volume of salt to apply.
- Control the rate of spreading by equipping trucks with ground-speed sensors.
- Many of the problems associated with contamination of local waterways stem from the improper storage of deicing materials. Salts are very soluble when they come into contact with storm water. They can migrate into ground water used for public water supplies and also contaminate surface waters.
- Facilities should be located on flat sites away from surface water and on impervious surfaces that are easily protected from overland runoff.
- Salt should be stored under cover to prevent a loss due to runoff.
- Contain wash water from trucks used for salting and sanding in a holding tank for disposal or discharge into sanitary sewers.
- Place salt piles in areas not subject to flooding.
- Cover salt piles with a tarp (polyethylene) during non-freezing spring and summer months when storage facilities are not available.
- Contain stormwater runoff from areas where salt is stored by using buffers to diffuse runoff before entering waterbodies.
- Use diversion berms to minimize run-on to storage areas.
- Cleanup “track out” after storm events.

Suggested Protocols

- Sensitive areas, such as public water supplies, lakes and ponds, should be identified and made known to salt applicators. Consider de-icing alternatives in sensitive areas.
- Ground-speed controllers should be used for all spreaders.
- Give salt time to work; time plowing operations to allow maximum melting by salt, before snow is plowed off the highway.
- Know when to plow and reapply salt. The need for another salt application can be determined by watching melting snow kicked out behind vehicle tires. If the slush is soft and fans out like water, the salt is still working. Once the slush begins to stiffen and is thrown directly to the rear of vehicle tires, it is time to plow.
- For lesser traveled roads, consider applying salt in a windrow in a four to eight foot strip along the centerline of a two lane road. Less salt is wasted with this pattern and quickly gives vehicles clear pavement under at least two wheels. Traffic will soon

move some salt off the centerline and the salt brine will move toward both shoulders for added melting across the entire road width.

- Determine levels of service for all roads in a service area. Salt application rates and frequency should be based on traffic volume, road grade and curvature, intersections, and weather conditions. Sand or sand/salt mix should be used based on the level of service requirements.

Training

- Train drivers to improve loading of materials, application techniques and reduce losses.
- Train drivers to report areas of “over salting” to allow possible cleanup and to reduce salt runoff.

Spill Response and Prevention

Other Considerations

Requirements

Costs

Covering stored road salts may be costly; however, the benefits are greater than the perceived costs. Storing road salts correctly prevents the salt from lumping together, which makes it easier to load and apply. In addition, covering salt storage piles reduces salt loss from storm water runoff and potential contamination to streams, aquifers, and estuarine areas. Salt storage piles should be located outside the 100-year floodplain for further protection against surface water contamination.

The use of pre-wetting of salt can increase the effectiveness and reduce the usage of road salt.

The use of alternative materials on bridges and structures may be initially more costly, but can reduce longer term maintenance costs of the structure because of the less corrosive nature of these materials.

Further Detail of the BMP

Training of employees, calibrating equipment, and use of brine solutions or other materials for certain situations need to be continuously evaluated to increase effectiveness and reduce potential environmental impacts.

Use of temperature sensor technology in pavements and on vehicles is continuing to improve. As the technology improves, the costs will continue to decrease and become a more viable option.

Examples

References and Resources

<http://www.deq.state.mi.us/documents/deq-swq-nps-wrm.pdf>

<http://www.mto.gov.on.ca/english/engineering/roadsalt.htm>

<http://www.saltinstitute.org/>

<http://www.saltinstitute.org/snowfighting/index.html>

<http://www.usroads.com/journals/p/rmj/9712/rm971202.htm>

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