



## 1.0 Mission

Since 1917, Wisconsin's primary mission for winter highway maintenance is to improve the coefficient of friction between motor vehicle tires and the pavement. To accomplish this mission, it may not be necessary to completely remove or melt all of the snow or ice. Over the years, many methods have been used to accomplish this goal.

## 2.0 Historic Context of Winter Maintenance and Current Policy

1. Historically, snow plowing has been the principal winter maintenance tool. In addition, abrasives such as sand and cinders have been used to improve traction.
2. Wisconsin, like most cold weather states in the late 1940s, began using mixtures of sand and rock salt (sodium chloride) to increase wintertime friction on highway pavements. The chemical was originally added in small amounts primarily to keep stockpiled sand from freezing into a solid mass.
3. Early in the 1950s, it was discovered that common rock salt by itself could be spread on the pavement to quickly form a brine solution with the snow or ice and effectively lower the freezing point. The rock salt brine would easily melt a thin ice cover or break the bond of thicker ice and packed snow, making the snow/ice accumulation ready for mechanical removal with a plow.
4. Beginning with the winter of 1956-57, the department adopted a "bare pavement" policy for state highways. This policy meant that efforts would be made to ensure that all state highways were kept essentially clear of ice and snow throughout winter driving season. To achieve this objective, the snowplows operated continuously during a winter storm. The snowplows simultaneously plowed and applied chemicals throughout the storm. The chemicals, sodium, and calcium chloride were used to keep the pavements clear of ice and snow.
5. In the winter of 1973-74, the clear roads policy was modified for economic reasons. The first nationwide energy crisis and the high cost of employee overtime contributed to this policy change. The department decided to reduce the drivability of less traveled state highways. This decision was implemented by creating three classes of highways, each with a different policy for snow plowing and ice control.
6. After the second energy crisis in 1978, the department modified its clear roads policy to place an emphasis on reducing the use of chloride chemicals to reduce the potential environmental hazards. The department implemented this policy objective by:
  - Mechanically removing the snow as fast and efficiently as possible.
  - Using chemicals wisely: (1) to prevent the bonding of snow to the pavement and (2) to clean up after the storms.
  - Limiting each application of highway salt at a rate not to exceed 0.15 tons (300 lbs) per lane mile. Placing a high priority on the proper handling and storage of chemicals.
7. In 1983, Wisconsin enacted significant laws to protect groundwater. The laws mandate that salt be stored inside a building on an impermeable base to prevent dissolved chlorides from leaching into the groundwater. This law is a statement on the importance of good highway salt storage and handling practices. The careless storage of highway salt causes far more environmental problems than the improper spreading of highway salt for snow and ice control.
8. In 2002, the clear roads policy from 1973 was further clarified to give counties and districts a better understanding of the clear road policy expectations. As a result, the guideline name was changed to "Passable Roadway – During a Winter Storm".

9. In 2011, the term “impassability” was discontinued and replaced with “Travel not Advised”, “Travel Restricted”, and “Highway Closed”.
10. In accordance with the department’s salt reduction initiative, during the winter of 2018-2019, four counties started using Direct Liquid Application (DLA), following best winter maintenance practices. In this practice, liquids, in the form of salt brine, are applied directly to the pavement for deicing, replacing rock salt as the primary storm management tool. This reduces the amount of salt applied and has been found to be more effective than solid salt.
11. Throughout the years, Wisconsin has been quick to utilize new technology, methods, and machinery. In the last decade the use of highly sophisticated weather services, AVL/GPS (Automated Vehicle Localization/Global Position System), and high-capacity brine makers has given storm managers additional tools for improved service and communication.

Anti-icing, pre-wetting, direct liquid application, and new chemicals are expected to reduce the total chemical needs for a storm and improve the coefficient of friction quickly. Training in this and other winter operation areas has increased for supervisors and operators, and will continue to be emphasized, to provide a more knowledgeable work force.

New equipment has been developed throughout the world and the states. Wisconsin and its partner counties have selected new plow blades, truck lighting, chemical spreaders, liquid application systems, on-truck computerized controls and reporting, snow fencing, and chemical storage facilities, to improve service outputs for the winter highway traveler.