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Available On-Line
To obtain the Maintenance Manual in its entirety, it is available on the Internet at:

Please be aware that there have been some formatting changes in the manual.

Instructions:
Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the Maintenance Manual that are to be removed and inserted to accomplish this revision.

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Signature
Stephanie Williams
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Chapter 7  

Snow and Ice Control

General

Removal of snow and ice from the roadway is extremely important and takes precedence over all non-emergency work.

The roadway must be plowed, sanded or deiced if necessary, and widened as quickly as possible. Snow and ice removal continues until the job is done, even if it involves working extra hours at night, weekends, or legal holidays. Work vigorously to maintain the roads in as good a condition as is possible with the equipment, materials, and personnel assigned to the work.

The department’s policy is to remove snow from all high priority regularly traveled highways. After priority highways are cleared, snow removal occurs on lower priority highways according to established region/area criteria.

Some mountain passes are closed each year once deep winter snows arrive. These road closures occur where light traffic and deep snowfall does not justify the hazard and expense of attempting to keep roads open.

The snow removal operation is intended to provide the prudent motorist with a reasonably safe traveling surface. Although plowing starts soon after the storm begins, it takes time to complete the operation. During heavy snowfalls there may be periods of time when the roads will not be sanded or deiced and the motorist may need to install chains or other traction devices.

Safety for the traveling department and public personnel is the primary consideration at all times.

Economy and efficiency of operation is the goal of all maintenance personnel.

The Snow and Ice Plan is available to view at:

Preparation for Winter Operations

Make plans early for winter work. Get snow plowing equipment, anti-icing/deicing equipment, sanding equipment, radio equipment, equipment operators, deicing materials, sanding materials, and supplies including signs, flags, barricades, small tools, and equipment parts ready for the first frost or snowstorm. Don’t be caught unprepared for an early snow.
Prepare each roadway for effective plowing.
• Keep side ditches clean.
• Shoulders should be smooth and flush with the pavement.
• Clean sand out from under guardrail.
• Cut and remove all tall weeds, grass, and brush that may cause snow drifting.
• Clear right of way fences of wind-blown weeds and sand drifts.
• Erect snow stakes, if necessary, to indicate hazards or the edge of the roadway which may be covered with snow.

Each Area Maintenance Superintendent has maps that shows local priority routes for anti-icing, snowplowing and sanding in multilane and urban sections. Equipment operators are responsible to study the maps and become thoroughly familiar with the priority routes. These maps are available at each maintenance section shed before winter begins.

Maintenance Supervisors are responsible to:
• Assure their employees know what is expected of them.
• Keep records that document work directions given to crews.
• Instruct all operators in the proper operation and maintenance of equipment.

WSDOT has a Winter Snow and Ice Training Program in place that instructs employees on how to properly perform winter anti-icing, deicing, snow plowing and sanding. This training especially targets the intermittent, seasonal and new permanent employee.

Calibrate each sand spreader to make the spreads required at a reasonable speed. Several drivers typically operate the same piece of sanding equipment during the winter. Some drivers may not be familiar with the specifications (or quirks) of a particular vehicle. To remedy this, post a card in the cab of each vehicle showing the truck speed or tachometer reading and adjustment to the spreader to deliver specified spreads. Variations from this calibrated rate may be necessary in accordance with actual field conditions.

Get stockpiles of sand ready for winter use. Locate stockpiles on smooth surfaces. If possible, set stockpiles up to work from the south side with maximum exposure to sunlight. Get loaders ready for operation at these sites.

Snow and ice control chemicals should be mixed into winter abrasives stockpiles only at locations where cold winter weather would typically freeze an un-conditioned stockpile.

When abrasives stockpiles are conditioned, either rock salt or solid, corrosion-inhibited chemicals may be used for this purpose. No more than the minimum amount of chemicals needed to keep the abrasives stockpile workable.
should be used. In many locations around the state, this will be a ratio of 20:1 (twenty parts abrasives to one part chemical) by volume. In some areas with wetter climates, a stronger concentration, up to 10:1, is required to keep stockpiles from freezing.

At times, stockpiles are conditioned at a rate stronger than the minimum concentration needed to keep them workable so that ice-melting capabilities are added to the abrasives. This is generally viewed as a less-than-optimal approach to snow and ice control. The current belief is that straight chemicals should be used to melt snow or ice and that adding abrasives to this equation results in costs and adverse impacts that outweigh its benefits. However, if maintenance personnel are working with some unique circumstances where such a mixture provides the most cost-effective method for improved road conditions, they can mix and use stockpiles with stronger concentrations of anti-icing chemicals. In such cases of stockpiles being conditioned at a chemical concentration of stronger than 10:1, only corrosion-inhibited chemicals shall be used.

Highway Categories

The priority of maintenance given to a state highway facility is influenced by the functional class and amount of use (traffic) that it receives. In general highways are prioritized according to the following categories.

Category -1- Highway
Interstate with an ADT (greater than) > 80,000

Category -2- Highway
Interstate or Principal Arterial with an ADT (greater than) > 20,000

Category -3- Highway
Interstate or Principal Arterial with an ADT (less than) < 20,000
Minor Arterial with an ADT (greater than) > 10,000

Category -4- Highway
Principal Arterial with an ADT (less than) < 10,000
Minor Arterial with an ADT (less than) < 5,000
Collector with an ADT (greater than) > 5,000

Category -5- Highway
Principal Arterial with an ADT (less than) < 5,000
Minor Arterial with an ADT (less than) < 5,000
Collector with an ADT (less than) < 5,000
Special Criteria

The priority of a highway may be raised or lowered a category, based on the following special criteria:

1. Importance to commerce, truck routes, etc.
2. Important commuter routes
3. School bus routes
4. Proximity to population centers
5. Curvature and grade of highway alignment

Work on State Highways

Area of Responsibility. Snow and ice control operations on state highways are restricted to the highway right of way. This includes those portions of intersecting public roads that are within the state highway right of way.

Snow Control Operations. Snow control operations consist of removing accumulated snow from the traveled way, shoulders, widened areas, and public highway approaches within highway right of way. When accumulated snow becomes compact and removal is not possible with available equipment, the accumulation is treated as an ice control operation.

Ice Control Operations. Ice control operations are done on the highway and on public accesses within highway right of way. This can consist of pretreatment of the roadway surface with anti-icing chemicals or the application of abrasives and/or deicer chemicals. When removal of compact snow and ice is not immediately possible, an abrasive application at bridges, curves, intersections, railroad crossings, steep grades, and isolated shaded areas is acceptable. Ice and compact snow are best removed under thawing conditions.

If possible, schedule ice and compact snow removal operations during the temperature rise that often occurs between 11:00 a.m. and 3:00 p.m. Use this time to clear surfaces of melting snow and ice, and to remove as much slush as possible prior to evening temperature declines. The use of road graders for ice removal is most effective during this period. Proper use of this warmer temperature period can make the difference between efficient and non-efficient cleanup operations.

Anti-icing & Deicing Chemicals. The use of anti-icing and deicing chemicals containing reduced chlorides such as Calcium Chloride and Magnesium Chloride or no chloride like Calcium Magnesium Acetate is encouraged. Use anti-icers/deicers in all areas where the Regional Administrator has determined there are benefits of such application.

Adverse impacts of a storm can be reduced when forecasts are used to apply anti-icing chemicals. Roadway weather information systems such as “RWIS” help WSDOT estimate the onset of road surface ice. With this information maintenance crews can apply anti-icing treatments just before a storm or ice condition hits.
Level of Service Coordination. Proper snow and ice control operations include coordination between adjacent regions. This assures that obvious changes in level of service on continuous sections of highway are avoided.

Tandem Plowing. Tandem plowing can be used for snow removal on multilane highways. Where reversible plows are available, it is often advantageous to operate one plow toward the left plowing to the median strip. In areas where drifting snow is a frequent problem, caution should be exercised in placing snow on the median. A narrow median filled with snow can cause drifting in adjacent lanes. Also, melting snow in the median can cause icy roadways during colder nights. Take care to assure that plowed snow is not thrown into the path of oncoming vehicles or onto a roadway below the highway being plowed.

Spinner Shut-off. In most cases spinner assemblies are used to distribute abrasives. In these situations, turn off the spinner temporarily when the sanding truck meets oncoming traffic. Stop sanding temporarily to allow backed up traffic to pass.

Operations at Interchanges. Interchange ramps are considered as separate roadways independent of the highway they serve. Priorities are determined by traffic volume. Ramp roadways are normally treated after one or more lanes are open on the main roadway.

Railroad Crossings. Never leave a windrow of snow on a railroad grade crossing. Drivers are to raise or otherwise adjust the blade before reaching the crossing to prevent damage to the crossing and/or equipment. Be aware of and avoid any conflicts between snow removal operations and approaching railway traffic.

Widening. Widening for snow storage, established turnouts, mailboxes, etc., may be accomplished when available manpower and equipment permit. Shoulders are often plowed in conjunction with the traveled way, or immediately after the storm is over. Clearing shoulders provides storage space for additional snow, makes the highway safer for motorists, helps prevent drifting, damage to the roadbed from moisture infiltration, and excessive runoff onto the pavement. Perform shoulder plowing in the direction of travel. Always establish proper traffic control before plowing against traffic on the median shoulder of divided highways.

Drainage Ways. Clear all drainage ways from the roadway surface prior to thawing conditions. Utilize a road grader or wing plow if possible.

Highway Sign Installations. Clear snow-covered highway signs after normal snow and ice control operations have been accomplished. Give first attention to regulatory and warning signs.
**Construction Projects.** Perform state-force snow and ice control operations on construction projects only if the project is open to traffic. Before beginning, assure that appropriate arrangements between region maintenance, construction staff and the contractor have been agreed to.

**Pedestrian Facilities.** In some urban locations, plowing operations may clog sidewalks or other pedestrian facilities. Regions need to initiate coordination with local jurisdictions in the fall to establish responsibilities and priorities for keeping pedestrian facilities free of snow. Keep in mind that areas outside the curb line are a city responsibility.

**City Streets on the State Highway System**

RCW 47.24.20 defines the jurisdiction of the state and the cities for those city streets that serve as a part of the state highway system within the corporate limits of a city.

In respect to snow and ice control, the law provides that a city or town shall remove all snow at its own expense. Except, WSDOT is responsible to plow snow on the roadway when necessary. Cities are also required to clean the streets, including catch basins.

Cities generally plow city streets and are expected to plow the state highways in the city as well. State crews are expected to assist by plowing on the way through town. However, plowing on city streets is a secondary priority to be completed after rural lanes have been cleared.

The general exception is routes within cities that are designated as limited access highways. In those instances, the state exercises full responsibility for the entire facility and all maintenance operations.

**Work on Other Roads and Areas**

**Other Governmental Agencies.** Snowplowing for other governmental agencies may be performed when authorized, on a reimbursable basis. When winter operations are conducted for other agencies, agreements are processed by the Region Administrator or his/her authorized representative.

Snow and ice control operations on roads and other facilities under the jurisdiction of other governmental agencies are secondary to work on state highways. Work is completed in accordance with the provisions of the agreement with the other governmental agency.

**Private Approaches.** Snow and ice control on private approaches, including that portion that may be located within the state highway right of way, is the responsibility of the abutting property owner.
WSDOT does not remove snow, ice, or sleet from private driveways, including any portion that may be located within the state highway right of way. All such activities are the responsibility of the abutting property owner.

Snow and ice control activities may inadvertently result in the deposit or the windrowing of snow, ice or sleet onto private approaches. The department does not assume responsibility for the removal or clearance of such material, even if caused by normal winter maintenance operations. However, all employees involved in snow control operations are expected to be sensitive, considerate, and courteous when carrying out these policies.

Mailbox turnouts on the shoulders may be plowed as a part of the shoulder widening operation.

**Abandoned or Illegally Parked Vehicles**

RCW 46.55.085 allows the State Patrol to impound abandoned or illegally parked vehicles after documented attempts to notify the owner. This process can require several days. However, if the vehicle is determined to be a hazard, the Patrol can arrange for immediate removal. The State Patrol has requested that WSDOT record any department requests for such removal, in order to support the Patrol’s actions should a conflict arise with the owner of the vehicle.

**Closures**

Occasionally winter conditions are so severe they overwhelm the capability of maintenance crews to effectively respond. This happens despite our best planning efforts and highly motivated crews. Temporary road restrictions or closures may be the only safe alternative in these situations.

The Secretary or his designated representative may temporarily close or place temporary traffic restrictions on any state highway for any reason. The Secretary or designee may also close any state highway, without delay, in an emergency. When it becomes apparent that a road section will be closed by snow, ice, snow slides, or for any other reason, maintenance personnel must take immediate action to safeguard themselves, and the public.

The following actions are taken when a road must be closed for more than an hour.
- The Regional Administrator or designee notifies the State Patrol and other pertinent organizations.
- Immediately erect appropriate traffic control devices advising motorists of the closure and possible detours.
- Take all necessary measures to prevent motorists from entering and becoming stranded in the closed section.
• Keep the Regional Public Information Officer apprised of road conditions so that the news media can be informed of closures. Emergency closures require that the Area Superintendent, Regional Maintenance Engineer, Regional Administrator and the Regional Public Information Officer be notified as soon as possible.

• Keep the State Maintenance Engineer informed of all closures that are expected to last for four hours or more and of all actions taken to reopen the roads.

Emergency Assistance

During winter maintenance operations, limit emergency assistance to actions that safeguard life and property. Time spent helping motorists with minor problems could result in road conditions that would cause more serious problems for other motorists.

Employees may render emergency assistance to motorists, at the motorist’s request. Stranded vehicles may be pulled onto the highway, provided the vehicle is driveable. The motorist must make his/her own tow chain or cable hookup and disconnect. This kind of assistance is typically permissible only when snow or ice conditions are reasonably under control and when private towing trucks are not available.

It may be necessary occasionally for an employee to exercise judgment as to whether a motorist is capable of driving his vehicle. Sometimes it appears that the motorist is inebriated or otherwise unsuited to drive. In these situations notify law enforcement agencies by radio or other available means as soon as possible. Employees are required to notify the State Patrol about any accidents that occur on the highway.

Never tow any vehicle that may be unable to proceed because of lack of power or traction, except when the vehicle blocks the traveled way. In this instance, the stalled vehicle may be towed a sufficient distance to clear the normally traveled portion of the roadway to allow the safe passage of other vehicles.

Department employees may not accept compensation of any kind for this or any other type of assistance.

WSDOT desires to avoid situations that can cause the department or its employees to be sued. This has resulted in a general policy that non-employees do not ride in state-owned vehicles. However, employees may provide transportation in state-owned vehicles to stranded motorists under emergency conditions. Employees are advised to consider the particular circumstances and exercise careful judgment.
Precautions

Take precautions to prevent damage to signs, mail box posts, sign posts, and other roadside appurtenances. Rotary snowplow operators are to reduce speed when in an area where adjacent buildings or facilities might be damaged from the flying snow. Redirecting the chutes helps minimize this danger. Utility lines and transformers can also be damaged by rotary plows.

Trucks must be operated at moderate speeds when removing snow, especially when slush exists. When plowing shoulders or when meeting traffic, operators need to be aware of what is going on around them. Stop or slow down occasionally to allow traffic from the rear to pass. Plowing slush at high speeds deposits the slush on signs and other vehicles and thereby obliterates warning signs. Plowing snow at high speeds causes excessive snow clouds, making the highway less safe for the traveling public.

Be especially careful when passing or being overtaken by other traffic. Avoid throwing snow onto windshields and obstructing the vision of other drivers.

Take care while removing snow in the vicinity of cars parked adjacent to the highway. Even though the cars may be illegally parked on the traveled way, take reasonable care consistent with the necessity of accomplishing the work.

Raised traffic buttons are often used in western Washington for lane stripe delineation. Care must be taken to minimize damage to the raised traffic buttons. Snowplows with rubber bits are used for this purpose—they are effective in slushy snow or in snow that has not been compacted by traffic.

Service Level Quality Measurement

The Headquarters Maintenance Office has developed quality performance measurements for snow and ice control. These performance measurements have been established to assess how well maintenance offices are able to control snow and ice. The purpose is to find the best ways to do our jobs with reduced funding and personnel. These measures focus on providing targeted levels of service for snow and ice control based on the highway category and local maintenance area priority. For more details on how this process affects you, check with your supervisor.
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