

## Chapter 9

### Winter Maintenance Program

#### 9.0 Introduction

##### Description

Due to Montana's vast and varied geography, elevations, and topography, snow and ice occur in varying amounts over most of the state. Montana's economy is dependent on its road system. Therefore, it is necessary to keep the roadways open and safe.

This chapter addresses variations in conditions such as storm intensity, duration, type of traffic and traffic volumes. It is not intended to anticipate every condition. It is a guide that outlines methods and procedures that apply for most situations. Since every storm is different and every situation cannot be anticipated, experience of the crew should be used to modify the plan when necessary, so long as it is consistent with the intent of the plan.

The statewide winter maintenance program defines operational procedures for items such as levels of service, priorities, snow removal activities, snow pole installation and removal, abrasives and road closures.

The MDT Maintenance has identified a level of service for all maintained roadways. The response will be based on that service level, safety of the traveling public and law enforcement requests.

To be responsive to the needs of the public, a number of factors should be considered in snow removal and ice control. When scheduling snow and ice control, consideration should be given to Level of Service Guidelines. Within the guidelines additional consideration is given to peak traffic periods on commute routes. Areas that historically have been a problem for motorists should be a high priority. Bridge decks can be problems and should be monitored. An effort should be made to accommodate school bus routes.

##### Responsibilities

The Maintenance Chief is responsible for providing a reasonably safe level of service as outlined in this program. Cost, driver safety, personnel, equipment availability and environmental concerns are factors that must be considered. The Area Maintenance Bureau Chief, Maintenance Superintendents, and Field Maintenance Supervisors are responsible for annually reviewing and modifying the Area/Section Winter Maintenance Plan.

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Each section needs to develop a winter maintenance plan. Plans should be completed by October 1.

Considerations developing winter maintenance plans include:

- Route level of service
- Operational procedures
- Personnel needs
- Shift schedule
- Equipment/availability
- Incident /road closure plan
- Communications
- Contracted snow removal
- Material needs
- Availability of Remote Weather Information Systems (RWIS)

All employees are responsible for being familiar with the Area/Section plan and RWIS data for thorough preparation prior to storms and for good tactical procedures during storms. The Field Maintenance Supervisor should manage shift changes to avoid fatigued employees. All maintenance employees are responsible for understanding procedures and conforming to the requirements of the job such as being available to work beyond scheduled shifts on weekends and holidays. Alternative work schedules should be considered to help ensure snowplow coverage is available throughout the week. Alternative schedules help with stabilizing overtime hours without sacrificing safety.

#### **Purpose**

MDT strives to maintain its highways in a reasonably safe condition for the traveling public. The Department removes snow and ice and applies abrasives and chemicals to the roadway to improve driving conditions. The Department has established Winter Maintenance Service Level Guidelines to provide uniform service levels throughout the state. During the unusual or extreme winter conditions, normal services will be provided as soon as available resources permit.

#### **Limits of Work**

Maintenance should confine snow and ice removal to MDT maintained routes unless there is a Memo of Understanding with other agencies or any special right-of-way agreement with individuals.

#### **Construction Projects**

Standard specification and special provisions of the contracts will determine snow and ice removal on construction projects.

### **Private Approach Roads**

Removal of snow on private approach roads, both on and off the right-of-way is the responsibility of the property owner unless there is a special right-of-way agreement for snow removal. Maintenance forces should plow snow deposited across private approaches and mailbox turnouts as a part of after storm cleanup operations.

Property owners may not move snow onto the roadway. If a property owner continues to do so, after being asked not to, the Division Maintenance Superintendent should be notified and the Montana Highway Patrol or local law enforcement should be asked to assist in stopping the practice. The illegal pushing of snow onto a right-of-way should be documented with photographs when possible. (MCA 61-8-365)

### **Winter preparation**

Roadside ditches should be clean. Shoulders should be smooth and flush with the pavement. Tall weeds, grass, and brush next to the roadway, which may cause drifting, should be cut.

Field Maintenance Supervisors should review signing that pertains to snow removal activities to ensure that signs are in good condition. Any signs including delineators, snow poles and other winter warning signs, should be installed before the first major storm.

Supervisors need to prepare for winter maintenance prior to the first storm. Supervisors should prepare shift schedules for regularly assigned crews, including temporary or part-time employees. Winter temporary staffing needs to be in place to allow training before the winter season. Maintenance Chiefs may review snow removal plans with the Highway Patrol and other law enforcement agencies. Special attention should be given to ensure equipment is ready for winter use. Shop superintendents should coordinate with the Field Maintenance Supervisors and Area Maintenance Supervisors to identify and prioritize work. Teamwork and cooperation are essential for successful snow removal operations.

Maintenance employees should know the locations of drainage structures and should ensure that they are open to eliminate areas of ponding or water running across the road. Drainage structures should be marked before winter so they can be located during and after storms. Ponding water with falling temperatures may cause inlets to freeze, creating an additional hazard to traffic. Water from melted snow can create a greater hazard than the original storm, especially when it freezes.

### **Personal Clothing and Equipment**

Because of varied and unpredictable circumstances that occur during the winter, employees should have the following personal equipment with them when they begin their shift:

- Gloves

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- Warm jacket with hood
- Insulated boots

#### **Traffic Control**

Maintenance personnel must always be alert to the conditions and use whatever is immediately available to warn the traveling public of an incident that might pose a safety hazard. Many incidents are temporary. Maintenance workers can use equipment-warning lights to alert the public. If the incident, in the opinion of the Field Maintenance Supervisor, is going to take substantial time to resolve, appropriate signs should be placed in accordance with the MUTCD.

#### **Chain or Snow Tire Requirements**

“Chains Required” signs may be posted when, in the judgment of the Field Maintenance Supervisor or designee, roadway conditions exist that towing vehicles may not be able to negotiate the roadway without traction aids. Chain requirements should be removed when conditions improve enough to allow the average driver to control a vehicle without chains.

The decision to post and remove chain requirements may be made at the highest level practical within a crew and must be reported to the appropriate dispatch center to be included in the road information update report. The Field Maintenance Supervisor or designee should review the posted section to ensure that requirements have been posted or removed in accordance with conditions.

#### **Emergency Procedures**

Emergencies are defined as unforeseen circumstances or conditions that call for immediate action. During the winter, situations such as traffic accidents, hazardous material spills and abandoned vehicles become more critical from adverse road conditions. In emergency situations, MDT employees must notify the Area office or dispatch center.

If vehicles are parked partially blocking the travel lane or interfering with snow removal, the Montana Highway Patrol should be asked to have the vehicles removed. MDT employees are not authorized to remove or tow vehicles. MDT employees may assist in acquiring a wrecker through the Area office or dispatch center.

It may become necessary to close a road. Refer to Chapter 8.8 for procedures.

#### **Winter Road Reporting**

The Winter Reporting System was developed and is used to provide the traveling public with timely, accurate information on roadway conditions.

The MDT Road Reporting Unit, within the Maintenance Service Center provides Montana travelers with winter roadway conditions from approximately the end of October to the end of April. The exact dates are weather-dependent.

Roadway condition information collection and distribution is a cooperative effort using maintenance section personnel, road reporting team members from the eleven Area offices and Helena headquarters staff. The office staff then uses two-way radio polling to solicit the conditions from each section's roadways. Once the polling has been completed, the road reporting team member enters the conditions for all the areas routes onto an Oracle-based road-reporting program. The information is transferred to Helena headquarters office for use in preparation of the statewide morning road report.

These procedures begin at 6:00 A.M. and are completed by 7:35 A.M. Monday through Friday. An afternoon report is put out by 3:30 P.M. Updates are provided seven days a week.

### **Radio Procedures**

During the winter months, maintenance personnel rely on two-way radio communications. Employees need to be aware that other agencies and individuals commonly monitor Department radio frequencies. With many calls for abrasives and assistance to specific areas, the two-way radio is the most efficient means for workers and dispatch center to communicate. Some rules that relate to radio include the following:

- Use appropriate Area call codes; do not use CB jargon.
- Use identified desired contact first, then your identification, and channel in use. For example: 21-04, 21-05 on channel 2.
- Be brief, courteous, and do not interrupt other messages. Use the radio for Department business only.
- Profane, foul, or abusive language on the radio is unacceptable.
- Use Mutual Aid Channel (Channel 4) for direct contact with law enforcement.

### **Environmental Best Management Practices**

Environmental best management practices are defined in MDT Maintenance Environmental Best Management Practice Manual. Sensitive environmental areas are defined and mapped in Section E.

### **Resources**

New Training Manual

Winter Maintenance Service Level Guidelines

MUTCD

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## 9.1 Winter Maintenance Service Level Guidelines

### Level of Service

The objective of the Winter Maintenance Guidelines is to provide a uniform service between maintenance areas and better allocation of resources. Six levels of service have been established. Factors considered when establishing the level of service for a specific route were as follows:

- Safety
- Average Daily Traffic (ADT)
- Commuter routes
- School bus routes
- Availability of alternate routes
- Public interest and concern
- Potential economic impact
- Consequence of not providing higher level of service
- Available resources.

Note: If the Area Maintenance Bureau Chief and/or District Administrator has justification why a roadway should receive a different level of service from the guidelines indicate, a letter of justification will be sent to the Area Maintenance Bureau Chief if the change could result in a budget overrun. An example would be a high-volume route or frontage road like in the Billings or Missoula areas.

Plowing, sanding and chemical anti-icing and de-icing will be accomplished as follows:

### Level I (Urban)

- **All MDT-maintained roadways generally within or adjacent to a 3 mile radius to towns or cities with an average daily traffic (ADT) greater than 5000 per day.**

Snow plowing and anti-icing/de-icing operations may be continuous throughout the storm. These routes are eligible to receive up to 24-hours-per-day coverage during a winter storm event.

The primary objective will be to keep at least one travel lane in each direction open to traffic and to provide intermittently bare pavement as soon as possible. Snow plowing, anti-icing, and/or deicing operations may be continued after the storm to achieve an intermittent bare pavement in the primary travel lane. Remaining travel lanes and shoulders should be cleared as quickly as available manpower and equipment permit. In order to ensure the most efficient and effective use of available staffing and equipment, a schedule of coverage time frames will be implemented at the discretion of the Area Maintenance Bureau Chief.

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Level I roadways are eligible for the development and implementation of anti-icing strategies, using available remote weather informational system (RWIS) information and weather forecasts in combination with accepted/efficient anti-icing techniques. When deemed appropriate, the application of anti-icing chemicals normally commences prior to the storm with uniform and controlled, predetermined coverage.

Application of abrasives or chemicals alone and/or in combination and/or straight for deicing purposes is acceptable. Straight applications of liquid chemicals (De-icier) are acceptable to thin accumulation of snow/ice pack when acceptable weather conditions and effective application methods are employed.

#### Level I-A

- **All interstate and other MDT-maintained roadways with ADT of greater than 3000 vehicles per day.**

Snow plowing and sanding/de-icing operations may be continuous throughout the storm. These routes are eligible to receive up to 19 hours per day coverage, typically between the hours of 5:00 AM and 12:00 AM during a winter storm event. In order to ensure the most efficient and effective utilization of available staffing and equipment, coverage will be at the discretion of the Area Maintenance Chief.

The primary objective is to keep the roadway open to traffic and provide an intermittent bare pavement surface in the main driving lane as soon as possible. The remaining lanes and shoulders should be cleared as soon as conditions and available manpower and equipment allows. The exception is when blizzard and/or other severe forms of weather make conditions such that maintenance and motor vehicles cannot safely negotiate the traveled way.

Anti-icing and sand/de-icing operations typically are conducted during the storm. De-icing operations normally consist of applying a predetermined quantity of a salt/sand mixture, liquid de-icier/sand mixture or a straight application of deicing chemicals. The application of straight chemicals to snow packed or icy surfaces will not be a standard practice, an exception being where unique or extraordinary circumstances exist, and then only when acceptable weather conditions and effective application methods are employed.

#### Level II

- **All MDT-maintained roadways with ADT of 1000-3000 vehicles per day.**

Snow plowing and sanding/de-icing operations should be conducted during the storm event. These routes are eligible to receive up to 17- hours-per-day coverage typically between 5:00 AM and 10:00 PM during a winter storm event. In order to ensure the most efficient and effective use of available staffing and equipment, coverage will be at the discretion of the Area Maintenance Chief.

The primary objective is to keep one lane in each direction open to traffic. Snow packed and/or icy surfaces are acceptable but they may be treated with abrasives or abrasive/chemical combination. The exception is when blizzards or other severe forms of weather make conditions such that maintenance and motor vehicle operators cannot safely negotiate the traveled way.

Plowing/removal of any snow pack or icy surface, widening of the traveled way and clearing of shoulders should be accomplished only during regularly scheduled work hours. The Area Maintenance Chief may authorize overtime for additional work where unique or extraordinary conditions exist.

Anti-icing strategies and techniques will not be implemented on Level 2 routes unless it can be documented to be cost effective to do so.

### **Level III**

- **All MDT-maintained roadway with an ADT of 200-1000 vehicles per day.**

When staffing and equipment is available, snow plowing and sanding operations will typically conducted during the storm to keep the driving lane passable. These routes are eligible to receive up to 15 hours per day coverage typically between the hours of 5:00 AM and 8:00 PM during a winter storm event. In order to ensure the most efficient and effective utilization of available staffing and equipment, coverage will be at the discretion of the Area Maintenance Chief.

Hills, curves, bridges and intersections should be treated with abrasives or abrasive/chemical combinations prior to ceasing operations. The exception would be when blizzard or other severe forms of weather make conditions such that maintenance and motor vehicle operators cannot reasonably negotiate the travel way.

Snow packed and/or icy surfaces are acceptable for Level III roadways. Generally straight sections of roadway will not be sanded unless extraordinary circumstances exist. Additional snow removal will be accomplished during regularly scheduled working hours. Generally, straight chemicals will be not used except in combination with abrasives.

### **Level IV**

- **All MDT-maintained roadways with ADT of less than 200 vehicles per day.**

When staffing and equipment is not being used to clear other roadways, snow removal operations may be conducted. Winter maintenance activities will be accomplished during regularly scheduled working hours.

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These roadways may be closed for an extended period of time until resources are available to plow the traveled way. Abrasives may be used on hills, curves, bridges and intersections. If surface conditions become too hazardous for traffic to safely negotiate, the section should be closed. When temporary closures are required, the road closure process should be employed. These routes should be posted to indicate limited maintenance.

**Level V**

- **Seasonal Roadways**

These roadways will receive no scheduled winter maintenance activities. These will generally be roadways that are of a seasonal nature or designated a non-maintained route. These routes should be posted to indicate no winter maintenance.

## 9.2 Snow Plowing and Removal (MMS 7202 & 7205)

### Activity Description

This activity includes but is not limited to

- Plowing and removing snow and ice from pavement surfaces.
- Application of chemicals
- Posting chain requirement signs.
- Posting appropriate warning signs.
- Applying abrasive materials to improve traction.
- Widening to provide storage space for snow accumulations.
- Hauling accumulated snow to designated sites.

### Purpose

The purpose of this activity is to maintain safe winter driving conditions for the traveling public and to benefit commerce and emergency services.

### Timing of Maintenance

Response to winter events should be prompt and in conformance with the Level of Service Guidelines.

Preventive winter maintenance, for example, would be the application of anti-icing chemicals before snow begins to stick to the roadway. It is important to follow guidelines for temperature when applying chemicals. Timing of work under this activity is dependent on storm intensity, anticipation of the duration of the storm and level of service of the routes being maintained.

### Specialized Equipment

- Snow blowers – truck and loader mounted
- Crawler Dozer
- Motor Patrol
- V-Plows – motor grader, loader or truck mounted

All sanding equipment, anti-icing and de-icing equipment should be calibrated before winter operations and checked on a regular basis during operation. Because equipment is essential to the performance of winter maintenance it is essential that equipment be properly maintained and operated.

### Materials

Sanding abrasives or anti-skid material is used for snow and ice control. Only aggregates that meet the current MDT specifications should be used in anti-skid applications. Anti-icing and de-icing materials are typically magnesium chloride or calcium chloride that are purchased through annual purchase contracts. Sections are required to take chemical product samples for quality control as per contract requirements.

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Maintenance supervisors should review needs in the spring to ensure that required materials for winter maintenance operations are on hand in sufficient quantities for the next snow season.

#### **Storage**

Anti-skid mixtures should be stored in buildings or covered wherever possible. When buildings are not available, attention should be given to drainage and prevention of materials from migrating into watercourses or otherwise impacting the environment. Salt or anti-icing chemicals are commonly used with the abrasives to help keep materials from freezing and enhance their effectiveness. Side-caste frozen chunks should be reintroduced into anti-skid stockpiles when thawed.

#### **Hauling and Disposing of Snow**

Snow hauling can be accomplished with state equipment and forces or with snow hauling contracts. Contracts need to be reviewed and bid prior to the winter season.

Snow disposal, especially in larger urban areas, can be a problem during periods of heavy accumulation. Snow disposal areas should be reviewed at the beginning of each winter. It is preferred to use snow-hauling contracts in these types of areas.

Before hauling snow to stockpiling sites on private property, an agreement identifying all conditions and responsibilities must be completed. Because of aggregate and chemicals used in snow and ice removal, locations of snow storage areas should be evaluated for possible environmental effects.

#### **Safety and Training**

In addition to attending new employee orientation, new employees should be monitored by the Section Supervisor or his/her designee. Supervisors need to provide on-the-job training in operational techniques, safe practices, and specific section information to enable the new employee to become an effective and safe winter maintenance employee.

The Field Maintenance Supervisor is responsible to review the winter operation plan with all crewmembers. New policies or goals may require additional emphasis and training. Maintenance employees should be reminded of areas that may present special problems, such as bridge deck icing before other sections of the highway or how to handle traffic accidents or other potential hazards.

#### **Environmental Best Management Practices**

Sensitive areas will be identified. Sensitive areas are sections of the highways or highway features, the maintenance of which would detrimentally impact (directly or indirectly) fish or fish habitat.

Maintenance develops winter management and operation plans that identify sensitive/critical areas, levels of service for roads and methods for maintaining levels of service during winter weather.

Best management practices include:

- Striving to reduce the overall amount of aggregates used through alternative treatment strategies.
- Applying liquid chemicals alone or in combination with abrasives at site-specific sensitive locations where appropriate and practical.
- Placing barriers in site-specific locations where appropriate and practical, along streams or direct drainages to route sanding/anti-icing material away from watercourses. If a culvert or catch basin could drain with sediment impact to waterways, sediment control measures should be implemented whenever possible to prevent excess sand run off into waterway.
- Reducing plowing speed in Sensitive Areas.
- Stopping side cast sweeping within 50 feet of structures over water, where structurally possible, and whenever possible avoiding the casting snow and/or ice into a waterway.
- When cleaning in the spring, sand should be recovered from bridges and the highway shoulder when weather and road conditions allow. Cleanup should also include removing materials from under the guardrail.
- Hauling and disposing removed snow in an appropriate manner away from sensitive sites.
- Educating MDT maintenance staff on water quality and fishery resource issues.
- Where applicable, adhering to MDT/DEQ materials specification for PM-10 non-attainment.

## Procedures

### Plowing

The operating speed of the plow truck is directly related to efficiency and effectiveness. Operators should maintain a speed that does not endanger life or property, but provides a reasonably prompt service. Excessive plowing speeds can result in damage to the roadway, damage to the plow, poor performance and a rough road. With excessive speed, wet snow can damage objects such as mailboxes and signs.

Plowing speeds shall be determined by actual roadway conditions and in no case exceed 45 mph. The plowing speed on urban streets should never exceed the posted speed limit and generally should not exceed 25 mph.

Snowplows are **NOT** emergency vehicles. There are special considerations relative to loads carried and services rendered. Statutes and Department policy do not allow snowplows to disobey traffic laws or regulations.

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Operators should follow these guidelines:

- Employees are not to operate vehicles and equipment at speeds that are unsafe for conditions.
- Snow removal equipment shall not be operated against opposing traffic unless the road is closed with appropriate traffic control.
- When plowing on a two-lane road, plows start at the center of the roadway and plow to the right.
- Each Section shall have a Winter Operation Snow Removal Plan that defines specific plowing methods and priorities based on resource availability and storm conditions.
- When plowing on four-lane roadways, plowing units should be operated in tandem whenever possible.
- When plowing four lane roadways without medians several plowing techniques may be used, depending upon conditions. For heavy snow conditions, trucks should operate close together, plowing from the median barrier to the right. Lighter conditions may allow for greater truck spacing to allow overtaking vehicles to pass. When plows are not available to work in tandem, priority should be given to the driving lanes.
- On divided highways, with medians wide enough to use for snow storage the recommended practice is to plow the passing lane to the left after the driving lane has been plowed to the right.
- When plowing where there is a curb, gutter and sidewalk, plowing to the right is performed carefully so that snow is not stacked on the sidewalk. Depending on anticipated accumulation, it may be advisable to plow snow to the center of the street for later removal. Plowing to the center of the street should be in accordance with the Area's snow plan or by approval of the supervisor.
- When plowing on bridges and overpasses, decrease speed so snow or ice is not pushed over the side of the structure onto traffic, pedestrians or waterways below.
- Plow and wing combinations are only to be used if the combination does not encroach into on-coming traffic. The wing should only be used when the plow truck occupies the right driving lane. The plow extension wing is used for light-duty and is not used for benching snow or plowing off the paved surface.
- Benching wings are commonly used as plow extensions and to move accumulated snow farther from the roadway to enhance storage.
- Operators should be aware of white out conditions caused by snow plowing and should adjust operations to the extent practical to reduce the hazard.
- Traffic control may be required when using snow-blowing equipment.
- Extreme care and caution is required at turn around sites and median crossings.

### **Application of Abrasives (anti-skid)**

The Department uses hopper-type sanders with anti-icing saddle tanks to pre-wet abrasives with chemicals to enhance performance. The units are equipped with mechanical conveyors, which feed material to a spinner. The spinner distributes the material to the roadway.

Applying anti-skid materials during winter road maintenance enhances traction. Operators need to pay particular attention to the following so that the application of anti-skid materials produces optimum results:

- Equipment should be calibrated and checked for accuracy on a regular basis.
- Operating speeds of trucks applying anti-skid material is important. Proper speeds enhance material spread patterns and retention.
- When meeting oncoming traffic, plow drivers should shut off the sanders far enough in advance to reduce damage from abrasive materials.
- Anti-skid materials are applied at a rate that is adequate to provide traction.
- Spinner speed settings are critical. A spinner that revolves too fast will throw material over an excessively wide area, which has two detrimental effects. It wastes material and may damage vehicles behind the sand truck or in an adjacent lane. Two methods are available for reducing the distance the spinner casts material. These include reducing speed of the spinner and/or adjusting the deflectors on the chute.
- Dry, untreated anti-skid materials will not adhere to icy roadways.
- Cold air reaches the top and bottom surfaces of a bridge that cools off much faster than the remainder of the roadway surface. Because of low temperatures and high humidity, bridge decks may ice up when there is little or no precipitation. Traction-aid techniques (anti-skid materials or liquid chemicals) are frequently used on bridge structures.

### **Anti-icing and De-icing**

Anti-icing is the application of chemicals to prevent snow and ice from bonding to the pavement surface. Eutectic temperature (lowest freeze point temperature for a given product) should be considered when applying anti-icing chemicals. Appropriate application rates can be determined from experience and/or the use and development of T.A.P.E.R. (Temperature, Application, Product, Event and Results) Charts.

Anti-icing and de-icing recommendations:

- Do not anti-ice during rain as it wastes the product.
- Caution should be used in windy areas, as it can cause snow and ice pack on the road.
- Typical anti-icing rates are significantly less than de-icing rates.
- In the fall and spring with low humidity, light application rates, such as 25 gallons per lane mile, should be used.

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De-icing is the application of chemicals to remove snow and ice from paved surfaces. Care should be taken when using chemicals as a de-icer because cold temperatures and light applications may worsen conditions. Stream nozzles are preferred. Use of anti-skid during de-icing should be considered to maintain adequate traction.

Equipment for these two operations should be calibrated and checked for accuracy on a regular basis. Monitor all liquid application for accuracy and uniformity. If there is a problem, check nozzles and screens for plugging.

### **9.3 Patrolling for Snow and Ice (MMS 7201)**

#### **Activity Description**

Work under this activity includes inspecting roadways and reporting conditions.

#### **Purpose**

The purpose of this activity is to patrol the roadways to check winter roadway conditions and determine maintenance needs.

#### **Timing of Maintenance**

This activity is the routine patrolling done to determine need and report winter road conditions.

#### **Procedures**

1. Check assigned routes for travel conditions and emergency situations
2. Report findings to dispatch.
3. Commence winter maintenance activities if needed.

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## **9.4 Snow Fence and Berms (MMS 7204 & 7205)**

### **Activity Description**

This work activity includes the installation, removal, repair, and maintenance of snow fences and the building of snow berms. Types of snow fence include:

- Permanent snow fence.
- Temporary snow fence
- Living snow fence
- Snow berms

### **Purpose**

The purpose of this activity is to trap snow, to provide needed snow storage, and improve driver visibility.

### **Timing of Maintenance**

Snow fence repairs, maintenance, and installation should be accomplished before the winter season. Temporary snow fence applications should be removed as soon as possible after winter.

### **Approval**

Written landowner approval is required before installation and maintenance of snow fences or berms.

### **Specialized Equipment**

- Hole Auger for fence installation
- Backhoe or loader – for fence installation
- Motor Grader/Loader with V-plow for making berms

### **Materials**

As required and appropriate to the type of fence

### **Safety and Training**

Supervisors should review safety, training and work zone requirements with employees to ensure compliance with approved guidelines.

### **Procedures**

Snow fence design and requirements are determined by the area geography, wind direction, velocity and snowfall in relation to the road.

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