Snow Management SN-1

BMP Objectives
- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

Snow management involves the relocation of snow by transporting, plowing, dozing, and/or blowing snow to locations where erosion impacts are less likely to occur during melting. This BMP can be used in conjunction with snow fences.

Appropriate Applications

This BMP is appropriate when construction projects extend through winter months and at locations (such as high mountain areas) where snow accumulation can be significant.

Limitation

This BMP may not be appropriate in areas with little snow accumulations and where access is limited.

Design Guidelines and Considerations

- Utilize snow blowers, snowplows, or other equipment to remove snow or move snow to less erosionally sensitive areas with proper drainage.
- Modify existing snowplow operations so snow is not piled in erosionally sensitive areas.
- Remove heavy snow accumulations from around temporary structures such as culverts to minimize ice jamming and structure failure during freeze-thaw cycles.
- Place snow in areas where soil/cover is stable and snowmelt will have a less significant impact.

Maintenance, Inspection, and Removal

- Remove or move snow as needed to reduce melt impacts.
- Inspect snow placement areas during the thaw cycle.

Snow Accumulation Management SN-2

BMP Objectives

- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

At construction sites, snow can accumulate on disturbed areas and in drainages prior to cover being established. The Snow Barrier BMP involves the installation of snow barriers to reduce the amount of erosion on disturbed areas. Temporary Snow Barriers are most commonly constructed from synthetic materials; however, boards, hay bales, rocks, and other similar materials can be used as well.

Appropriate Applications

In areas where snow drifts of 1.5 to 3 meters (5 to 10 feet) in depth can occur, snow fences can be installed to prevent snow from accumulating on sensitive areas. This practice will minimize erosive snowmelt runoff and ice blockages. Snow fencing can be used in conjunction with Preservation of Existing Vegetation (SS-2) and Wind Erosion Control (WE-1).

Limitation

Snow fences are difficult to install on steep slopes and rocky surfaces. Snow fences may not be cost effective when large areas need to be protected from snow accumulation. Removal at the end of the project is manpower intensive.

Design Guidelines and Considerations

- Install snow barriers adjacent to disturbed areas, perpendicular to the prevailing wind direction, and “upwind” of disturbance area.
- Fences in moderate snow areas should be 1.2 to 1.8 meters (4 to 6 ft) in height. Two or more parallel rows of snow fence may be used in areas of heavy snow accumulations.
- Synthetic fence density (the ratio of the solid area to the area of the fence) should be between 40% and 60%.
- Fences should be placed, if practical, at a distance of 15 to 20 times the fence height from the area to be protected.

Maintenance, Inspection, and Removal

- Inspect snow barrier materials and installation throughout the winter to make sure they are functioning properly.
- Remove snow barriers when the areas to be protected have been stabilized.

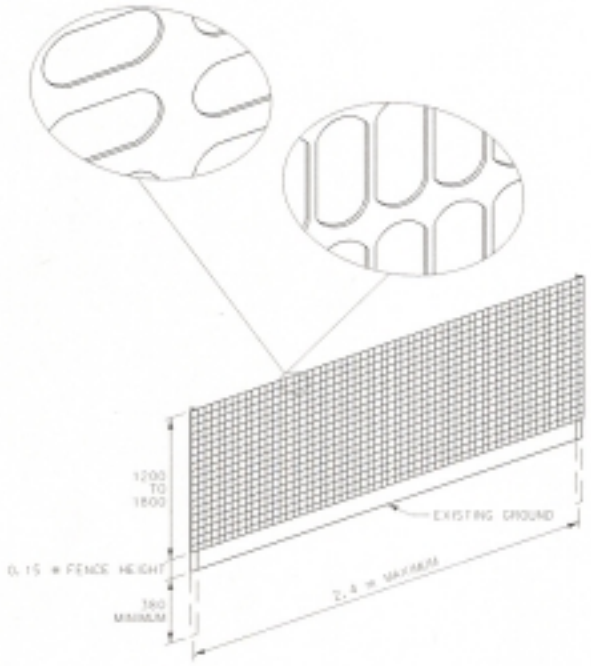
SYMBOLS

SNOW ACCUMULATION MANAGEMENT (SN-21)

SNOW ACCUMULATION BARRIERS PROVIDE AN AREA OF REDUCED WIND VELOCITY WHICH ALLOWS SETTLING OF SNOW. MAXIMUM REDUCTION OF WIND VELOCITIES OCCUR IMMEDIATELY DOWNWIND OF THE SNOW BARRIER, GRADUALLY DECREASING FURTHER DOWNWIND.

SNOW FENCING IS ONLY EFFECTIVE FOR DRIFT CONTROL FOR APPROXIMATELY 15-20 TIMES THE HEIGHT OF THE FENCE. SNOW FENCE IS REQUIRED TO BE A PREFABRICATED COMMERCIAL PRODUCT MADE OF WOVEN, POLYETHYLENE, AND ULTRAVIOLET RESISTANT MATERIAL WITH A POROSITY OF 40-60%. SNOW FENCING IS MOST PROTECTIVE IN A DIRECTION THAT IS PERPENDICULAR TO THE WIND DIRECTION. SEVERAL PARALLEL FENCES CAN BE USED IN AREAS OF HIGH SNOW ACCUMULATION OR HIGH WIND CONDITIONS. SECURE FENCING TO APPROVED POSTS WITH FOLLOWING MANUFACTURE RECOMMENDATIONS.

MAINTAIN SNOW FENCING AS NEED OR AS SPECIFIED BY THE ENGINEER. REMOVE SNOW ACCUMULATIONS FROM FENCING ONCE LEVELS HAVE REACHED THE BOTTOM OF THE FENCE.

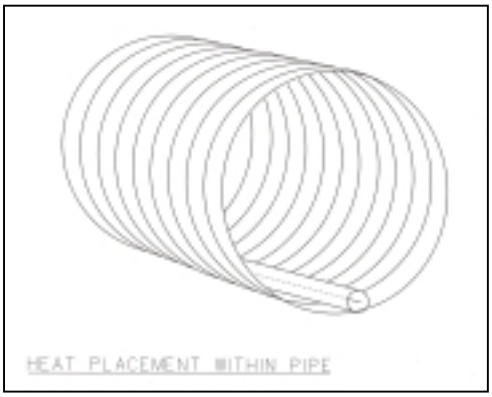


ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

PRELIMINARY

REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-22
SNOW ACCUMULATION MANAGEMENT (SN-21)	
EFFECTIVE:	
CDM Camp Dresser & McKee Inc.	

Freeze Reduction SN-3



BMP Objectives
- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

Snow and ice accumulations in structures such as ditches and culverts can lead to plugging and subsequently to significant water flows across disturbed areas causing erosion. Frozen culverts can cause water to flow over roadways destabilizing them. Ice blockage in channels can increase water levels in the channels causing flooding and potentially resulting in significant damage. The freeze reduction BMP involves the use of oversized culverts, dual culverts, elevated culvert outlets, and heat trace to reduce the impacts of freezing weather on culvert effectiveness.

Appropriate Applications

Generally, ice blockage occurs during the winter months in Montana and proper slopes and proper installation of standard hydraulic structures reduce freezing. However, in areas where failure could cause significant damage, conservation methods such as the ones described in this BMP may be necessary.

Freeze reduction BMPs are appropriate in areas where heavy frost and snow may cause unacceptable failure, such as at or near environmentally hazardous sites, or in locations where failures could be a health hazard or cause unacceptable problems.

Limitation

Areas with limited access and space to install oversized and/or dual hydraulic structures. Elevated culvert outlets in streams should be avoided if fish migration is a concern. Heat trace may not be appropriate for remote areas with limited access to electricity.

Design Guidelines and Considerations

- Install oversized culverts to allow for some freezing.
- Install dual culverts with one culvert raised higher in elevation than the other culvert. This will allow water passage through the upper culvert if the lower culvert freezes.
- A vertical drop of approximately 0.6 meters (2 feet) at a culvert outlet may reduce water freezing within the culvert.

- Install channel freeze protective measures as shown in the Freeze Reduction (SN-3) Detail Drawing.

Maintenance, Inspection, and Removal

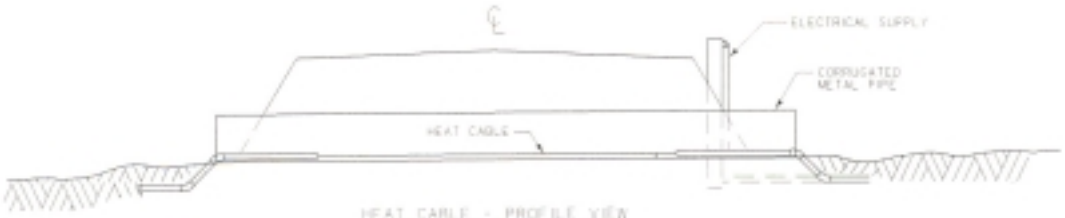
- Inspect temporary structures during freezing conditions and prior to spring thaw to assure that they are properly functioning.
- Disconnect and remove any electrical components when no longer required for freeze reduction.

SYMBOL: _____

FREEZE REDUCTION SN-51

FREEZE REDUCTION BMPS ARE USED TO ENSURE THAT CRITICAL CULVERTS DO NOT FREEZE DURING THE WINTER MONTHS. USE HEAT TRACE IN CULVERTS TO PREVENT FREEZING. IN ENGINEER APPROVED CONDITIONS A DOUBLE CULVERT SYSTEM MAY BE USED. WITH THIS SYSTEM IF ONE CULVERT FREEZES A SECOND HIGHER OR LOWER, CULVERT WILL CONTAIN RUNOFF.

ALL ELECTRICAL WORK TO BE COMPLETED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH NATIONAL ELECTRICAL CODES AND MDT STANDARD SPECIFICATIONS. HEAT CABLE IS INTENDED FOR CONTINUOUS OPERATION IN THE WINTER AND CAN NOT BE USED TO THAW FROZEN CULVERTS.



HEAT CABLE - PROFILE VIEW

HEAT CABLE - PLAN VIEW

HEAT PLACEMENT WITHIN PIPE

PRELIMINARY

REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-22
FREEZE REDUCTION (SN-51)	
EFFECTIVE:	
CDM Camp Dresser & McKee Inc.	