1.4.6 METHODS OF SNOW AND ICE REMOVAL (2021)

1.4.6.1 General

a. Maintenance of roadbed in territory subject to heavy ice and snow requires planning and preparation for its removal. Prior to the start of snow season in your region, all snow equipment and accessories should be inspected, tested and made ready for use. A general program should be formulated for stationing snow-fighting equipment at vantage points, outlining a general supervisory plan, and determining methods by which personnel are to be secured, transported, protected from hazards attending to snowstorms, fed and relieved.

b. Where such reports are considered helpful, meteorological information should be made available for general and division officers, and local officers should be kept well informed of the progress of approaching storms.

c. It is desirable to keep ahead of storms and not let the line become blocked. In some areas, the best results are obtained when snowplows are started from terminals before the storm breaks and, in severe storms, additional plows dispatched at such intervals as will preclude the formation of snowbanks that cannot be moved with plows. Having a relief locomotive at the ready to pull out the plow or its engine, or both, if they get stalled or derailed, is good practice when conditions warrant. Prompt clearance of cuts before further snow or windstorms is important. Secondary storms often cause the greatest problems.

d. During severe storms, if there is difficulty in keeping the line open, consideration should be given to reducing tonnage, double heading or the abandonment of trains and curtailment or complete stopping of yard switching until the storm abates and the line is opened. Stalled trains and dead locomotives add expense, anxiety and hazard to the work of moving snow and delay the opening of blockades.

e. No definite rule can be established for the use of flangers or plows. Much depends on the moisture content of the snow, the formation of drifts, and on the available clear space for snow disposal.

f. See also Section 6.5, Methods of Controlling Drifting Snow for additional information on snow drift prevention.

1.4.6.2 Track other than Yards and Terminals

a. Flangers should be used for the removal of snow where the depth is less than 6 inches over the top of the rail. Flanging of tracks is greatly expedited if the flanger is equipped with scoops for each direction, which allow flangeways to be cleared in either direction without turning the flanger. The scoops must in all cases be equipped with lowering and raising device operated from inside the car. A flanger attached to the rear of a train may be used to avoid using an extra train and crew.

b. The wedge or push plow placed on the pilot of the locomotive is useful for occasional light drifts of up to 2 or 3 feet over the top of the rail if state laws permit such operation.

c. The larger wedge or snowplow should be used for removing snow up to 6 or 8 feet deep which cannot be removed by flangers or push plows on locomotive pilots. The effectiveness of these plows is greatly increased if they are equipped with adjustable side wings, which can be used for widening the opening. These plows should be equipped with a coupler on the front and rear to expedite the switching of cars from siding or yard

tracks, which must be cleared of snow. Communication between crew and plow operator can expedite this operation.

d. Great care must be exercised in the use of plows placed on the front of loaded ballast or gondola cars to prevent the weight of the snow on the cutting edge of plow from riding on the rail and catching at frogs, switches and crossing plank. This can be prevented by a narrow casting placed under the plow near the cutting edge so as to ride on the rail and keep the plow up. Special consideration must be given to design and placement of this casting if used on jointed rail or over special trackwork. There are combined flangers and plows that are designed to mitigate this concern.

e. Care must be taken when entering oblique snow drifts that do not allow the plows to strike the snow squarely, as such conditions sometimes result in the plow turning over. The face of a drift should be broken down or “faced” so that the plow will engage the snow and not ride atop the drift.

f. If the plow was stuck and then pulled back, the snow might have been compacted to such an extent that it should be broken down before making another charge, and possibly causing serious damage to the plow from impact with the solid snow.

g. Spreaders or spreader ditchers with a plow-shaped front make excellent snow movers. The spreader wings can be used to good advantage to widen the cut after it is opened. Many of these ditchers are equipped with steel teeth (set under the front edge of the plow) which are very effective in cutting up ice that might have formed between and over the rails.

h. Ice cutter cars have been used with great effectiveness for loosening hard snow and ice that forms in the tracks in yards and possibly over long stretches of track. These cars are essentially box cars with end lookout windows, and with compressed air equipment that can raise and lower a plow or a V-shaped steel plate (e.g., 1-inch-thick, 6-inch-tall, and about 4’- 9" long), placed below the center of the car on edge and between the running rails. To the steel plate, 4 inches apart and extending 6 inches below its lower edge, are bolted steel teeth with points inclined slightly forward. Extra teeth are carried in the car. The cutter must be raised at turnouts, crossings and at other protruding items between the rails.

i. Rotary snowplows are necessary for the quick removal of snow where the depth of snowfall is such that it cannot be removed with a push plow. Attempts to use them with shallow depths not deep enough for reasonably full contact of the wheel with snow might cause the wheel to race under the light load and damage the machinery.

j. When operating flangers and plows over the line, the problem of keeping ice and snow out of guard rails, frogs and switches is important, particularly in locations which are difficult for maintenance forces to get to in severe storms. Deicing chemicals can be used, but attention should be given to problems they can create in electrified, automatic signal, or train-control territory.

k. Snow blowers utilize airflow to remove snow and ice without creating any condensation. The use of snow blowers can reduce risk of damage to tracks and special trackwork when removing ice and snow; however, additional time and effort is usually needed. Special care should be taken to prevent potential injuries and damage from flying snow, ice and debris.

l. Jet snow blowers utilize airflow, as well as heat, to remove and melt snow and ice. High velocity airflow and potentially extreme temperatures are involved. This equipment has

generally the same advantages and disadvantages as snow blowers; however, high air temperatures and sound levels require additional special care.

1.4.6.3 In Yards and Terminals

a. The method for removal of snow from yards and terminals depends upon the physical layout, the density of traffic, and the amount of snow. Removal operations should avoid blowing snow back over places already cleaned. The use of melters requires good drainage to carry away melted snow as it may freeze and cause more trouble than the snow; otherwise, the heat must be great enough to evaporate the water.

b. If snow is not very deep, it is best not to remove it from the tracks, except to make flangeways by hand shoveling, or with flangers if traffic will permit. Clean out of switches should be performed by hand with shovels, brooms, or use of snow blowers or snow melters.

c. Salt should be avoided, if possible, because of its potential to increase corrosion and electrical conductivity. It should not be used in electrified, automatic signal or train-control districts, and should be used in other districts only during that portion of winter when snow melts during the daytime and freezes at night. If necessary, salt can be used in some instances to prevent slippery conditions in the area of the switch stand.

d. One method for clearing yard tracks of heavier falls of snow is to first pull cars off of several tracks; then run a snow plow down one track and follow with a spreader, pushing the snow clear of adjacent tracks; then run the spreader down the cleared adjacent tracks, repeating the operation until the snow is piled too high for further piling. The clearing should then start again on the other side of the pile and repeat. In some instances, where the yard is not too wide and the snow not too heavy, the entire yard may be cleared with the spreader; thus picking the piled snow up is avoided. Where this cannot be done, the piles of snow must be left to melt or be mechanically loaded onto cars.

e. In cleaning snow off station platforms, where snowfall is light, hand methods are probably the most economical. Use of brooms and snow shovels are effective. Snow should not be placed on tracks, as passing trains may throw it back onto platforms. Hand-operated power snowplows or farm tractor-type plows are useful for platform cleaning. A supply of deicer, salt, or sand should be on hand at stations to scatter over platforms in sleeting and freezing weather.

f. At team yards, snow can be pushed to the center or side of driveways with plows placed on trucks or tractors. The snow may be left to melt or loaded onto trucks or cars by hand or machinery. Front-end loaders are useful in this operation.

g. Jet snow blowers on track equipment, revolving brooms attached to small tractors, and flangeway cleaners attached to hi-rail equipment are other devices that have been found useful in cleaning crossings, yard leads, etc.

h. Parking trains prior to a heavy snowstorm on vital tracks or ladders can keep the tracks clean of snowfall and expedite a return to service.

i. Smudge pots and/or propane/electric switch heaters may be installed in yard and line of road tracks. These devices provide direct heat to the rail preventing snow and ice accumulations in switches. Some devices can be turned on from a remote location and

others must be physically turned on or lit. Proper inspection and maintenance of these devices prior to a snowfall is paramount for trouble free operation.

(1) Smudge pots are kerosene lamps that are placed under each running rail of a switch. When lit, the flame sits directly under the rail providing heat to prevent snow and ice accumulation in the point section allowing the switch to operate freely. The pots are filled with kerosene and can burn up to 36 hours. To install, the crib of the track is dug out under both running rails of the switch so that the pot can be placed under the rail. Minimize the excavation to the amount necessary to install the pots so as to not compromise track stability. This should be performed in warmer weather before the ground becomes frozen. Two or more pots are spaced out on each rail depending on the length needed to be heated. Pots are typically manually lit just prior to the storm.

(2) Propane and electric switch heaters are more complicated to install and are installed on the field side of each running rail and typically run to the length of the point section. The propane heater can be lit manually or remotely and requires a propane tank stored track side. This requires highway access for propane suppliers to fill the tanks. Electric switch heaters are the most convenient to operate, however they need a nearby power source, and may be susceptible to storm outages. Additionally, both these types of heaters need to be removed during track maintenance and then reinstalled afterwards.

j. Chemical pre-treatment de-icers sprayed on switch components prior to a snowfall are helpful but have limitations. These products do not melt snow, but rather prevent snow and ice from sticking to the rail. Heavy snowfall rates can overwhelm de-icers. Moreover, de-icers need to be reapplied regularly. The cost effectiveness of using de-icers needs to be considered based on storm forecasts and other considerations. Avoid products that can cause corrosion or subgrade instability.

k. Cribbing out the headblock ties prior to winter weather provides additional space between the throw rods and the ballast, which reduces the possibility of the rods becoming frozen to the ballast. Rods becoming frozen typically happens in early spring when snow melts during the day and refreezes at night. The frozen ballast between the ties (especially if fouled) may not allow the water to drain and may act like a dam. Providing additional depth beneath the rods may mitigate the risk of the throw rod becoming locked in ice.