

5. WINTER OPERATIONS

Before operating in any winter condition, you must become familiar with certain attachments that are part of the dump truck when performing snow operations. These attachments are the snow plow and the salt spreader.

SNOW PLOWING

During the winter season plows should be mounted before a weekend, holiday, or at the end of a normal work shift when a storm is imminent. In addition to the safety equipment required, the dump truck should be equipped with at least one good flashlight, a shovel and the necessary small tools to make adjustments or minor repairs. Extra plow pins and a good set of tire chains should also be kept with the truck.

The hydraulic control lever for the plow is located next to the dump bed lever. The lever immediately next to it controls the spreader box. A fourth lever would be to change the angle on a plow equipped with hydraulic cylinders.

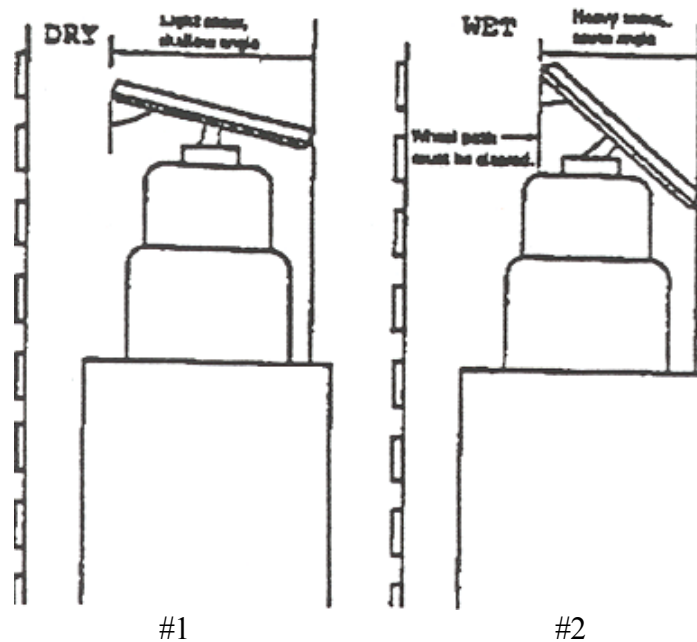
The plow and plow frame should be stored on blocking set to match the height of the attach points on the truck to facilitate hook-up. Normally, each plow frame and plow is "mated" to a specific unit. The unit should be disconnected for normal operations after a storm and when winter storms are no longer imminent.

The plow blade must be inspected for wear or damage periodically before, during and after a storm. Blades wear unevenly (right-hand plows and reversible plows used continuously in the right-hand mode wear most rapidly on the left side. The opposite is true for left-hand plows or reversible plows used continuously in a left-hand mode. The plow blades should never be allowed to wear down to the moldboard. Blades must be replaced when they are worn at any point! Repairing/replacing the moldboard is expensive and time consuming. Down-time of a needed unit may be the deciding factor in an otherwise successful operation.

Hooking up the plow is made easier if the operator has an assistant to guide in aligning the plow frame pin holes to the holes in the bracket on the truck's bumper. After hooking up the plow and hydraulic line, the plow should be raised and lowered to assure its proper operation. The hydraulic line and lift cylinder should be checked for leaks. It is a simple matter to either set-up or change an angle. Simply set the plow to the angle desired (including left or right hand plowing) and insert the pin through the aligned holes.

In order to determine the plow angle the operator needs to look at two basic requirements. (see the illustration below):

1. If the snow is dry and light, the operator should set the angle of the snow plow at a shallow angle. This will allow for a smooth movement of the snow away from the truck's plow.
2. If the snow is wetter than usual, the operator should set the snow plow at an acute angle to push the wet snow off the road. When setting an acute angle, make sure that the plow will clear a path for the truck wheels.



The dump truck bed should be filled with salt or abrasive material to provide good traction. If the material is not to be used during or after plowing, the load should be covered to prevent wetting and caking.

Tire Chains

The operator should be knowledgeable in chain installation procedure, should road conditions warrant the need to mount the tire chains. A "tip" on installation of single-wheel chains on dual wheels is to place a short piece of 2" x 4" lumber in front or behind the inside tire and drive onto the block, raising the outside wheel above the surface. Remember to install elastic tighteners to keep the chains under tension.

Plowing Tips

Operators of the plow equipment must remain alert at all times for traffic as well as obstructions. Obstructions include bridge and pavement joints, guardrail, curbing, etc.

Operators should begin plowing after an accumulation of 2" or more of snow/slush is actually on the road. After the initial plowing and salting operations wait approximately one-half to one hour, when a brine solution has been formed and the bond to the pavement broken before plowing again.

There are several basic procedures for effective snow plowing; specific "tricks-of-the-trade" are learned both from experience, and from experienced personnel:

- If the roadway has not been salted, and there is 2" or more of snow already on the surface upon the truck's arrival, **DO NOT** attempt to "burn it off" with salt. Plow first then salt as needed.
- Never drive faster than road and visibility permit.
- Always plow in the direction of traffic (unless traffic control is utilized).
- Be alert for all other vehicles.
- Even a raised blade has a very low clearance – use care.
- Plow from center line out to shoulder (except in multi-lane situations).
- Plow to low side of ramps or curves (when possible).
- Plow away from the wind whenever possible.
- Raise blade before making any sharp turn.
- Clear snow past intersection before making turnaround.
- Clear roadway before lifting blade; do not leave a windrow.
- Never attempt to push another vehicle with a plow for any reason. SHA vehicles are not intended to be tow trucks.
- Operations are to continue until all the slush/snow/ice has been removed from the roadway, including all ramps and turning or acceleration lanes.
- Normally, all widening/clean-up operations should be limited to daylight hours, and, if possible, during non-rush hour periods.

Automatic Tilt Correction

When a blade hits an obstacle, the moldboard will automatically tilt forward ("trip"). To restore the moldboard to its original position, stop the truck and raise the moldboard off the ground. This will allow the spring loaded trip cylinder to pull the moldboard back in place. If the trip cylinder is too weak to accomplish this you can assist it by backing up several feet dragging the blade across the pavement. The operator must then check the plow pins and replace, if necessary.

Operators should be aware that some trucks overheat when "carrying" a plow when driving at normal speeds. If this is the case, the plow should be lowered slightly to permit air flow to the radiator.

Plowing Speed

The speed the truck is operated should be great enough to move the snow well onto the shoulder or ditch area. Care must be taken not to damage whatever the thrown snow is striking. When a truck plows too fast, the snow can produce a "blizzard-like" condition on the truck windshield and may even obscure the vision of the plow operator and other traffic.

All operators should **REDUCE** their speeds at bridges. This will reduce the risk of throwing snow onto the roadway below or a vehicle passing underneath. Plowing next to a Jersey Barrier may cause snow to be thrown into the oncoming lane if plowing speed is too great.

Two-lane Roadways

Since a standard plow clears only eight feet (8') per pass, one plow working alone on a two lane roadway would require a minimum of four (4) passes to clear the entire road. The first and second passes would be on the centerline in each direction. The third and fourth passes are to complete clearing the roadway. Plowing on the left side of any roadway, against traffic, should never be done without proper lane closer.

Multi-lane roadways

The actual width of the roadway would determine the number of units required to clear it. The minimum overlap of any "plow train" should be at least one (1") foot. When using plow trains to clear a high-speed roadway, it is good practice to plow as fast as conditions will safely permit. If possible, other traffic should be kept from passing by spacing the units in the train close together.

Plow trains should be staggered from left to right, with the lead unit plowing snow toward the median when it is wide enough to accept snow. The other trucks in the train should plow to the right, carrying the snow to the shoulder.

Intra-county Cooperation

Every effort must be made to clear the roadways in a similar fashion between adjoining counties. This cooperation depends on good communications and observation by supervisors and operators of connecting counties. Operators en route from one section to another may "lend-a-hand" and plow State maintained roadways.

Bridges

When clearing bridges, care should be taken not to throw snow over the bridge onto roadways, railways, or any other place that could result in damage. Operators must be careful when plowing over neoprene/rubber expansion dams on bridges so as not to damage the material in the joints.

Railway Crossings

When clearing at grade-type railroad crossings, it's very important that snow not be piled against signals, switch boxes, signs, etc. Operators must exercise care to avoid "catching" their plows on the rails.

Windrows

To reduce windrows at any location, the plow could be directed to the right shoulder area. The accumulated snow in front of the blade will be left on the shoulder. This will reduce any snow piling across an intersection, railroad crossing, etc.

Private Driveways and Private Entrances

Slower speeds and slightly raised plows are the best ways to cut down on snowplow windrows resulting in entrance blockage. Reasonable efforts are expected to reduce the deposits of snow at driveways and entrances. Maintenance personnel or hired equipment are NOT to be used to clear any entrance to either a residence or place of business, unless emergency assistance has been requested from a Police agency or Fire Department. **Driveways to fire and police stations, hospitals and any building housing an ambulance or emergency equipment are not to be obstructed by any snow removal operation.**

Sidewalks

Snow should never be plowed onto sidewalks adjacent to the road, particularly in urban-type areas with foot traffic.

Mailboxes

SHA does not prohibit property owners from placing mailboxes within the limits of the legal right-of-way. The post office has certain placement requirements regarding the locations of mailboxes. Since the mailboxes are not placed under permit regulations, they are technically encroachments placed at the risk of the owner. Normally, if mailboxes are placed correctly, the box will withstand the windrow of snow from a plow.

SHA is not legally or technically responsible for damage to mailboxes. District Policy will govern in these matters. It may be considered a "public relations" gesture to repair mailboxes damaged by plowing. SHA is not liable for any damage to any fencing, trees, lawn ornaments, etc., caused by snow removal operations if the item damaged is within the legal right-of-way. All damage is to be reported by the operator to the supervisor. All personnel are expected to use tact with the public when dealing with these matters.

Setting Back / Widening

The time for setting-back or widening operations to begin will be determined by the Resident Maintenance Engineer or Assistant RME. Normally, these operations will not begin until all roadways have been cleared and daylight has begun. It is very important that counties with frequent heavy snowfalls complete the widening operations to the maximum width possible, because more snow can normally be expected before the present accumulation has melted.

Make sure that all snow is pushed back sufficiently from the high side of curves and ramps to prevent melted snow from running across the pavement and freezing when the temperatures drop. Inlets and drains must be reopened. Guardrail, median barriers, and other traffic safety devices must be cleared to function as designed. Piled snow could result in a serious accident or cause motor vehicles to actually vault over the safety devices.

All median's cross-over are to be cleared. Do not pile any snow that may obscure the sight distance to a motorist using the cross-over.

Any park-and-ride lots in the assigned area are to be checked and cleared as required. It is desirable to accomplish this task prior to rush hour before the lots are filled with parked vehicles.

Equipment Clean-Up

All equipment used during the snow removal operations are to be cleaned as soon as possible following the storm.

All plows must be returned to their original storage areas, blades checked, then placed onto "chocks" ready for the next use.

All vehicle/equipment defects **MUST** be reported to the shop mechanic or shop supervisor.

SNOW MATERIAL SPREADING

SHA has equipped its fleet with fully automatic servo control systems, and a hydraulic power system that includes a constant-running pump. The operator has only to move one lever forward to energize the hydraulic power system required to operate the auger and spinner. This lever is on the far right of the three hydraulic controls, the first and second being for the dump hoist and snowplow respectively.

To calibrate, it is necessary to determine the weight of material discharged by 1 revolution of the auger. This figure remains constant for all 11 control settings and is generally found to be between 7 and 8 pounds for salt and is generally rounded to the nearest whole number for easy computation. Auger revolutions per mile for each of the 11 settings may be determined by adapting a counter to the auger shaft to obtain the number of revolutions made in a measured mile. For example, say the auger revolutions per mile at settings 3 is determined to be 42. If each revolution discharges 8 pounds then 8 multiplied by 42 equals 336 pounds applied per mile. If a constant of 7 is used, 294 pounds will be applied.

Calibration for differences in densities of materials can also be obtained by weighing the material to determine its weight per cubic foot (c.f.). Calibration charts furnished with each spreader-equipped unit are based on material weighing 77 pounds per c.f.. To arrive at the application rates per mile shown at each of the 11 settings, divide the weight of the new material, say sand at 100 pounds per c.f., by 77 to obtain a factor of 1.2987. Then, multiply the chart application rates for each setting by the factor; at setting 1, two hundred pounds per mile multiplied by 1.2987 equals 259.74, or rounded out, 260 pounds per mile.