b) This device automatically adjusts the application rate in accordance with the truck speed

1) The spread rate per mile remains constant while the "pounds per minute" indicator fluctuates with the speed

5. Zero velocity spreaders

a. As mentioned earlier, solids tend to bounce off the roadway

i. The higher the traveling speed of the truck, the more pronounced these negative effects become

b. Zero velocity spreaders were designed to counteract certain effects

i. The faster the vehicle travels, the faster the material is applied in the opposite direction

ii. The net effect is that the material hits the road at zero speed, as if it had been dropped by hand by a person who was standing still

H. Plowing and Removal

1. Intent of plowing

a. To remove as much snow and loose ice as possible from the pavement surface before applying chemicals

b. Plowing is all that is necessary if the pavement and snow are both cold and dry and the snow is not adhering to the pavement

2. Plow types

a. There are many types of snow removal equipment available

i. The most common snow removal equipment used at ODOT are trucks equipped with plows

b. Snowplows are available in a variety of types

i. Front plows

ii. Underbody plows

iii. Wing plows

c. Trucks can be equipped with one or several plows

d. Various cutting edges are also available

i. Carbide

ii. Steel

iii. Synthetic polymers

iv. Rubber

e. Some plows are equipped with shoes to protect the cutting blade from obstructions in the pavement (raised manholes, bridge joints, or steel plates)

    i. Some locations prefer to omit the shoes and run the blade directly on the pavement surface

f. Plows may contain a hydraulic or mechanical counter balance which reduces pressure and blade wear

Figure 12-16 Dump truck with a front plow

Figure 12-17 Dump truck with a front plow and a wing plow

g. Typical areas of consideration for plow selection

i. Plow length, height and tripping mechanism

ii. Hitching mechanism

iii. Angle adjustments, moldboard material and type

iv. Cutting edge composition

v. Shoes

3. Other removal equipment

a. Other types of equipment frequently used for snow and ice removal

i. Graders

ii. Front-end loaders

iii. Snow blowers

iv. Belt loaders

4. In addition to plowing the pavement surface, consideration must be given to loading and removal of snow when storage is a problem

a. It is not uncommon to load snow out for removal from median walls along the freeway or from business districts within urban areas

I. Equipment Maintenance

1. Equipment is the key to fighting any storm

a. Everyone associated with snow and ice control must know and understand the equipment

b. Proper pre-trip, during trip, and post-trip inspections, as well as preventive maintenance, are crucial

2. Pre-storm check

a. Complete the C.D.L. walk around inspection, the EM-78 form completed daily or per shift

b. Check the condition of the plow and plow shoes

i. Look for loose bolts, worn shoes or blades and damaged or leaking hydraulic hoses

c. Check the spreader, tailgate and wetting system or hopper

d. Verify that all lights and wipers are functioning properly and washer fluid is topped off

e. Visually check the fuel level

3. During the storm

a. Perform the following tasks during the storm to have a safer trip, and to make the tools we use last longer

i. Keep equipment as clean as possible during the storm

ii. Monitor all gauges and indicators

iii. Replace fluids, wiper blades and lights as needed

iv. Check plow blades, shoes, bolts and snow deflectors

v. Regardless of the type of spinner/auger you may operate, jams are going to happen. Always be sure all hydraulic switches and levers are in the off position before exiting the truck

b. Most of the people involved in snow and ice control are professionals

i. Use the senses

ii. Be aware of what a properly running diesel engine and a properly running hydraulics system sound like, smell like, and feel like

iii. If the senses indicate that something is wrong, odds are that it is

a) Do not wait for a gauge or a warning light

b) Check it out or check with a mechanic

c) Most problems discovered early are easier and less expensive to fix

c. Periodically stop and clean the wipers

d. Adjust the spinner to place salt in the middle third of the road

4. After the Storm

a. After each storm, all snow equipment (including the front end loader) must be washed thoroughly and allowed to dry

i. All moving parts such as chains, sprockets, turntables, slides, spinners and augers

b. Check hydraulic pumps, hoses, quick connects and rams for leaks

c. Inspect electrical connections for corrosion and tightness

d. Clean the cab thoroughly; operators may spend up to 16 hours at a time in the cab

i. Both regular and auxiliary operators should clean out the cab at the end of a shift

ii. This equipment often runs 24 hours a day during a storm, with multiple operators. Continue to check it.

e. If the storm is over, empty the remaining material into the stock pile. If the storm is ongoing, refill the truck with material.

f. Refuel the truck and top off the washer fluid

g. Wash the truck, especially all glass and lights

J. Calibration

1. **Proper calibration of equipment**

    a. Validates that proper spread rates and applications are being achieved

    b. Prevents wasting of materials and ensures efficient and effective winter operations

2. **During normal operation and maintenance, automated systems lose accuracy with regard to calibration and require re-calibration on a routine and as-needed basis**

3. **Proper calibration procedures are outlined in the procedures for systems calibration as issued by the Office of Equipment Management**

    a. It is important for the operator to get to know the equipment at the garage facility and learn to recognize systems that are not properly calibrated

K. Plow Hook Up

1. **Gledhill video**

2. **Field exercise**