

Snow and Ice Control Training Outline & Checklists



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by

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Preface

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1 - Intended Use of This Document

This document is intended to provide winter maintenance agencies with detailed equipment inspection and safety information, NOT TO SERVE AS A SUBSTITUTE FOR INTERNAL AGENCY TRAINING.

There are several ways agencies can effectively use this information:

Tailgate training

Small groups can meet periodically and discuss one of the sections in the outline. There is probably sufficient experience within a given crew or group to provide background and real life examples of the items being discussed.

Within a formal agency training program

The outline is sufficient to serve as a basis for a customized internal training program. Not all items will be applicable, and agency-specific concerns and procedures must be addressed.

Incorporation into written agency plan and policy documents

Information in this document can be incorporated into written agency plan and policy documents. A combination plan, policy and training document is one of the most efficient and effective administrative tools an agency can create.

Tip sheets or safety bulletins

Reasonably detailed 1 to 3-page documents can be created for each of the outline sections or subsections. These can be used for tailgate training or distributed by newsletter and other methods.

2 - Preseason Route Inspection

DRY RUNS

Drive the route in clear weather during both normal and peak traffic conditions. Mark obstacles and other safety-related features on the highway with poles, reflectors, etc., and record those and unmarked obstacles on “Route Maps”, in case other operators have to service the routes. Physical markings may not be appropriate in urban settings. Items to mark include:

- Manholes
- Utility and construction plates
- Settled utility cuts
- Mailboxes that may be too close to the road
- Railroad crossings
- Overhead and guy wires
- Utility poles
- Hydrants
- Guiderail ends
- Isolated curbing and raised drainage structures
- Overhanging trees (trim if possible)
- Active construction projects
- Temporary overlay joints
- Dead-end streets and alleys
- Narrow carriage, pedestrian and bicycle facilities
- Newspaper stands
- Signs of all types
- Bulb-outs, islands and other raised traffic control features
- Roundabouts
- Bridge joints that may be uneven or at a similar angle to the plow
- Drainage features that may conflict with plowing
- Identify and mark safe turn-around locations on maps and/or road

WET RUNS

Drive the route in the rain during both normal and peak traffic conditions. Identify and mark/record the following:

- Areas on the pavement where ponding occurs
- Locations where water is running onto the pavement
- Poor drainage areas
- Overhanging tree branches. These will be lower in the rain, and even lower during heavy snow.

3 - Equipment Inspection

TRUCK INSPECTION

The items listed below are summarized from the Federal CDL manual, which is more detailed. It is impractical to check all of the items in the list immediately prior to snow and ice operations. More thorough inspections should be performed a short time prior to operations. Each agency should have its own policy specifying what items are to be inspected, when, by whom, and how inspection records are to be kept. Items followed by an asterisk (*) are not in the CDL manual, but are appropriate for plow trucks.

Engine compartment (engine off)

- Leaks/hoses
- Oil level
- Coolant level
- Power steering fluid level
- All Belts - condition and tension
- Battery - corrosion, cable and mounting security
- Every 24 hours, bring vehicle in to dry out and check for oil/fluid leaks on the floor*

Cab check/engine start

- Use safe start procedure
- Oil pressure gauge
- Temperature gauge
- Air gauge
- Ammeter/voltmeter
- Dash and control panel indicators (all functions)
- Heater/defroster
- Mirrors and windshield
- Wipers/washers
- Emergency equipment
- Steering play
- Horn
- Seat belts
- Parking brake check
- Hydraulic brake check
- Air brake check
- Service brake check
- Clutch pedal free play (if appropriate)
- Radio and other communications systems*

External Inspection

Steering

- Box/hoses
- Linkage

Suspension

- Springs/air/torque
- Mounts
- Shock absorbers

Hydraulic System

- Fluid level
- Hoses
- Connections

Brakes

- Slack adjusters and pushrods
- Brake chambers
- Brake hose/lines
- Drum brakes
- Brake linings

Wheels

- Rims
- Tires (hit with billy or tire iron)
- Tire valves (spit or leak detector fluid test, and straightness of valve)
- Hub oil seals/axle seals
- Lug nuts (look for rust)
- Spacers
- Fitted tire chains, including for right front tire*

Sides and underside of vehicle

- All external lights and reflector markings
- Doors and mirrors
- Fuel tank
- Battery/box
- Drive shaft
- Exhaust system
- Frame

Rear of vehicle

- Splash guards
- Doors/ties/lifts
- Shovels and bars*

FRONT PLOW INSPECTION

Items to check include the following:

- Damaged, broken or missing parts
- Condition of the moldboard
- Presence and condition (deformation) of all hinge and shear bolts/pins
- Proper application of hinge and shear bolts/pins
- Presence and condition of retainers for all pins
- Deformation of pin and bolt holes
- Condition and adjustment of lift bridle chain
- Hydraulic ram(s)
- Presence and condition of plow or frame shoes or casters
- Presence and condition of mounting springs
- Presence and condition of blade cutting edge
- Presence, condition and tightness of blade mounting bolts
- Condition of hydraulic cylinder/ram, lines and connections
- Presence and condition of markers
- Presence and condition of plow guards and similar items
- Tripping mechanism components

WING PLOW INSPECTION

Items to check include the following:

- Damaged, broken or missing parts
- Presence and condition (deformation) of hinge and shear bolts/pins
- Deformation of pin and bolt holes
- Proper application of hinge, lock and shear bolts/pins
- Presence and condition of retainers for all pins
- Elongation of bolt and pin holes
- Condition of hydraulic cylinders/rams, lines and connections
- Condition of the moldboard
- Presence and condition of blade cutting edge
- Presence, condition and tightness of blade mounting bolts
- Presence and condition of markers
- Front tower mast cable and sheaves
- Presence and condition of shoes or casters
- Presence and condition of plow guards and similar items
- Condition and adjustment of the push arms
 - Proper spring tension
 - Presence, condition and tightness of all pins and bolts

NOTE: locking shear pins should not be used for routine plowing operations

- Condition of the D-block assembly
 - Condition and adjustment of spring
 - Presence and condition of hinge pin
 - Presence, tightness and condition of the D-bolt, castle nut, flat washer and cotter pin
 - Elongation of pin and bolt holes
- Condition of the rear lift assembly
 - Crane arm
 - Sheaves and pulleys
 - Presence and condition of cable clamps and pins
- Presence and condition of safety chain
- Tripping mechanism components

INSPECTION OF V-BOX MATERIAL SPREADERS

Other types of spreaders have similar components and should be inspected accordingly.

- Condition of ladder
- Presence, condition and tightness of tie-downs
- Position of tailgate latches
- Proper function and setting of gate mechanism
- Obstructions in chute
- Condition and adjustment of internal deflectors
- Condition and adjustment of external deflectors
- Location (if movable) and condition of spinner plate and vanes
- Proper slack adjustment in conveyor chain
- Condition and mounting of rate sensor (if ground speed controlled)
- Leaks in gear box motor
- Abrasion points and leaks in hydraulic lines and connections
- Abrasion points and integrity of electrical lines
- Rear mirror visibility issues with the routing of hydraulic lines
- Disconnect of dump body lever (if applicable)
- Dry run the spreader (without material) and check for proper function of all components

INSPECTION OF PREWETTING AND DIRECT PAVEMENT APPLICATION LIQUID DISPENSING SYSTEMS

- Nozzle damage
- Nozzle placement, orientation and mounting security
- Connection leaks
- Tank Integrity

- Tank mounting
- Tank liquid level
- Electrical connections on electric pumps
- Hose condition and rubbing points
- On-board fill system
- Storage tank
- Storage tank fill system

INSPECTION OF FRONT END LOADERS

Exterior

- All lights, triangles and reflectors
- Cab, body and glass
- Coupling devices
- Hydraulic lines
- Integrity and lubrication of bucket, arms, pins, etc.
- Tires, wheels and lug bolts/nuts
- Hydraulic reservoirs
- Steering mechanism
- Drive line and universal joints
- Exhaust system
- Dust bowl pre-cleaner
- Brake fluid reservoir

Under the hood

- Engine
- Engine oil level
- Power steering fluid level
- Windshield washer fluid level
- Fuel line leaks
- Battery corrosion, cable and mounting security
- Position of master switch (ON)
- Fan
- Radiator for fluid level and condition
- Condition and tightness of belts
- Turbo charger leaks and cracks
- Condition and tightness of all filters
- Air restriction indicator

Interior

- Brakes
- Parking brake
- Loose objects
- Steering
- Horn and other safety devices
- Wipers
- Mirrors
- All instruments, gauges and controls
- Fire extinguisher, first aid kit and other required safety equipment
- Heater and defroster
- Seat and seat belt

4 - Operational Safety

SAFETY ENHANCEMENTS FOR SNOW AND ICE VEHICLES

- Operator-friendly placement and complexity of controls
- Roof and tower spotlights
- Defrost system enhancements
- Convex mirrors
- Heated mirrors
- Heated windshields
- Heated wiper fluid and other wiper features
- Plow markers (front and wing)
- Plow marker lights
- Laser plow guidance system
- Plow deflectors
- Rear vision cameras
- Back-up alarms
- Reflective tape
- Anti-glare painting of truck hood and rear of front plow
- Open-grated access steps
- GPS location and data delivery systems

SAFE DRIVING PRACTICES

Getting in and out of the cab

- Keep steps clean
- 3 point contact
- Handrails

Parking the truck

- Take keys out
- Disengage and lower all plows to the ground
- Put shift lever in proper gear or transmission position
- Set brake
- Do not idle the truck

When driving

- Wear seatbelts
- Physical and mental condition
- Attitude (keep cool)
- Proper rest and reasonable breaks
- Driving awareness
- Visual “safety scan”
- Know your braking distance

Snow and Ice Control Training Outline & Checklists

- Obey traffic laws (to the extent possible)
- Lights on
- Do not use 4 way flashers while operating
- Be aware of emergency vehicles
- Keep energy and hydration levels up with appropriate food and beverage during breaks and in cab (not while driving)
- Exercise defensive driving
- Maintain visibility by keeping windows, mirrors and lights as clear as possible
- During whiteouts, get the truck safely off the road and shut off lights
- Test the engine braking system (jake brake)

When backing

These apply to all types of backing, including over-the-road and docking. Some are redundant and others may not be appropriate during snow and ice conditions.

- Remember - safe driving and backing is mostly attitude, attitude, attitude
- Put macho and ego in the glove box and leave them there
- Park and back defensively
- Avoid backing whenever possible
- When in doubt, don't back up
- Position yourself so you don't have to back up
- Don't back up if you don't have to
- You will always have blind spots - know their location, and try to minimize them
- Every backing situation is different
- Plan to back the minimum distance possible
- Back toward the driver's side of the truck, if possible
- Get out and look prior to backing
- Check for all types of obstacle, including overhead
- Back immediately after checking
- If you don't have a back-up alarm, sound your horn before backing, and periodically during backing
- Continually check mirrors on both sides of the truck while backing
- Always use a spotter when possible
- Eliminate noise and other distractions before backing (cease conversations, turn down radios, CB's, stereo's, etc.)
- Open your window so you can hear outside noises
- Back slowly, in the lowest gear possible
- Start backing from a proper position
- Back into parking lot spaces so you can pull out forwards, or better yet, drive through two open spaces to the far one so you are facing out
- When parallel parking, leave enough room in front so you don't have to back up when exiting

SAFE SNOW PLOWING PRACTICES

During transport

- Keep plow angled to the right
- Turn plow controls off
- Position plows to not block headlights
- Position wing plows to allow proper visibility
- Drive at lower than normal speeds
- Look out for bumps and other pavement discontinuities that may cause the plow to violently move up and down

While plowing

- Check temperature gauge often
- Be aware of transmission overheating
- Be aware of obstructions (pavement, deck, roadside and vertical)
- Use extra caution in low-visibility situations
- Avoid creating windrows of snow on the pavement if possible
- Be aware of your snow cast and the area of impact
- Be aware of the destructive force of the plume of plowed snow and objects that may be in the plume
- Do not plow snow off bridges onto underpassing roadways
- Be aware of soft shoulders
- If plowing a grid system, use right turns to the extent possible to minimize backing
- In intersections and other areas that require backing, final plow in low traffic volume periods
- Plow snow while driving in the direction of traffic
- Depending on drainage, cul de sacs may be plowed by casting snow away from the driveways
- If freezing rain is expected, leave some snow on the road
- Watch your speed!
- Keep the truck motor RPM's up (engine speed in the upper 25% of the recommended RPM range and in the high torque range)
- When you think you are in the proper gear, drop down one gear.
- When raising and lowering wing and front plows, be sure the area of movement is clear
- Know the area of impact before lowering wing plows
- Do not use cruise control
- Know the operating characteristics of the engine 'Jake' brake during operations, if used
- Report and place on route maps any new pavement, bridge or shoulder characteristics that may impact future plowing
- Be aware of structurally poor shoulders to minimize plowing damage
- Be aware of areas that may develop frost heaves in the pavement and shoulder as the season progresses

SNOW PLOWING SPEED

Things to be aware of include:

- Character of the snow
- Roadside conditions
- Wind conditions
- Traffic conditions
- Pavement surface conditions
- Highway character, geometry and grade conditions
- The presence of drifts and other accumulations of snow

SPECIAL PLOWING SITUATIONS

- Ramps
- Intersections
- Bridges
- Railroad crossings
- Plowing back
- Benching or shelving
- Drifts and blow-Overs
- Roundabouts

SAFE MATERIALS SPREADING PRACTICES

- Watch speed to be sure material is being placed where desired
- Match speed to pavement surface and traffic condition
- Watch box height if using tailgate spreaders
- Watch revs to be sure hydraulics can function properly
- Be aware of spreading materials that may strike passing vehicles
- Verify that material is being dispensed
- Do not overload vehicle (spillage and potential liability)

SAFETY RESTORATION AND CLEAN-UP OPERATIONS

- Shoulders
- Maintaining satisfactory pavement conditions
- Sight distance problems
- Re-freeze problems
- Trouble spots and Problem areas
- Super-elevated sections that may drain across pavement
- Drifts and blow-overs
- Pushing back (future snow storage and mobility)
- Safety appurtenances
- Bridge decks
- Drainage restoration in critical areas or time frames

- Railroad grade crossings
- Signs and signals
- Commuter lots, parking lots, sidewalks, crosswalks, raised features and hydrants
- Snow removal procedures (loading, hauling, melting and relocation)

In-cab Truck Safety

- Safety restraints
- Loose objects
- General cab cleanliness (no loose items)
- Climate control
- Visibility
- Safety equipment
 - Vest
 - Hard hat
 - Gloves
 - Flashlight
 - Flares, triangles and other warning devices (store flares properly)
 - Flags
 - Fire extinguisher
 - First aid kit
 - Tow chain, cable or strap (as per agency policy)
 - Small tools
- Communication system(s)
- Comfortable and functional in-cab clothing and footwear
- Weather-appropriate out-of-cab (emergency) clothing and footwear stored in the cab (layered clothing, waterproof boots, warm gloves, hats, hoods and masks)
- Operating knowledge of all controls
- NO HORSEPLAY BETWEEN PEOPLE OR VEHICLES

YARD AND FACILITY SAFETY

- Plan yard plowing to be the first, and a continuing priority
- Traffic patterns
- Lighting
- Lighting and ventilation in storage structures
- Loading ramps
- Loading safety procedures
 - Stay in truck cab
 - Stay off hoppers and truck bodies
 - Loader reach issues
 - Level loading area

Snow and Ice Control Training Outline & Checklists

- Backing procedures
- Materials handling
 - Know contents of MSDS for all materials being used
 - Protective clothing / devices as necessary
- All plows stowed on the ground
- Tailgate removal, storage and replacement procedures
- Plow installation, removal and storage procedures
- Hopper/spreader installation, removal and storage procedures
- Fueling procedures
 - Properly parked
 - Engine off
 - No smoking
 - No cell phones (distraction)
- Plow blade changing procedures
- No horseplay

5 - Safety Related Agency Policies

- Hours of operation/ required time off duty
- Supervisory determination of fitness for duty (fatigue, sobriety, etc)
- Yard safety policy
- Backing policy
- Training/certification requirements
- Mechanical procedures policies
 - Tailgate removal and replacement
 - Materials spreader installation, removal and storage
 - Plow installation, removal and storage
 - Plow blade removal and replacement
- One person plowing policies
 - Tires on pavement only
 - Periodic communications
 - Isolated re-load areas
 - Unique beat characteristics
 - Spot benching
 - Hours of operation
 - Equipment requirements
- Warrants for “Downing” or classification of equipment not safe to operate
- Driving speed limitations for various highway types and operations

6 - Other Safety Issues

HOME AND PERSONAL SAFETY

- Family readiness
- Plan to allow sufficient rest during storm and other time off
- Personal vehicle readiness
- Home readiness
- Control or eliminate alcohol consumption well in advance of anticipated duty and be sure the requirements of the omnibus transportation employee testing act of 1991 (OTETA) are known and followed
- Leaving home and driving to work safely

CUSTOMER COOPERATION AND SAFETY

- Pile driveway snow on the traffic downstream side
- No snow forts and similar items near the road
- No obstacles near the road
- No massive mailbox structures
- No trash cans in the road
- Keep basketball and other sports structures well away from the road
- No driveway snow in the road

