Maryland Department of Transportation

State Highway Administration

SINGLE & TANDEM AXLE DUMP TRUCK

Office of Maintenance
Training and Certification Team
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INTRODUCTION

The objective of this student guide is to provide the student with a basic knowledge and skill in operating the Dump Truck. This book will include the following areas: Safety, Terms & Definitions, Preventive Maintenance (Pre-start, Pre-operations, Shut-down) and basic dump truck operations including snow removal.

The student should be aware that each District and/or shop may have different equipment. It will be up to the student to become familiar with the operator's manual for your equipment.

After covering this student guide and hands on instruction, you will be tested on your knowledge by means of a written test and a field test. All information on the written test can be found in this student guide and the operator's manuals. Written testing requires 80% to pass. The field portion of the test requires 100% to pass.

1. SAFETY

- Before starting the engine, always ensure that the service and parking brakes are fully engaged.
- Use steps and handhold for getting on or off the dump truck. **DO NOT JUMP OFF!**
- Keep hands, shoes, cab floor, and controls free from water, grease, and mud to insure non-slip control.
- Never attempt to start or operate a dump truck except from the operator's seat.
- Always look all around, behind and under the dump truck before moving.
- When transporting or driving on the road during the day or at night, use the Beacon light, accessory lights and other reflective devices for adequate warning to operators of other vehicles.
- Never coast downhill in neutral. Always maintain control of the dump truck. Do not ride the brakes. Always use proper speed and/or range of gears. Do not leave dump truck unattended while it is running.
- Do not oil or grease any part of the dump truck, while it is in motion.
- Never leave the engine running while making adjustments or repairs.
- Reduce speed before turning or applying brakes. Drive at posted speeds to insure operator safety, especially over rough ground.
- The speed of the dump truck on hillsides and curves should always be slow enough so there is no danger of tipping.
- Watch for overhead structures, electric cables, and wires. Never touch or place electrical wires near any part of the dump truck.
- Never allow anyone to work near or under a raised snow plow or attachment without it being properly chocked or secured.

- Do not leave snow plow or attachments in a raised position when not in use. Always lower the plow or attachments to the ground. Bleed the hydraulic pressure from all attachments at the end of the day or when shutting down the dump truck.

- Park the dump truck on level ground when possible and apply the parking brake. Use wheel chocks and parking brake if truck must be parked on a hill.

- Always look before backing up. A back-up alarm or a signalman should be used.

- A spotter and hand signals should be used when backing a dump truck.

- Remove all trash from the operator's cab daily, and lock the cab at the end of the day.

- Use caution when dumping your materials so no sudden moves are made that will cause the dump truck to tip over.

- When dumping, look around for obstacles and overhead obstructions.

- Ensure that the tail gate is properly unlatched before dumping.

- Dump material on as level ground as possible.

- NEVER start the salt spreader while there is someone standing near or by the spreader mechanism.

- After snow removal operations are complete, remove the plow and store in an accessible area. It is highly recommended to remove the plow frame and store with the plow. If the plow frame is not removed, the lift arm must be lowered to reduce the potential hazard to other vehicles.

STANDARD DUMP TRUCK SAFETY EQUIPMENT

I. Horn (both warning and back-up).
II. Seat belts and adjustable seat.
III. Windshield wipers and washer fluid.
IV. Steps and/or grab irons.
V. Mirrors.
VI. Parking and service brake.
VII. Lights:
  A. Beacon (warning).
  B. Cab lights.
  C. Work lights.
  D. Plow lights (when applicable).

Personal Protective Equipment

I. Fire Extinguisher.
II. First Aid kit.
III. Flares or Reflecting triangles.
IV. Spare fuses.
V. Flag and vest.
VI. Two-way radio.

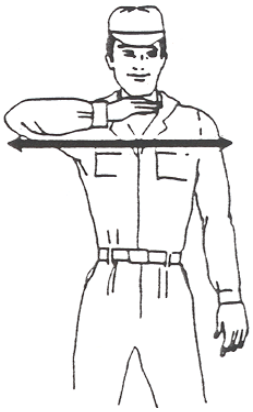
HAND SIGNALS

Occasionally you will need the assistance of a signal-person while operating a dump truck. The signal-person is used for safety purposes and to assist the dump truck operator in seeing behind and in front of the dump truck. In order for you as students to become familiar with hand signals, the following illustrations have been provided.

Maryland SHA Standard Safety Hand Signals.

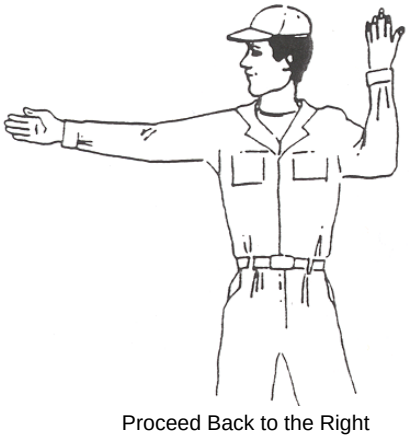
IDENTIFICATION
(I will be directing you)

Start Engine

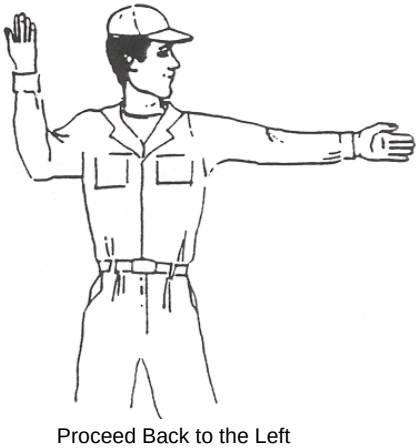


Stop Engine

Proceed Straight Back



Proceed Back to the Right



Proceed Back to the Left

Stop

FREQUENTLY USED HORN SIGNALS

Below is a list of horn signals used by operators and drivers whenever standard safety hand signals cannot be used. If there is no one available to assist in hand signals, it will be the operator's responsibility to get out and check around the dump truck before moving.

It is a good idea for an operator to use a sequence of horn signals instead of hand signals when backing up to or moving around equipment. This method is to create a safe working environment when there is a lot of heavy equipment activity, and a signal person cannot be used. The following sequence of horn signals is suggested:

One (1) Beep of horn = **Stop**.

Two (2) Beeps of horn = **Go ahead your done**.

Three (3) Beeps of horn = **Proceed back**.

2. TERMS AND DEFINITIONS

Air bleeding

The release of condensation and other foreign materials from air lines. Bleeder valves can be found on the air tanks (reservoirs) of dump trucks.

Air brakes

The brake systems on heavy trucks that use air instead of hydraulic brake fluid.

Air pressure gauge

An instrument on the dashboard which indicates the air pressure in the air tanks (reservoirs), measured in pounds per square inch (psi).

Ammeter/Voltmeter

An instrument on the dashboard that shows the **RATE** the battery is being charged or discharged.

Double clutch

Gears in a diesel truck that are synchronized manually by the driver depressing the clutch and shifting the gear shift into neutral. Next the clutch is completely released while in neutral. The next step is depressing the clutch again as the operator shifts to the next gear. The final step is to completely release the clutch, engaging the transmission.

Downshift

To shift down from a higher gear ratio to a lower gear ratio.

Emergency brakes

Brakes that automatically lock-up when air pressure drops below a designated minimum (usually below 40 psi).

Fish eye

A convex (bulges outward) mirror used in addition to the west coast mirrors.

Free wheeling

To roll uncontrolled either with the gearshift in neutral, with the clutch depressed, or two-speed gear disengaged.

Governor

It controls the amount of fuel allowed to the engine. When the engine speed reaches shift point, the governor prevents more fuel from being injected and the engine will not turn any faster.

Gross Vehicle Weight (G.V.W.)

Means the total weight of the loaded truck. It is the sum of the chassis, accessories, equipment attachments, cab, body, fuel, driver, and load.

Lugging

Trying to pull forward in a gear that is to high for the speed you are going or trying to start in a high gear with a very heavy load.

Lug nuts

Nuts which fasten wheels to the axles.

Red Lining

Running or operating the engine rpm's to the red line (peek power) of the tachometer.

Revolutions Per Minute (RPM)

The number of revolutions per minute that the engine is turning.

Saddle tank

Fuel tanks which hang on either side of the dump truck.

Single axle

A dump truck with one (1) rear axle.

Split shift or splitter

A two (2) speed or split transmission which allows each transmission gear to be "split", making two (2) gears out of one. Each gear is used twice at each of the two different ratios.

Straight shift

Straight 4, 5 or 6 speed pattern.

Tachometer

An instrument on the dashboard, in most vehicles, that measures the rpm of an engine.

Tandem

A double rear-axle combination on any kind of truck, trailer or bus.

Tandem axle

A dump truck with two (2) rear axles.

Temperature Gauge

An instrument on the dashboard that indicates the temperature of the coolant in the engine.

2-Speed button

An electric switch that splits the rear axle into high and low gears.

Upshift

To shift up from a lower gear ratio.

West Coast mirrors

Large rectangle mirrors extending from the doors on the dump truck.

3. PREVENTIVE MAINTENANCE

Daily and weekly preventive maintenance (P.M.)

After you have completed the basic safety steps, the next stage is to conduct a thorough preventive maintenance inspection of the dump truck. The importance of this procedure is to provide a level of safety and security to you and the State Highway, as well as the taxpayer that shares the interstate with you.

The operator's manual and owner's guide contains guidelines for P.M. checks which should be made before, during, and after operating the dump truck. Most policies on the subject of P.M. state that the order of checks or inspections is not important. There should be some routine order established by the operator to be certain nothing is missed.

SHA has introduced a new, conforming form titled, "Operator's Daily Checklist & Equipment Service Request" (SHA 71.0-FS-5, 3/98), which sets up a sequence of daily checks during P.M.. Following the sequence on the back side of the form; the operator, on the front side, places a √ if the component is okay, and an "X" for any defects found. For more information on this form, please review SHA's Forms Workbook.

The operator will give the yellow copy to the shop with the "Repairs Required" box marked to change the “Operator’s Daily Checklist” into an “Equipment Service Request” for any defects found.

The purpose of the Equipment Service Request is to give the shop automotive specialist a precise idea of where or what the problem is on the defective equipment. It is important that the distribution be made immediately for any problem discovered so that the shop can schedule timely repair or maintenance.

The first inspection that you will perform is the pre-trip inspection. A post-trip inspection will be performed at the end of the work day. The ending odometer and ending hour meter reading is entered on the ODC/ESR during the post-trip inspection. The meters readings are entered during the pre-trip inspection if the truck requires service that would prevent it from being used the entire day.

The pre-trip inspection is broken down into a pre-start and a pre-operation inspection. The following is a detailed description of these two inspections.

Pre-start inspections

1st walk around

This inspection can be done as you approach the truck. Look for water, fuel, and lubricant leaks on the ground under the truck. **Never** start the truck if there are any noticeable leaks in any of the fluids (motor oil, coolant, fuel, hydraulic). Check for flat tires, loose or broken wires, broken glass, weld breaks in frame, steering defects, etc. Continue with all checks that can be made with the engine off. The operator should always use common sense and be thinking "**SAFETY**" when conducting any pre-start inspection.

Any time that you conduct a preventive maintenance check on any piece of State heavy equipment; you must always accurately and completely fill out the Operator's Daily Checklist / Equipment Service Request. If you feel that you need to review how to complete this form, please review the SHA Equipment Forms Workbook.

Engine oil level and condition

Oil level should be maintained between the "ADD" and "FULL" marks on the dipstick. Oil should be visually inspected for presence of contamination. To check that the oil is clean and at the proper level, pull the dipstick twice. The first time to check for contamination and the second for a true reading of the oil level. If you see foam or condensation, it may indicate that there is a presence of fuel or coolant contamination. If grit or filings are found it may indicate that the air filter is bad or there is abnormal engine wear. Be particularly wary of an over-full level on the dipstick. This condition could indicate fuel or coolant contamination. Oil and filter change should be done immediately upon confirmation of contamination and the engine monitored closely afterward for recurrence. If oil must be added to the crankcase of the dump truck, use the manufactures or SHA's recommended oil weight.

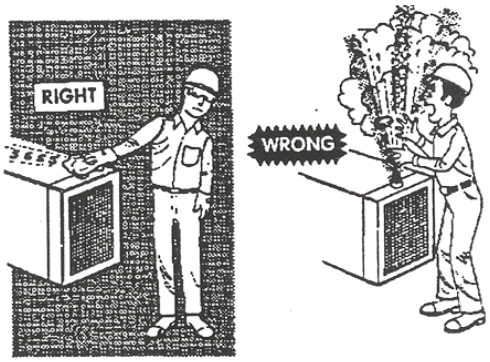
Automatic transmission

Oil level should be maintained between the "ADD" and "FULL" marks on the dipstick. Oil should be visually inspected for presence of contamination. To check that the oil is clean and at the proper level, pull the dipstick twice. The first time is to check for contamination and the second for a cold reading of the oil level.

Automatic transmission oil level will have to be checked again after engine warm-up for true level.

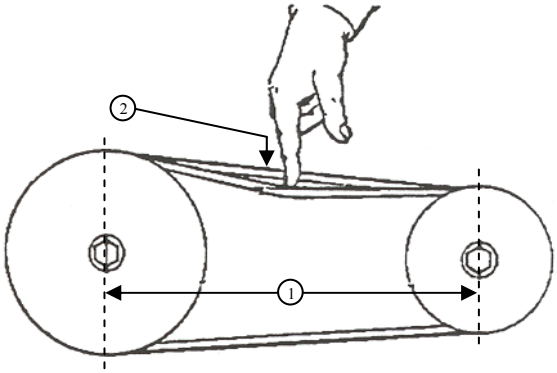
Coolant level, hoses, and radiator

Make sure the coolant is at the proper level in the fill tank. This level mark is usually 3/4 of an inch from the top of the radiator. One way to check the coolant for the proper level is to unscrew the radiator cap and feel for coolant liquid. **Remember NEVER unscrew the radiator cap while the radiator is hot!! Wait until the radiator is cool**. Another way to check the coolant level is to visually check the radiator overflow jug. The operator should look for the coolant level on the jug to be between the minimum line and the maximum line. Some radiators have a sight glass mounted in the side of the radiator to indicate the presence of coolant. Inspect all engine and heater system hoses for wear, leaks and loose hose clamps.



Belts

Inspect fan and accessory drive belts for proper tension and wear. Accurate tension checks should be made by shop personnel. The operator should be alert to cracking or looseness which could lead to electrical system discharge, overheating and/or other engine problems. To get an idea of what the tension factor should be for checking tension, the following illustration is provided. Remember that the illustration below is only a guide for tension deflection.



1 Belt Free Span
2 See Table for Deflection

Belt Deflection Chart	
Belt Width	Deflection per 1 foot of span
11/16” (17.5 mm)	13/32” (10.3 mm)
7/8” (22.2 mm)	1/2” (12.7 mm)
3/4” (19.1 mm)	7/16” (11.2 mm)
1/2” (12.7 mm)	13/32” (10.3 mm)
1” (25.4 mm)	9/16” (14.3 mm)

What this conversion states is that if the width of the belt is say..1/2 inch, the deflection of the belt can be no greater than 13/32”. In other words, when the operator checks the tension of a ½” belt, it cannot be “pushed in” more than 13/32” of 1 inch. (see the illustration above).

” = inch (standard measurement)
mm = millimeter (metric measurement)

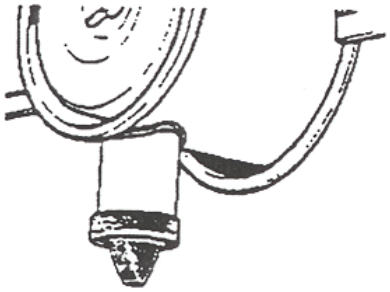
Air Filter

Make sure the air filter is clean. Because of the various types of dump truck in SHA, be sure to check either the dusk cover or air restriction gauge.

Older SHA dump trucks will have a dust cup located at either end of the air filter container. The operator should "flick" the cover to check that the air filter is clean.

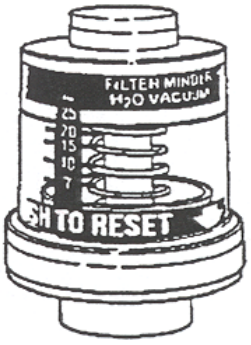
When the air filter gauge reads above **15** inches, it is a good indication that the air filter is due for replacement.

Push the reset button after the air filter has been cleaned or replaced with a new one.



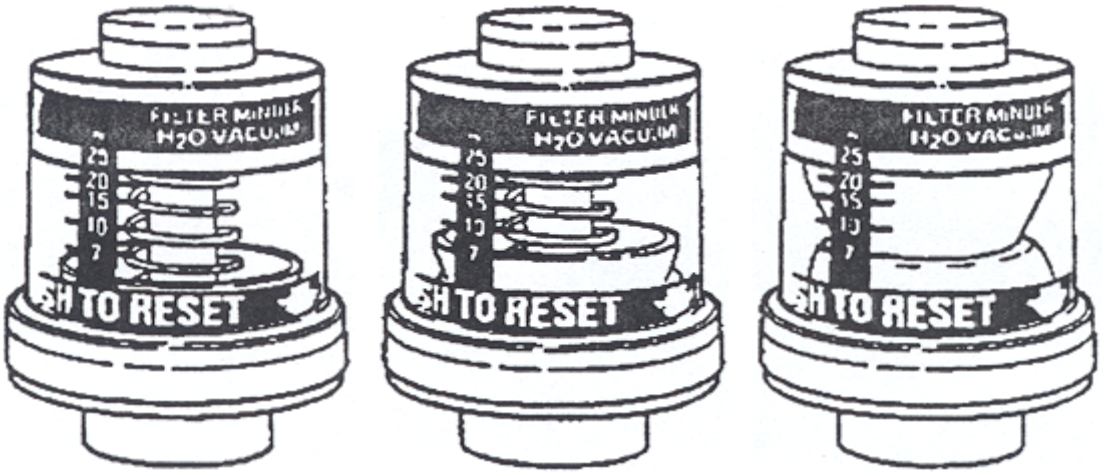
Dust Cup

Dash mounted



Air filter mounted

The following are three pictures of air filter gauges, showing different readings of the air filter. As the air filter becomes clogged with dust and contaminants, the indicator rises to indicate how many inches of dust and contamination are in the air filter. When the air gauge has a reading as in picture #3, it means that the air filter is due for a change. Normal clean air filter reading is between 0 and 5 inches.



#1 **#2** **#3**

Power steering oil level and condition

Oil level should be maintained between the "ADD" and "FULL" marks on the dipstick. Oil should be visually inspected for presence of contamination. Pull the dipstick twice to check oil for impurities and at the proper level. The first check is for contamination and the second for a true reading of the oil level.

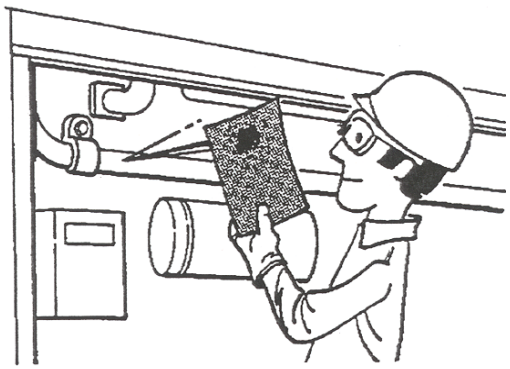
Batteries

Electrolyte levels should be maintained at the indicator level in each cell of the battery, the battery case should be checked for cracks or leaks. Check terminals (corrosion-free), and make sure that the cable clamps are tight. On maintenance free batteries, check the green or blue dot. If the dot is faded or turned white, have the automotive mechanic re-charge or replace the battery.

Hydraulic oil reservoir

The hydraulic oil for the dump truck must be checked before operation and during pre-operations steps. Make sure the site glass is clean and that you get a hydraulic reading of "Run". Check the hydraulic oil for color and dirt particles floating in the site glass. After checking the hydraulic oil, check for leaks in the hydraulic hoses and hose connections.

Warning: If a leak is suspected, do not use your hand to find a pinhole leak. Escaping fluid under pressure can penetrate the skin and cause serious injury!
Use a piece of cardboard, paper, or board to search for leaks.



Tires and wheels

Check <u>all</u> tires for cuts, abnormal wear, and proper air pressure. Check the tire sidewall for the precise air pressure requirement. Use an accurate tire pressure gauge and check the tires when they are cool. Check for cracked rims and missing or loose lug nuts. Shiny areas around studs indicate possible looseness of the lug nuts.

A single axle dump truck tires should be equal in size. Tires that differ more than 1/4 of an inch (6.36 mm) in diameter or 3/4 of an inch (19.05 mm) in circumference should not be mounted on the same side of a dual wheel axle. The larger or less worn tire should be mounted on the outside of dual tires that differ less than this.

If you are driving a tandem axle dump truck, never install the four largest tires on one driving axle and the four smallest on the other axle. If you do, it could lead to premature axle failure. The unevenness of the tire mounting will cause an increase in the axle lubrication that will lead to axle failure.

When you check for wear of the tires, keep the following common patterns:

Even wear

The usual sign of even wear is when the operator can run his hand across the face of the tire and feel for a constant smoothness. Even wear can also be noticed by the way that the tire grooves look even and smooth.

Erosion wear

Is also known as rolling wear, channel or river wear and can be found in both bias and radial tires. Erosion wear is an indication that the tires are used in slow operations. Erosion wear can be detected when the tire or tires begin to fray at the edges of the tire. In other words, wear will start at the edge of a tire and have little or no effect on the tread. If this occurs, rotate the tire or tires to the inside of a dual or tandem axle.

Shoulder wear

Is the normal wear of the outside portion of a tire. You can usually detect this wear by noticing that the outside groove begins to take on a shiny look. This is normal wear so do not over compensate for this wear.

Lug nuts

The operator's manual directs that the nuts be sequentially checked when operating a unit which has had a wheel removed after about 50 miles of operation and, once each week inspect and re-torque wheel lug nuts.

Wheel bearings

Wheel bearings should be inspected, lubricated and adjusted at regular intervals. This is especially important if you are operating in deep sand, mud, or water. Refer to lubrication section of the operator's manual for correct interval.

Undercarriage

Check sub-frame, steering, drive shaft, leaf springs, mounting brackets and bushings for evidence of fatigue, shifting, bending or breakage. Check U-bolts and nuts for looseness, breakage, or rust. Proper torque must be maintained on U-bolt nuts to keep axle from shifting.

Brake Slack adjusters

Check slack adjusters on the front air brake system for the correct amount of slack when applying brakes. Apply the brakes with 90 psi to force the brake chamber piston rod out of the brake chamber and measure distance traveled. This can be done manually on the front brakes but is not as accurate. Chock the rear wheels and release the parking brake to measure the rear brake chambers for proper slack. The air brake chamber piston rod travel distance should be as short as possible without brakes dragging. Brakes should be readjusted when stroke is between 1 ¼" and 2 ¼" depending on the brake chamber size and manufactures specifications.

Warning: The National Transportation Safety Board states that automatic slack adjusters should **NOT** be manually adjusted in an effort to correct excessive pushrod stroke. Manually adjusting automatic adjusters could have serious consequences.

Brake linings worn to within 1/16th of an inch of the rivets should be replaced.

Safety features

Check all your safety features that are part of your dump truck.

Check the seat belt condition for fraying, particularly at attach points, and availability.

Fire extinguisher should have current inspection tag and show a full charge (in the green), and should be stowed/attached within easy reach.

A first-aid kit should be fully stocked and handy.

A supply of flares or warning reflectors should be safely stowed in case of an accident, breakdown, or to assist other motorist in trouble.

The glove compartment should contain a valid registration card, and at least one copy of the insurance brochure titled, "In Case Of Accident". (See Appendix).

Lubrication

One of the most important steps to preventive maintenance is the lubrication of the dump truck. The single axle dump truck has about 7 to 8 primary lubrication points that must be checked and greased every day. The tandem dump truck's primary lubrication points increase to between 10 and 15 points. Do not over-grease the lubrication points. Excess pressure from too much grease can damage seals.

GENERAL LUBRICATION GUIDE

The following page contains an illustration of the tandem axle chassis, and locations of most of the important points requiring daily lubrication for the single and tandem axle dump trucks. Familiarity with lubrication points will be required for certification. Reference the numbers and match with the drawing for location. The single axle dump truck has fewer lubrication points than the tandem dump truck.

Single Axle lubrication points

6 - Steering knuckles

11 - Clutch shaft

15 - U-joints

26 - Drag link

29 - Prop shaft slip joint

30 - Prop shaft U-joint

40 - Tie rod ends

Tandem axle lubrication points

6 - Steering knuckles

11 - Clutch shaft

15 - U-joints

26 - Drag link

29 - Prop shaft slip joint

30 - Prop shaft U-joint

32 - Spring pins

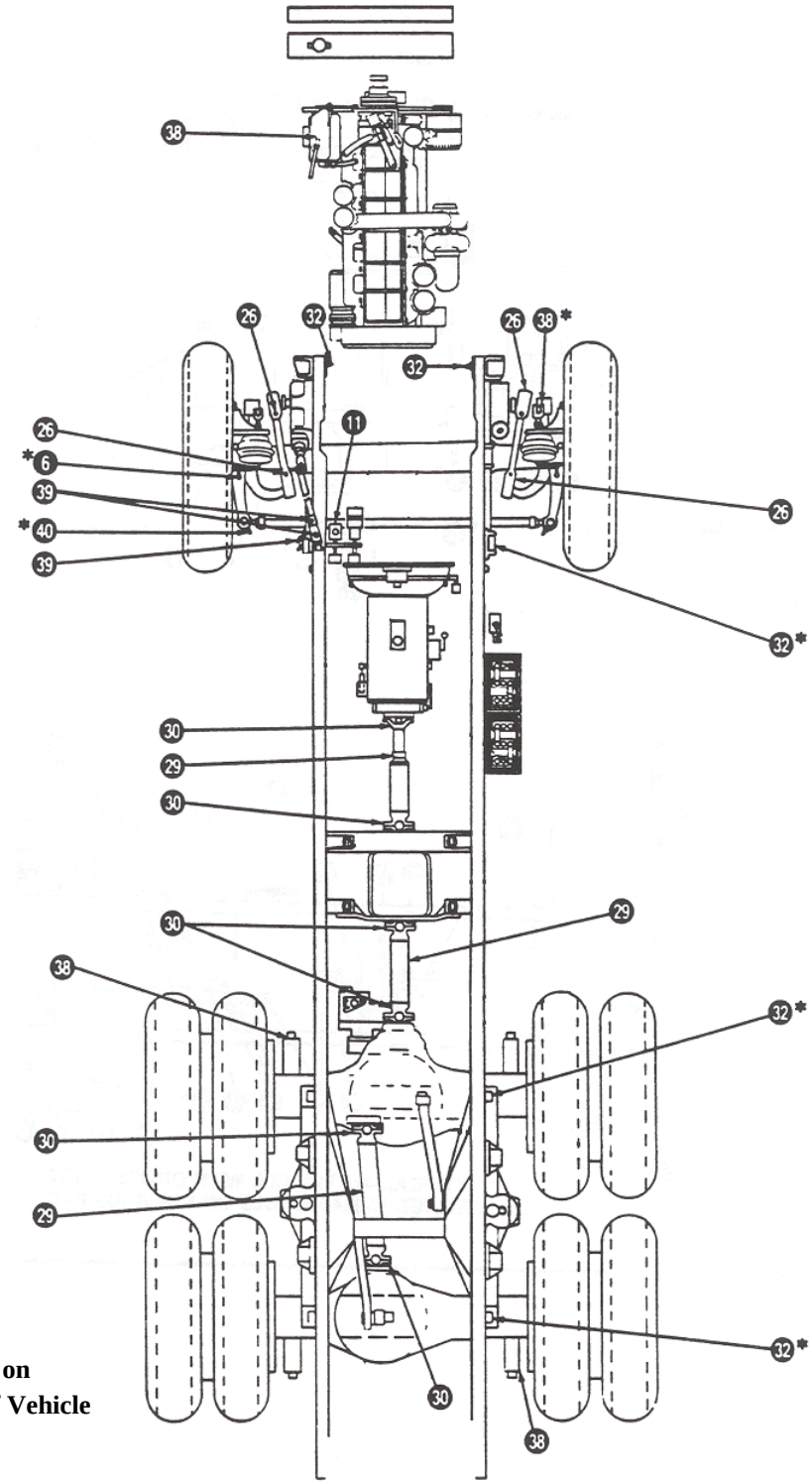
35 - Transfer case shift link

38 - Brake slack adjuster

39 - Steering column U-joint

40 - Tie rod ends

Lubrication Diagram for Single & Tandem axle Dump Trucks



*** These Points Symmetrical on Both Sides of Vehicle**

Lubrication of dump body and hoist

Note: Different manufacturing designs on hoists call for different lubrication points. Be sure to inspect the hoist carefully to locate all grease points.

SHA's dump trucks are equipped with a constant-running hydraulic pump located in front of the engine. Check the pump, drum, and hoses for leaks.

Inspect the welds on the dump bed for breakage. Inspect the frame bolts that connect the dump bed to the truck for looseness. Oil the joints on the tailgate latch system.

Pre-operation inspection

After conducting your pre-start checks, proceed to the next sequence of steps called the pre-operations checks. The pre-operations check is the process in which the operator will start the vehicle's engine and conduct basic operation checks to be certain the vehicle will run smoothly and effectively.

Seat & Seat belt

Make certain the seat will adjust to your needs and lock in place. Check seat belt for adjustment and the ability to restrain the operator in the seat properly.

The steps described below are the fundamental steps in checking that the vehicle will run smoothly and effectively. Any problems or deficiencies found must be written down immediately on your Operator's Daily Checklist / Equipment Service Request.

Engine warm-up

Engine idle rpm should be set at 1,000 for 3 to 5 minutes, depending on outside temperature. The warm-up period provides time for the cold engine oil to warm and circulate, establishing a film between moving parts.

The warm-up period is especially important for turbo-charged engines when temperatures are at or below freezing. The cold external lines leading to the turbo-charger will tend to slow oil flow until the oil warms. Slow oil flow to the turbo-charger reduces the oil available for the bearing. Engines equipped with a turbo charger must have a minimum warm up period of 5 minutes at 1,000 rpm.

Oil pressure

The initial start-up oil pressure should be between 60 and 90 psi and should come up to a "normal" reading in about 20 to 30 seconds. The low oil pressure warning light should cut off right after the engine has started. **If it does not, shut down the engine immediately and investigate.**

Water Temperature Gauge

The normal water temperature gauge reading usually means either seeing the red needle in the green area or the red needle between 180 to 208 degrees. Make sure that the needle moves into that range as the engine warms up.

Voltmeter

Make certain the voltmeter gauge shows a charge for the battery.

Air Pressure

If air pressure has dropped below 60 psi, you should hear a buzzing sound or see a red warning light indicating low air pressure. The air pressure must reach a reading of between 90 and 120 psi in order to operate the air brake system. After air pressure reaches 120 psi, the parking brake may now be released.

Parking Brake

The purpose of the parking brake is to hold the vehicle in a stationary position and to assist in bringing the vehicle to a complete stop in an emergency. Do not use to stop the vehicle during normal driving. Test the parking brake by pushing "IN" and then pulling "OUT" the yellow triangle control knob and listen for escaping air.

Hydraulic oil reservoir

Maintain the oil level between 3/4 and full in the site glass. Keep hydraulic oil free of contaminants to avoid damage to the system. Raise dump bed and listen for any unusual noises and feel for jolts or slowness while raising the dump bed. This will speed up the warming cycle of the hydraulic oil and circulate through the system. Visually inspect the hydraulic cylinder(s) and hoses for condition and leaks.

Clutch

Check the clutch pedal for any unusual free play. A properly adjusted clutch pedal should have a free play of no less than **1&1/4"** for most model trucks. This means that when you depress the clutch, the clutch should begin to disengage the transmission after the clutch is depressed **1&1/4"**.Some model trucks may have more free play. See the chart below taken from International truck manual. If the clutch feels "spongy" or the transmission does not engage, **have the clutch serviced immediately!!**

INTERNATIONAL TRUCK

Vehicle Model	Pedal Free Travel
2000 – 4000, 7000 – 8000, Metro II, 1452, Model II, 1652	1 1/4 inch (32 mm)
5000	1 1/4 – 2 inches (34-48 mm)
9600, 9700	1 5/8 – 2 1/8 inches (43-55 mm)
9300	1 1/2 inch (38 mm)

Brakes

Check the service brake for proper operation (the air pressure must be above 60 psi before performing this task). Check the service brake by engaging the transmission in low gear and at 5 mph apply the service brake. Feel for any unusual vibrations, pulling left or right and sponginess when applying the brake. Repeat this in reverse gear.

When backing up, listen for the Back-up alarm. The parking brake should also be checked at this time. With the parking brake on, and transmission in low gear, slowly engage the clutch and apply force against the parking brake. Automatic transmission need only to place in drive and increase engine rpm. If the parking brake does not stop the vehicle from moving, have it serviced immediately. For tandem axle trucks, please check under tandem dump truck operations.

Steering

Check the steering by moving the steering wheel from side to side to check that there is minimum play. Minimum play is less than 10 degrees of slack. This means that within 10 degrees the steering should move the wheels and tires. If steering play is greater than 10 degrees have it checked by the shop mechanic.

Electric Canopy

Tandem dump truck operators should check the electric canopy during the pre-operation to make sure that it is operating properly. The canopy arms should swing smoothly and without stopping as the motor unravels the canvas. The canopy should extend all the way to the tail end of the dump bed. Inspect the canopy canvas after it has stopped. Write down any defects on the Operator's Daily Checklist / Equipment Service Request.

Dump bed

After checking all the gauges, engage the dump bed lever and raise the bed and listen for any unusual noises. Prior to engaging the dump lever, make sure that there is nothing in the dump bed. After raising the bed all the way up, raise the red safety prop bar, then lower the dump bed until it firmly rests on the prop bar. Once this has been done, inspect the hydraulic cylinder, hoses, and connectors under the bed. After completing your inspection, raise the dump bed, lower the red safety stop bar, and lower the dump bed.

Tailgate latch or release

To test the tailgate release lever or switch, the operator must either pull the tailgate release lever down or press the electric button that activates the tailgate release. The dump bed should be raised enough to allow the tailgate to swing open, yet still reach the manual release lever, before releasing the tailgate.

Winter attachments

Check the snow plow by raising and lowering the hydraulic lever that controls the snow plow. Engage the salt spreader hydraulic lever and turn on the Dickey john control box to check for the auger and spinner activation. Make sure the salt spreader box is empty before conducting this check.

Two-way radio

Check for power (ON), correct operating channel, squelch and volume controls, and depress the microphone transmitting key for indicator light.

Walk-around inspection

The warm-up period is an opportune time to inspect those components which require the engine to be running for proper inspection.

Inspect all lights for burned-out bulbs, broken or dirty lenses, and broken or damaged wiring. Check all signal lights (turn, four-way flasher, brakes, warning beacon, back-up lights and alarm), headlights (high and low beam), tail lights, license plate lights for proper operation.

Inspect windshield, other windows, and mirrors for pits, cracks, and cleanliness.

Inspect for leaks around and under the dump truck.

Once you have completed the pre-operation checks, the truck is ready to operate.

Shut-down Procedures

The proper shut-down steps required are as follows. The sequence or steps for a shut down provided below yield the most effective means to prolonging the life and use of the vehicle.

Cooling

Idle the engine 3 to 5 minutes before shutting down to allow lubricating oil and coolant to carry heat away from the engine and turbo-charger to prevent damage from rising heat. This idling period is especially important to the turbo-charger. It gets much hotter, and its bearings depend on engine oil for lubrication, so it must be allowed to cool down.

Fuel

The operator should refuel after letting the engine cool down. Shut off the engine before filling up the vehicle's fuel tank(s). Refueling before parking minimizes the accumulation of condensation in the fuel tanks and reduces preparation time spent in the morning.

Parking

After fueling, drive to the vehicle's parking area. Place transmission in neutral and pull the parking air brake knob out. Do **NOT** use the gear shift selector in place of the parking brake. Chock the rear tires for additional parking safety. Place wheel chock on downhill side of the rear wheels when parking dump truck on a down grade.

Air reservoir(s)

Some of SHA's dump trucks both single and tandem axle may have been retro-fitted with Automatic Reservoir Drain Valves (spitters), that operate automatically to eject moisture and contaminants, and require no manual assistance. The operator's and owner's manual recommend that the reservoirs be drained and the valve examined periodically to ensure the drain passage is not obstructed. Air reservoirs with a standard drain cock should be drained daily in cold weather and once a week in warm weather to expel any moisture. Open the drain cock located either on the bottom or at the end of the tank. Be sure to close the drain cocks after all moisture has been expelled.

Shut-down

Once you have completed the preliminary steps of a shut-down and the engine has cooled the required 3 to 5 minutes, proceed to shut down the engine. In some models of dump truck this simply means that you turn the ignition key to the off position. In other models, it may require turning the key to the off position and then pulling the "shut-off" or "cut-off" knob.

Housekeeping

Upon leaving the vehicle for the night make sure that you conduct a "clean sweep" inspection. That means take the time to keep the vehicle clean, remove tools, personal belongings and trash from the cab, and wash the vehicle after every use.

Final Walk-around

Inspect tires and wheels for abnormal wear and damage. Check lug nuts for looseness, and damage to glass, mirrors, lights, etc. Look for fluid leaks, and generally give the vehicle a good once-over.

Review

Items to check on a daily inspection. All deficiencies should be marked on the Operator's Daily Checklist / Equipment Service Request (ODC/ESR) and then given to your supervisor or shop foreman: The operator should be checking for possible problems, such as:

- Broken, worn, or missing parts.
- Leaks (oils or fuel under or on the Dump Truck).
- Hydraulic oil levels (sight gauges).
- Engine oil level and condition of oil.
- Radiator coolant level.
- Battery cables and connections.
- Fuel level.
- Air cleaner and filter indicator.
- Condition and adjustment of fan belts.
- Exhaust system.
- Safety devices.
- Tires, wheels, rims, and lug bolts.
- Windshield, glass in doors and cab wipers and washers.
- Starting circuit.
- Gauges for normal operation.

PERFORMING START-UP, WARM-UP AND SHUT-DOWN

Daily pre-start checks are to be performed every day prior to starting the engine; this is commonly called preventive maintenance (P.M.).

I. Before starting the engine, first do a walk around inspection.

- Open engine compartment side panel, raise hood or open top of engine hood and check engine oil level. Check for contaminants or water.
- Check engine coolant: The level should be at least 3/4 inch from the top of the radiator. Check fan belts and hoses.
- Hydraulic oil level: Check through the site glass.
- Air cleaner: Check air filter indicator. Make sure that the filter is clean.
- Fuel tank: Keep fuel tank full to reduce chance of condensation and corrosion.
- Transmission oil level: Some transmissions have a check plug, others have a dip stick. Check for proper oil level.

II. Starting the engine.

- Enter cab and once seated **Fasten seat belt**.
- Check to see that all the instruments are in good condition, and check that the parking brake is on.
- With clutch depressed, turn the ignition switch to the "on" position and press starter button. Release the starter button or switch key the instant the engine starts.
- As soon as the engine starts, **watch the oil pressure gauge** to be sure it immediately climbs to the correct pressure. If no oil pressure registers, immediately shut the engine off.

CAUTION: Do not engage the starter for more than a few seconds at a time.
If the engine does not start within 10 to 20 seconds, release the starter switch and wait 60 seconds before trying again. This will allow for the starter motor to cool off.

III. After starting the engine, check all the following gauges below for their proper readings:

- Fuel gauge
- Oil pressure
- Coolant temperature
- Voltmeter
- Transmission oil pressure and temperature (if applicable)
- Tachometer

IV. Check steering for excess play. Turn the steering wheel left and right and observe front wheel movement.

V. Check auxiliary systems:

- Horn
- Heater/defroster/fan
- Windshield wipers
- Mirrors, doors, windows

VI. Check all floor pedals for looseness and workability.

- Throttle
- Brake
- Clutch pedal for free-play.

VII. While engine is warming up, do a second walk around.

- Lights and back-up alarm.
- Listen for any unusual sounds or noises. If you here any, locate where they are coming from and inform your supervisor or shop foreman.
- Work all the attachments to verify their good working order and that hydraulic oil is flowing through the controls.

VIII. Shutting down

- Let engine idle and cool down for 3 to 5 minutes.
- Refuel dump truck.
- Park on level ground or across a slope.
- Transmission in neutral.
- Set parking brake.
- Chock tires when necessary.
- Do a final walk around inspection. checking for leaks and missing or loose parts.
- Shut off engine and remove the key.
- Remove personal belongings from the vehicle, and clean out cab and lock it.

Remember that any time that you conduct a preventive maintenance check on any piece of State heavy equipment; you must always accurately and completely fill out the Operator's Daily Checklist / Equipment Service Request. If you feel that you need to review how to complete this form, please review the SHA Equipment Forms Workbook.

4. OPERATIONS

The dump truck is the backbone of the FMT II classification. The more the operator knows how it works and how best to operate it; the better prepared the operator will be to undertake any dump truck operation. Under normal training circumstances, the operator should first become familiar with the fundamentals of dump truck operation.

Clutch and Transmission

Standard single axle dump trucks are equipped with a five-speed or six speed transmission. Vehicles with manual transmissions have a clutch pedal which is used to engage or disengage the clutch plates, connecting or disconnecting the engine from the transmission. With the clutch pedal released (extended), the clutch is engaged, which in turn drives the transmission and rear wheels. Depressing the clutch pedal releases the clutch, permitting selection of transmission gear changes.

Clutches will last many thousands of miles if properly used and maintained. Remember that excessive heat caused by riding the clutch or using the clutch as a foot rest will wear down the clutch before its time. **DO NOT RIDE OR SLIP THE CLUTCH**. Once a clutch is fully engaged, there is no heat generated and little or no wear. During the brief period when the clutch is engaging, considerable heat is generated. By riding or slipping the clutch, the period of partial engagement is lengthened, causing unnecessary heat and wear.

Start the dump truck in a gear that will move the truck forward with the engine at idle speed. An empty vehicle can be started in a higher gear than a fully loaded one. Starting in a gear too high for the load will cause the clutch to slip. If the engine must be "revved" up to prevent stalling, the gear selection is too high. As you release the clutch pedal and the clutch begins to engage, the engine speed will drop slightly. When this happens, increase the engine speed and fully engage the clutch. Increasing the engine speed before engaging the clutch could damage the clutch and drive train.

Do not shift until the vehicle has reached the proper speed. Upshifting before the vehicle has reached the right speed is almost as bad as starting off in a higher gear. When the difference between the vehicle speed and the engine speed is too great, the clutch is forced to slip.

Clutch brake

A clutch brake is used to stop the transmission input shaft rotation so that the initial first or reverse gear selection can be engaged while the vehicle is at a dead stop. When using the clutch brake, fully depress the clutch pedal and shift the transmission into either first or reverse gear.

Operating a ceramic clutch

- Start in a low gear.
- While operating a ceramic clutch, engage the clutch before giving the engine any fuel (engine should be at idle).
- The operator should not try to slip the ceramic clutch by raising the engine rpm and riding or feathering the clutch pedal.

In order to properly upshift or downshift, do the following.

1. Depress the clutch pedal to disengage the clutch.

2. Shift the transmission into neutral.

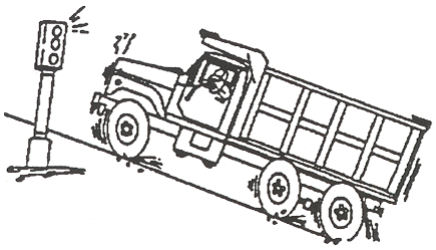
3. Release the clutch.

4. Re-depress the clutch and shift into the desired gear.

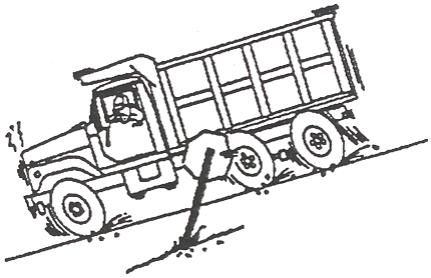
5. Finally, release the clutch pedal to engage the clutch.

If you are upshifting, wait until the engine speed matches the transmission output speed of the gear you desire to shift into. If you are downshifting, accelerate the engine with the transmission in neutral and the clutch released, until the engine speed matches the input speed of the gear you desire to shift into.

The operator should also remember the following simple rules of clutch usage. **Never attempt to hold a vehicle on a hill with the clutch.** In other words, never attempt to use the clutch, while in gear, as a brake in order to hold a dump truck on an incline.



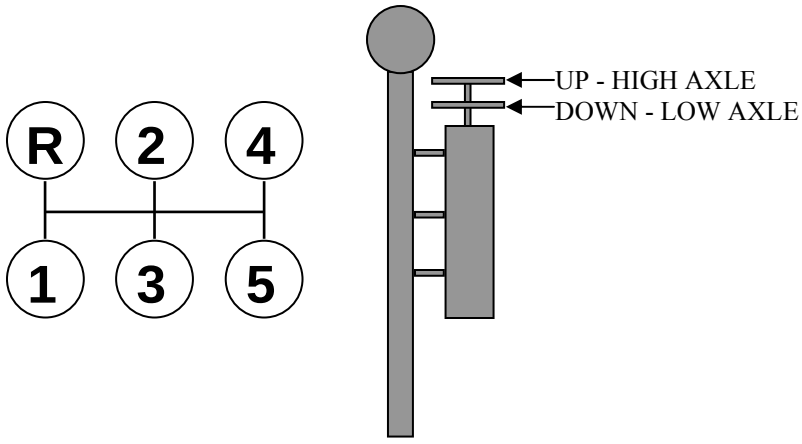
NEVER coast with the clutch disengaged and NEVER engage the clutch while coasting. Re-engaging the clutch during or after coasting will cause a tremendous shock to the clutch and the whole drive train. This could lead to internal engine damage and/or clutch and flywheel failure.



Transmission

To start the dump truck in a forward movement, you must start in the lowest gear or the gear that will not stall the engine. Always come to a complete stop before shifting to reverse or first gear. Under normal conditions, the operator will start in first gear and work up through the gear pattern. Do not skip gears (first gear, low range to second gear, high range, etc.). The transmission is synchronized from second through fifth gear. As the dump truck gains speed and momentum, the operator will shift through the gears. See the steps below in order to get a better idea of the gear shifting process. Those operator's that are studying for the tandem dump truck, refer to the tandem section at the back of this guide.

5 SPEED TRANSMISSION
2 SPEED AXLE



5 SPEED TRANSMISSION

I. UPSHIFTING TRANSMISSION

1. Release parking brake
2. Depress clutch pedal
3. Shift into first gear
4. Release clutch at idle rpm (1,000 -1,500)
5. Depress accelerator, increasing RPM
6. As speed increases, release accelerator, depress clutch pedal, and shift in the next highest gear
7. Repeat steps 5 and 6

II. DOWNSHIFTING TRANSMISSION

1. Depress clutch pedal
2. Shift into neutral
3. Release clutch pedal and increase engine speed
4. Depress clutch pedal
5. Shift transmission into desired lower gear

2 SPEED AXLE

III. UPSHIFTING TWO-SPEED AXLE

1. Keep accelerator down and move rear axle switch to high Range (see illustration above)
2. Release accelerator and depress clutch pedal
3. Release clutch pedal and apply accelerator at the same time

IV. DOWNSHIFTING TWO-SPEED AXLE

1. Keep accelerator down and move rear axle switch to low range
2. Rapidly depress clutch pedal, accelerate slightly, and release clutch pedal

V. SPLIT SHIFTING
(UPSHIFTING TRANSMISSION AND DOWNSHIFTING AXLE)

1. Shift transmission as indicated in i and ii
2. Move rear axle switch to low range before releasing clutch pedal (as indicated in iv)

VI. DOWNSHIFTING TRANSMISSION AND UPSHIFTING AXLE

1. Move rear axle switch to high range and release accelerator
2. Then shift the transmission as in ii

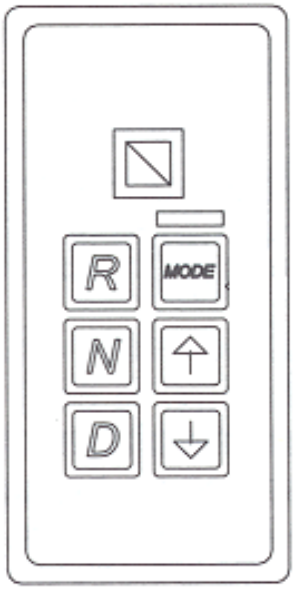
VII. CLUTCHING AND SHIFTING PRECAUTIONS

1. Clutch must always be pressed down when changing gears
2. Do not ride the clutch pedal
3. Always start truck in first gear and axle in low range
4. Never coast with transmission in neutral
5. Come to a full stop before shifting from a forward gear to reverse and vice versa

ALLISON AUTOMATIC

If your vehicle is equipped with a push button shifter, your control has the following selections:

- R (reverse)
- N (neutral)
- D (drive)
- MODE button
- Up arrow (upshift)
- Down arrow (downshift)
- Digital display



When a range button is pressed, a tone will sound. If the CHECK TRANS light (located on the instrument panel) is illuminated, the shifter control pad will be disabled and no tones will be heard. The SELECT indicator displays a chosen operation (if the Electronic Control Unit determines the shift is acceptable) and the transmission will shift to the starting range.

Selection of a specific gear can be accomplished by pressing the up or down arrow button after engaging the D (drive) button. The monitor will display the gear when it is attained. An example of this would be if the up arrow button selects 4th gear as the highest gear allowed, a 4 will be displayed in the monitor. The transmission will start in 2nd gear and progress to 3rd then 4th . The transmission will not shift higher than the gear selected, but will downshift automatically when the vehicle slows down.

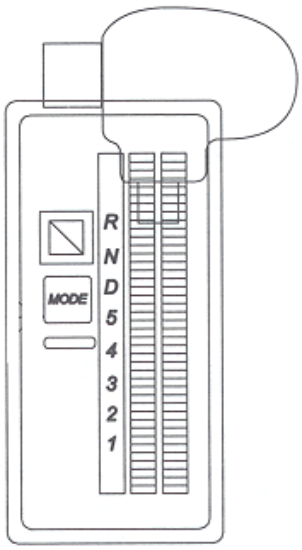
Select the D (drive) position to return to normal driving. In the D (drive) position, the transmission will start in 1st or 2nd gear, depending on the transmission series.

The MODE button may be used to activate a second shift schedule (this is typically programmed for **Economy** which will enable the transmission to shift at a lower rpm to conserve fuel).

If your vehicle is equipped with a gearshift lever, this selector is an electro-mechanical control and has up to six forward speeds and one reverse range.

In case of engine shutdown (running out of fuel), while the transmission is in gear, the transmission will remain in gear until the ignition key is turned to the OFF position.

If equipped with a gearshift lever, the transmission will return to N (neutral) (when the ignition key is turned to OFF) but the engine cannot be restarted until the gearshift lever has been moved to the N (neutral) position



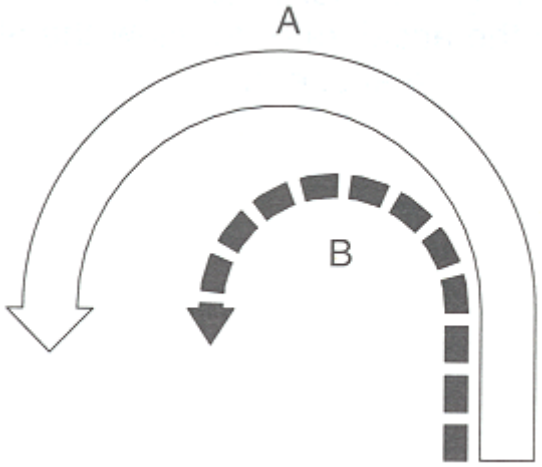
If equipped with a push button shifter pad control, after the ignition is turned off, the transmission will automatically shift to N (neutral) and the monitor on the shift pad will display N (neutral) when the ignition key is turned to the ON position.

WARNING: These transmissions have no P (park) position. Before leaving the driver's seat, always shift into N (neutral) and set the parking brake.

Differential Lock

The differential lock provides maximum traction under slippery conditions. When the differential lock is engaged, the clutch collar completely locks the differential case, gearing, and axle shafts together, maximizing traction of both rear drive wheels and protecting against spinout.

The turning radius is greatly increased when the differential is locked.

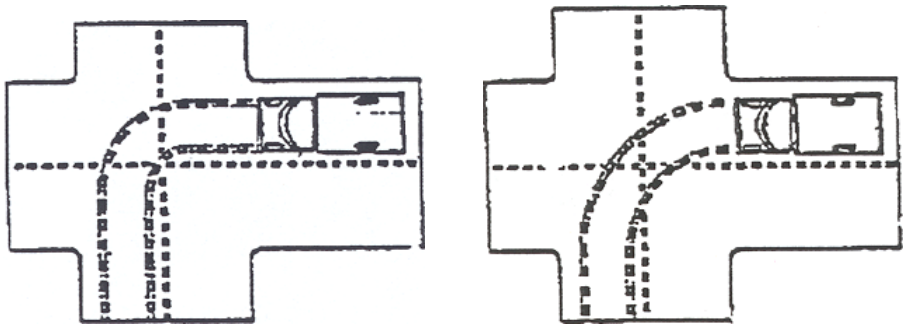


A. Turning Radius when differential is locked (engaged) – Understeer condition
B. Turning Radius when differential is unlocked (disengaged)

Warning: Lock the differential only when the vehicle is standing still or moving less than 25 mph. Never lock the differential when the vehicle is traveling down steep grades or when the wheels are slipping. This could damage the differential or lead to loss of vehicle control.

Once you have learned the basic elements of moving the dump truck, the next step is to learn how to maneuver the vehicle on the road. Although this portion of the operations may be very obvious and redundant, it is a good idea to refresh your memory to the basic driving skills.

Turns & curves



LEFT-HAND TURNS

1. Signal your turn in advance.
2. Check conditions before turning.
3. Complete the turn without stopping.
4. Make the turn without the rear wheels striking other vehicles or the curb. Don't cut corners.

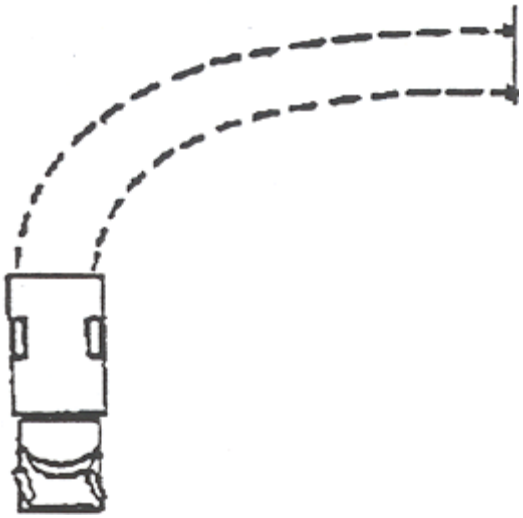
Backing

This is one of the most accident-prone maneuvers. The cardinal rule is, "avoid backing if at all possible". The following illustrations demonstrate some of the backing maneuvers and procedures. Rear-ward visibility is limited to the mirrors, so the safe operator, does not have a spotter to assist in backing, will get out of the truck and look to make sure the way is clear. There is a "cone of danger" or blind spot immediately behind the truck which even the conical mirrors cannot cover. If in doubt when backing, stop, get out and take another look, pick a reference point to back towards, and use a spotter to assist you if possible. Use your mirrors, back up slowly, and don't lean out of the cab.

STRAIGHT LINE BACKING

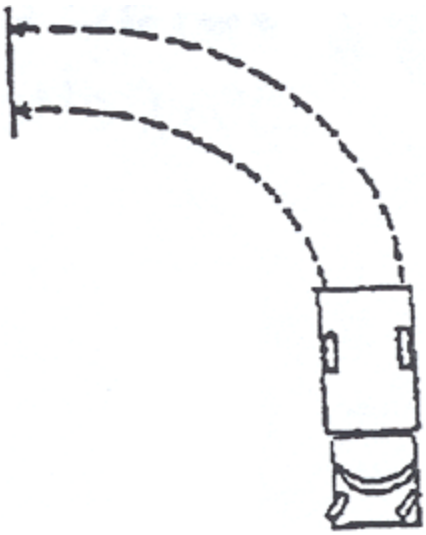
1. CHECK TO MAKE SURE AREA IS CLEAR.
2. PICK OUT A REFERENCE POINTS.
3. USE THE REAR VIEW MIRRORS AS MUCH AS POSSIBLE.

LEFT SIDE BACKING



1. POSITION TRUCK SO YOU CAN SEE:
2. PICK OUT A REFERENCE POINTS.
3. USE THE REAR VIEW MIRRORS AS MUCH AS POSSIBLE.

RIGHT OR BLIND SIDE BACKING



1. FOLLOW LEFT-SIDE BACKING PROCEDURES.
2. USE REAR VIEW MIRRORS AS LONG AS POSSIBLE.
3. LEAVE TRUCK AND REINSPECT AREA AS OFTEN AS NECESSARY TO RE-ESTABLISH REFERENCE POINTS.

Braking

The operator must become familiar with the basic function of "braking". One of the basic elements of operating a single axle or tandem dump truck is the ability to stop the vehicle in a safe and professional manner.

The objective of using the braking system is to slow down and stop the vehicle while in use. The emergency braking system is used only when the primary braking system has failed or when added braking power is required due to an unusual situation.

The first points that an operator must understand is that of gravity and motion. Gravity is known as weight being placed on an object and motion is the force at which an object travels through space. As a dump truck gains weight, the center of gravity is displaced by moving from a low point to a high point. In other words the weight being applied by the force of motion will shift from a low center of gravity (an empty dump truck) to a high center of gravity (a loaded dump truck). This shift in gravity will affect the motion that the vehicle is going and will require either more or less braking. The operator needs to consider how much space or cushion is needed to stop an empty or fully loaded dump truck.

The operator should keep the following steps in mind.

- Never slam, ride or habitually tap the brakes.
- Always look ahead and predict how much cushion you will need in order to stop the dump truck safely. Use the following formula to establish the proper braking distance.
    1. Perception distance (**Pd**)
    2. Reaction distance (**Rd**)
    3. Braking distance (**Bd**)

    Pd + **Rd** + **Bd** = **Total Stopping Distance**

- Never pump the brakes while driving at a high speed.
- The total Stopping distance is greater when the dump truck is loaded with materials. Materials may shift when operating the dump truck. This will have a direct effect on braking.

A fully-loaded truck may weigh upwards of twenty tons and will require much more energy or force to slow or stop than a lightly-loaded or empty vehicle. Always maintain the air pressure between 90 to 120 psi for maximum braking effort. Anticipate slowing and apply brakes sooner than you might otherwise expect. Watch the tachometer; down-shift when necessary; keep speed consistent with road traffic and weather conditions.

Rely on the braking effect of the engine to help control the speed when descending hills. Brakes will fade from overuse and air pressure may deplete. Operating the engine with a closed throttle and transmission/rear axle in reduced gear is the method that should be used to control speed downhill. If the selected gear will not hold the desired speed, an improper gear selection has been made. Come to a full stop and let the brakes cool. Then continue down the grade in a lower gear range.

Do not attempt to gear down if the engine has reached maximum speed (rpm) in any gear range since it will be impossible to shift into a lower gear. The common rule to follow in using the engine and transmission/rear axle to control vehicle speed is to select the same gear going down the hill that would be required to ascend the hill. There are some exceptions such as going down a short hill with good visibility and no hazards.

The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper low gear, the following is the proper braking technique.

1. Apply the brakes just hard enough to feel a definite slowdown
2. When your speed has been reduced to approximately 5 mph below your “safe” speed, release the brakes. This brake application should last for about 3 seconds.
3. When your speed has increased to your “safe” speed, repeat steps 1 and 2

For example, if your “safe” speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade

The Emergency brake should only be used when all other braking systems fail. Judgement on the operator's part will prevail over a given situation that may warrant the use of the emergency brake system.

Single or tandem axle dump trucks with air brakes, have an air brake system that is considered a "split system or dual system". The purpose of the split system is to provide a means of stopping the vehicle should a failure occur in either the primary or secondary brake system.

The two systems have separate air lines, air reservoirs, and air gauges. Both systems are activated simultaneously by the service brake pedal. Some vehicles have two gauges and some have two needles in one gauge. The primary system is for the rear brakes and the secondary system is for the front brakes. In the event, air pressure loss occurs in one system, the remaining system continues to provide braking action. **The vehicle must never be operated when a system failure has occurred**.

This means that if one of the systems does not charge up to between **90 and 120** psi. The operator should not use the vehicle until the system is repaired. **Under no circumstances will the operator or shop supervisor allow any dump truck to leave the shop, if one of the air pressure gauges does not register the proper air pressure.**

Single or tandem axle dump trucks with hydraulic brakes should note that the system uses a disc type with a split system piping. This system is known as the Hydro-Max Booster. It is a hydraulic assisted system that is powered by a hydraulic pump. The system also has a back-up power assist in the event of a malfunction in the hydraulic power pump system or loss of engine power. This back-up is electrically powered. The electric power back-up is designed to cycle whenever the engine is not operating and the key is in either the "ON" or "OFF" position.

If the vehicle is equipped with a split brake system, the operator is assured a reasonable brake control should one of brake system fails. If this should happen, the operator must utilize a longer brake pedal stroke to actuate the remaining brake system. Brake control of the vehicle will occur somewhere between the mid-position of the pedal travel and as the pedal approaches the floor board. An increase in pedal effort is required as the remaining section of the system picks up the vehicle load normally controlled when both systems are functioning. **Remember that the stopping distance may not be as short under the failed condition since only one section of the split system is operating. The vehicle should be operated only with extreme caution and return to the shop at once.**

Use the "Jacob Brake" that may be available in your dump truck to assist in braking. Most tandem dump trucks are equipped with a Jake Brake and should be used when going down hill or when appropriate. It is nothing more than a valve release that allows the compressed air from the engine piston chamber to escape.

Loading

Part of operating a dump truck, is the ability to load and unload materials from the dump bed. In order to accomplish this task the operator must become familiar with several steps required to load and unload from a dump truck. The loading capacity is different for single axle and tandem axle dump trucks. Prior to loading a dump truck, the operator must understand the principle of **G**ross **V**ehicle **W**eight. Gross Vehicle Weight is the total weight of a single vehicle plus its load.

Gross Vehicle Weight (G.V.W.)

Part of operating a single and tandem axle dump truck is knowing what the **G.V.W.** is for that vehicle. The **G.V.W.** varies among the units used by SHA and may be found either on the registration card, the driver's side door, or a placard somewhere in the cab. To get an average "empty" weight, go to a state weight scale station and record the "empty weight". Depending on the front end loader scoop and the weight of the material, the usual capacity of a single axle dump truck is about 1 1/2 to 2 scoops.

The objective is to stay within the weight limit of the established **G**.**V**.**W**. The driver should know the water-level volume of the body without sideboards. An example of a single and a tandem axle dump truck with average inside dimensions follows.

Single axle dump trucks	Tandem axle dump trucks
Length: 9.0 ft.	**L**ength: 14.0 ft.
Width: 7.0 ft.	**W**idth: 7.0 ft.
Depth: 2.08 ft.	**D**epth: 4.5 ft.

The volume may be calculated easily by multiplying the dimensions by each other and then dividing by 27 (cubic feet):

Single axle	Tandem axle
$\frac{9 \times 7 \times 2.08}{27}$ = 5 Cubic Yards.	$\frac{14 \times 7 \times 4.5}{27}$ = 16 Cubic Yards.

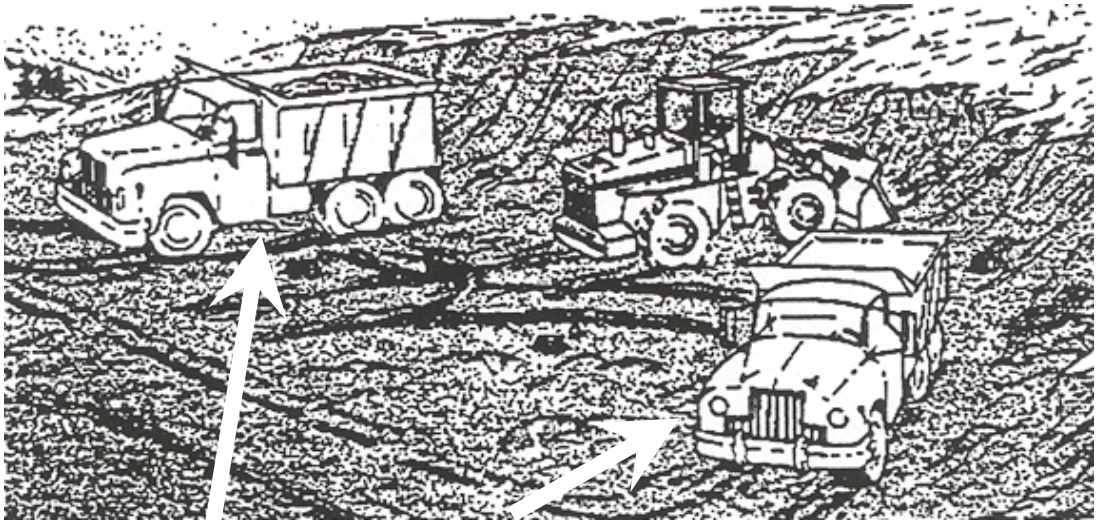
To complete the calculation, the operator must also have a general idea of the weight of material being loaded; for example, 3,000 pounds per c.y. for Graded Aggregated Sub-base (crusher run). Simply multiply the weight of the material in pounds per c.y. by the volume of the body in c.y.:

Single axle	Tandem axle
5 x 3,000: 15,000 pounds.	16 x 3,000 = 48,000 pounds.

Add this weight to the known empty weight to determine gross weight of the unit. If the gross weight exceeds the documented **G.V.W.**, the load must be lessened. The purpose of this calculation is to keep the weight of the material plus the vehicle weight below **G.V.W.**.

The Single axle dump truck is 33,200 **G.V.W.** and for the tandem axle dump truck it is 60,000 **G.V.W.**.

When working with a loader at a stockpile, position your truck so the loader operator does not have to make more than a 45-degree turn from the stockpile to the truck. If you get out of the truck, position yourself in front of and about 30 feet away from the truck. Stay within sight of the loader operator. (see illustration below)



Following a belt loader is one operation that requires continuous backing by the dump truck. It is a good and safe practice to use horn signals that both you and the loader operator are familiar with.

Maryland Motor Vehicle Law states that no part of the load may be within six inches of the top of the sideboards, unless the load is properly covered. SHA's policy, states that all loads be covered. A good practice would be to keep all material six inches below the top of the sideboards even when covered.

Dumping

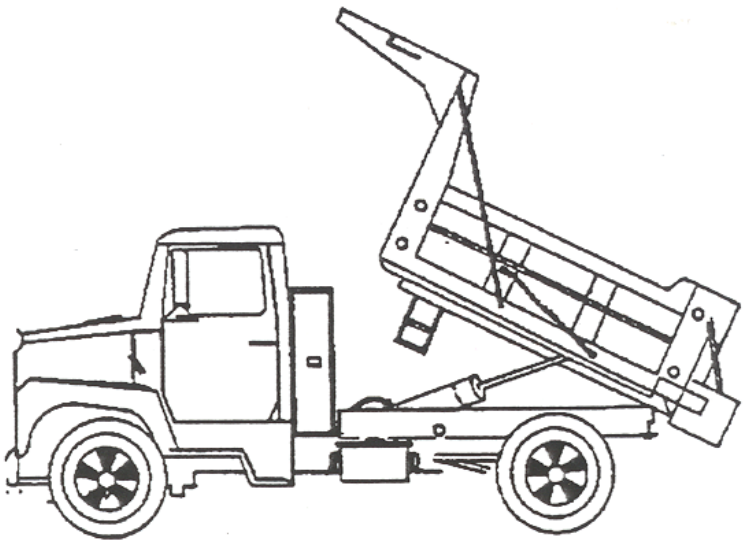
SHA vehicles are equipped with a constant-running hydraulic pump which powers all the hydraulically driven systems, eliminating the power-take-off control usually found in older trucks.

The hydraulic control levers are located to the right of the operator. The one closest to the operator is the dump body hoist control. Pull the lever to the rear to raise the dump bed and push the lever forward to lower it.

When dumping a load, the tailgate should be tripped before the body is raised. For single axle dumps pull the handle, located behind the driver's door, down to release the tailgate. The tandem axle dump truck has a tailgate release switch.

Increase engine rpm to raise the dump bed faster. Drive ahead to clear the pile after dumping and before lowering the dump bed. Lower the dump bed completely and re-latch the tailgate. On single axle dump trucks, move the tailgate lever up and check the tailgate hooks for a firm lock. For tandem dump trucks, re-engage the tailgate release switch. Once you have completed your dumping and the dump bed is secured, get out of the dump truck and brush off any loose material.

The operator may be required to spread the load while dumping. The depth of the spread is regulated by truck speed and adjusting the tailgate spreader chains. In a spreading operation, the bed is partially raised while the truck is driven ahead and the tailgate tripped to begin spreading. Continue to raise the body until the load is emptied. Know the approximate height of the body in both raised and lowered positions and be conscious of overhead obstructions.



DUMPING SAFETY

- Never dump with the truck parked sideways on a slope.
- Dump truck should be level as possible when dumping.
- Watch for overhead obstructions when dumping.

NOTE: Single axle dump trucks in use by SHA range in height from 9' to 11' to the top of the beacon with the bed down and from 14' to 18' with the bed raised. Tandem axle dump trucks range in height from 10' to 11' to the top of the beacon with the bed down and from 20' to 21' with the bed raised.

- Never drive down the road with an empty dump bed in the raised position.
- Always cover the load in the dump bed when traveling on public highways.
- Do not overfill the dump bed.
- Always latch the tailgate immediately after dumping.
- Always clean around and in back of the tailgate after loading and dumping.

Trailer Towing

Make a pre-trip inspection of the trailer before and after hooking to the towing vehicle. Inspect the pintle hook on the truck for cracks and loose or missing bolts. Make certain the retaining latch will close and lock in place. Check the truck rings used to hook the trailer safety chains.

Inspect the front of the trailer starting with the hookup ring. This point of contact must be free of defects to prevent separation of trailer from towing vehicle. Inspect the frame up to the trailer bed for any defects.

Inspect the safety chains for proper length which is long enough to support a tight turn but short enough so as not to drag on the ground. Check chains for weak links and hooks for safety latch. Make certain chains are large enough to support trailer weight should the trailer get disconnected. Safety chains are crossed (X) under the trailer frame and hooked to the truck's rings. Crossing the chains will provide support for the trailer in the event of a breakaway. Reference – Federal Motor Carrier Safety Regulations 393.70 (8)(i).

Inspect electrical connections for corrosion and broken prongs, and cable for exposed or broken wires.

Check the breakaway cable for ease of disconnect and that all trailer brakes engage. (See the reference – Federal Motor Carrier Safety Regulations below). Make certain the breakaway battery is fully charged and securely mounted on the trailer frame.

Inspect the rest of the trailer frame for cracks, rust, and broken welds. Check the trailer deck for debris, broken or missing boards, and steel support structure. Inspect the ramps if equipped.

Inspect the tires for tread depth, cuts, and proper inflation. Check the wheels (rims) for cracks and illegal welds. Check for loose or missing lug bolts and nuts.

Check all trailer lights for broken lenses and working status.

Federal Motor Carrier Safety Regulation

Each commercial motor vehicle must have brakes adequate to stop and hold the vehicle or combination of vehicles (e.g. truck and trailer). Reference – Federal Motor Carrier Safety Regulation § 393.40

Vehicles (trailers) equipped with an electric brake system must have a service brake system that meets the applicable requirements of § 393.42 (acting on all wheels), § 393.48 (operable at all times), § 393.49 (single valve to operate all brakes), and § 393.52 (able to stop in a specified distance).

Every commercial motor vehicle (includes trailers) shall be equipped with brakes acting on all wheels. The exception is any full trailer, semi trailer, or pole trailer (loaded or unloaded) with a gross weight of 3,000 pounds or less is not required to be equipped with brakes if the axle weight of the trailer does not exceed 40 percent of the towing vehicle's total weight. Reference – Federal Motor Carrier Safety Regulation § 393.42

Every trailer required to be equipped with brakes shall have brakes that apply automatically and immediately upon breakaway from the towing vehicle. All trailer brakes must apply upon breakaway from the towing vehicle. The brakes must remain in the applied position for at least 15 minutes. Reference – Federal Motor Carrier Safety Regulation § 393.43

Note: If the trailer has brakes, make sure they meet the above Federal Motor Carrier Safety Regulations.

Electric Trailer Brakes

Trucks towing a trailer with electric brakes should have a power adjust controller usually dash mounted within operator's reach. This device allows the operator to adjust the brake power output to match the weight placed on the trailer. The more weight on the trailer, the more the operator moves the adjustment bar up. Lock the trailer brakes and then move the adjustment bar down to a point just below where the brakes lock up.

Electric Breakaway System

The trailer must have an emergency battery backup system that provides electrical power to the brake magnets during the trailer breakaway brake activation process. This battery must have sufficient charge to activate and hold the electrical brakes for 15 minutes.

There is a breakaway switch with a pull pin and cable which, when attached to the tow vehicle, will provide electrical activation of the trailer brakes when the trailer disconnects from the tow vehicle.

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.

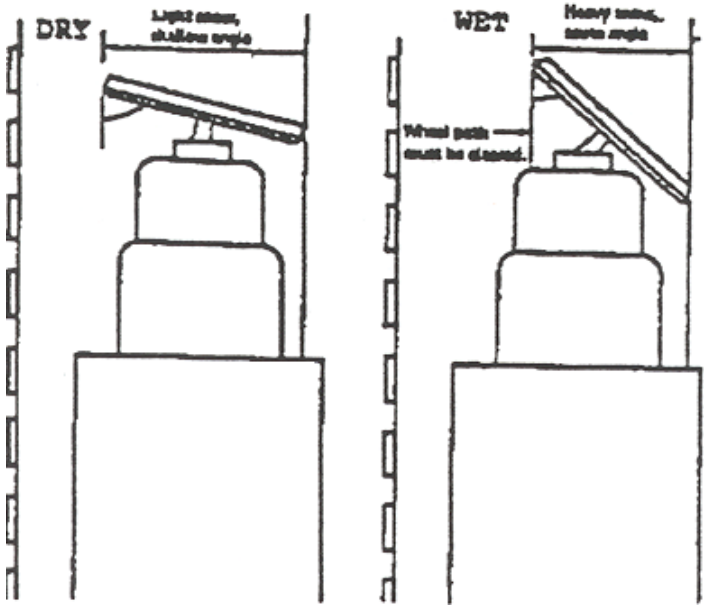
The plow blade must be inspected for wear or damage periodically before, during and after a storm. Blades wear unevenly (right-hand plows and reversible plows used continuously in the right-hand mode wear most rapidly on the left side. The opposite is true for left-hand plows or reversible plows used 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.



#1 #2

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.

DjGC15
GRANULAR SPREADER CONTROL SYSTEM

INTRODUCTION

The DjGC15 Closed Loop Spreader Control System is adaptable to most makes and models having hydraulically driven granular material spreaders. The system was designed to withstand the environmental conditions that exist in spreader applications. The system will provide automatic synchronization for the:

- application rate of spread material with the vehicle ground speed, regardless of the vehicle ground speed.
- direction of travel.
- hydraulic oil temperature.
- pressure variations.
- pump output.
- hydraulic motor wear.
- transmission gear selected (provided hydraulic oil demands are met).

The spread of material will be uniform as long as the vehicle ground speed is maintained within the control speed range of the spreader control system. The operator has complete control of the spreading operation from within the vehicle cab.

The Spreader Control System consists of four units:

- a control console which is installed in the vehicle cab within easy reach of the operator.
- a dual hydraulic control valve, which is installed in the hydraulic plumbing between the hydraulic pump and the feed mechanism and spinner hydraulic motors.
- a ground speed sensor, which provides vehicle ground speed information to the console.
- an application rate sensor, which is connected to the feed mechanism hydraulic motor shaft

The two sensors and the hydraulic control valve are connected to the control console by means of plug-in electrical cables. The control system receives its electrical power from the vehicle storage battery (requires+12VDC).

CONTROL CONSOLE SWITCH AND INDICATOR FUNCTIONS

POWER ON-OFF

Switch in the **ON** position supplies electrical power to the control console and backlights the indicators on the console panel. In the OFF position turns electrical power off.

AUTO-STATIONARY UNLOAD

Switch in the **AUTO** position provides automatic spreader operation with the application rate of material spread in proportion to vehicle ground speed. In the **STATIONARY UNLOAD** position the feed mechanism hydraulic motor runs at full speed. This allows the operator to unload the material with the vehicle either stationary or in motion. When in this mode, the **INACCURATE APPLICATION** indicator will be lighted and the audible alarm will sound.

SPREAD WIDTH

Knob sets the speed of the spinner motor. Position **1** provides minimum speed (minimum spread width), position **11** provides maximum spinner speed (maximum spread width).

APPLICATION RATE

Knob sets the amount of material to be spread. Position **1** provides a minimum flow of material; position **11** provides maximum flow. The proper setting for this knob is determined by an application rate chart.

SPREADER ON-OFF

Switch turns off feed mechanism and spinner hydraulic motors in the **OFF** position. In the **ON** position turns feed mechanism and spinner hydraulic motors on. Use of this switch allows the operator to stop or start spreading, as desired, without stopping vehicle or disengaging PTO.

INACCURATE APPLICATION

Indicator when lit indicates a fault condition such as excessive vehicle ground speed, PTO disengaged, hydraulic pump trouble, inadequate oil being pumped, **AUTO-STATIONARY UNLOAD** switch set to **STATIONARY UNLOAD**, or a system electrical or mechanical failure. The audible alarm will sound whenever this indicator is lit.

HOW TO USE APPLICATION RATE CHARTS

Make absolutely certain you are using the correct Application Rate Chart. Look at the decal on the left side of the console. The top number is the part number of the console. The bottom number is the chart number, which contains nine numbers. Make sure the numbers on your application rate chart are the same numbers that appear on the console decal. The chart number also contains a letter suffix and this letter denotes the spreader manufacturer and model number. Also make certain the spreader specifications on the chart matches your spreader.

Determine the amount of material to be spread per lane mile. If spread width is to be more than one lane, multiply the amount of material per lane mile by the number of lanes to be spread. Use this number in your application Rate Chart to find the desired ground speed and application rate setting.

SYSTEM CHECK

After the spreader control system has been installed, it must be checked to see that all functions will perform as required. This can be done with an empty spreader hopper. To check the system, proceed as follows:

A. System Check (without GSS-100 Simulator)

1. **DO NOT start vehicle engine**. On the control console set the **SPREADER** switch to **OFF, AUTO-STATIONARY UNLOAD** switch to **AUTO**, and the **POWER** switch to **ON.**

NOTE: If the control system power is through the vehicle ignition switch, turn the ignition switch on.

This step insures that the hydraulic control valve orifices are both closed (OFF). After a short period set **POWER** switch to **OFF**.

2. **IMPORTANT**: Remove everything from the Spreader Hopper. Make absolutely certain the Spreader Hopper and spinner mechanism is free of all debris, rocks, etc. The following procedure will cause the feed and spinner mechanisms to run and any debris left in the hopper or spinner could result in personal injury or damage to nearby equipment.

On the control console set the **APPLICATION RATE** knob to position **6, SPREAD WIDTH** knob to position **6, SPREADER** switch to **ON, AUTO-STATIONARY UNLOAD** switch to **STATIONARY UNLOAD**, and **POWER** switch to **OFF.**

3. Have an observer stationed near the rear of the vehicle. Start vehicle engine, maintain low rpm, and then engage PTO.

4. Increase engine rpm to normal operating range. Feed mechanism and spinner should remain stationary.

5. Set the console **POWER** switch to **ON**. The console **POWER** indicator and the **INACCURATE APPLICATION** indicator should light and the audible alarm should sound. Feed mechanism and spinner motors should start rotating.

6. Set **SPREADER** switch to **OFF**. Spinner should stop rotating, feed mechanism should continue to rotate and the alarm and **INACCURATE APPLICATION** indicator should still be on.

7. Set the **AUTO-STATIONARY UNLOAD** switch to **AUTO**, and **SPREADER** switch to **ON**. Spinner should start rotating and feed mechanism should stop. The alarm and the **INACCURATE APPLICATION** indicator should be off.

8. Rotate the **SPREAD WIDTH** knob to position **11**, spinner rotation speed should increase compared to position 6. Rotate the **SPREAD WIDTH** knob to position **1**, spinner rotation speed should decrease compared to position 6. Return **SPREAD WIDTH** knob to position 6.

9. Have an observer stationed in the rear of the vehicle where he can observe feed and spinner mechanisms while the vehicle is in motion. **OBSERVE ALL SAFETY PRECAUTIONS.**

10. Start vehicle in motion. The feed mechanism motor should start to rotate as soon as the vehicle is in motion. Increase vehicle speed; feed mechanism speed should increase. Decrease vehicle speed; feed mechanism speed should decrease. Spinner motor speed should remain constant at all engine speeds over 2000 rpm.

11. Maintain a steady vehicle ground speed and set the **APPLICATION RATE** knob to position **11**. Feed mechanism speed should increase compared to position 6. After feed mechanism speed steadies, set **APPICATION RATE** knob to position 1. Feed mechanism speed should be slower than the previous two positions.

12. Set the **APPLICATION RATE** knob to position **11**, then increase vehicle ground speed until the audible alarm sounds and the **INACCURATE APPLICATION** indicator lights. Decrease vehicle ground speed until the alarm goes silent and the **INACCURATE APPLICATION** indicator goes dark.

13. Maintain a steady vehicle ground speed (within the control speed range), then set the **SPREADER** switch to **OFF**. Feed mechanism and spinner motors should stop. Set **SPREADER** switch back to **ON**. Feed mechanism and spinner motors should start. This concludes the system check, set **SPREAD** switch to **OFF**. After feed mechanism and spinner motors stop, set **POWER** switch to **OFF.**

14. Check for oil leaks in the hydraulic system where the dual hydraulic control valve was installed.

B. System Check Using Optional GSS0100 Ground Speed Simulator (Recommended Method Of System Check)

The GSS-100 ground speed simulator is a test device which, when installed between the ground speed sensor and control console, provides the control system with two calibrated ground speed signals. The GSS-100 can be used for stationary checkout of the control console, hydraulic control valve, and application rate sensor.

NOTE: The use of the GSS-100 for calibration checks and troubleshooting is highly recommended to reduce the possibility of injury to personnel. Calibration checks and troubleshooting can be performed without the vehicle being in motion.

OPERATION DjGC 15 SYSTEM

Begin Spreading

1. Consult Application Rate Chart supplied with your spreader to determine setting of "Application Rate" knob, and gate opening.
2. Referring to your chart, on the next page, turn "Application Rate" knob to setting determined in step 1.
3. Set "Auto/Stationary Unload" switch to "Auto".
4. Set "Power" switch on "On". Power light should go on.
5. Turn "Spread Width" knob on console to desired setting.
6. Start truck engine and engage PTO.
7. Set "Spreader On-Off" switch to "On".
8. Check to see that conveyor runs when truck starts to move, and stops when truck stops.

Stop Spreading

Shut "Spreader switch "Off". Do Not Set "Power" Switch To Off. If "Power" switch is shut "Off" before "Spreader" switch is shut "Off", the spreader will continue to run at same speed it was running when "Power" was shut "Off".

Finished Spreading

1. Set "Spreader" switch to "Off".
2. Wait 20 seconds.
3. Set "Power" switch to "Off".
4. Disengage the truck PTO.

APPLICATION RATE CHART

GRANULAR TAILGATE CALIBRATION CHART

Model No. UAZ 111 and UTZ 110 DATE: 12-17-86 CALIBRATION CHART NO. 04049 048 00

APPLICATION RATE IN LBS. PER MILE WIDTH OF SPREAD DEPENDS ON SPINNER ADJUSTMENT FOR 1, 2 OR 3 LANES								
77 BLS. MATERIAL WT./FT.			LBS. MATERIAL WT./FT.			LBS. MATERIAL WT./FT.		
CONSOLE SWITCH SETTING	OPER. RANGE (MPH)	LBS. PER MILE	CONSOLE SWITCH SETTING	OPER. RANGE (MPH)	LBS. PER MILE	CONSOLE SWITCH SETTING	OPER. RANGE (MPH)	LBS. PER MILE
1	0-54	200	1			1		
2	0-54	300	2			2		
3	0-54	400	3			3		
4	0-50	600	4			4		
5	0-47	800	5			5		
6	0-45	1000	6			6		
7	0-45	1200	7			7		
8	0-44	1500	8			8		
9	0-36	1800	9			9		
10	0-31	2100	10			10		
11	0-27	2400	11			11		

1. Calibration for higher or lower density of materials: Take your density lbs. per cubic foot and divide it by 77 lbs. shown above. Then multiply this by lbs. per mile. Ex.: Your density is 85 divided by 77 = 1.1039 x 200 lbs. mile = 221 lbs. (Fill in extra chart)

2. Calibration for two or more lanes: After desired application rate is determined for one lane spread per mile. Multiply this number by number of lanes and match lbs. per mile to switch setting.

3. Gear Ratio: - - - - - - - - 1.6 to 1
4. Anger Sprocket:- - - - - 16 (tooth)
5. Hyd. Motor Sprocket: - 10 (tooth)
6. Lbs./Rev.: - - - - - - - - - 7.5
7. Anger:- - - - - - - - - - - - (6.38 Dia.)
8. Hyd. Motor:- - - - - - - - AM/17.9 cu. inc./Rev.
9. Graph No.: - - - - - - - 4

Emergency Shutdown While On "Auto Setting"

1. Disengage PTO, or if truck has bank valve, move spreader valve lever to "Off" position. Conveyor and spinner will stop immediately. Alarm and "Inaccurate Application" light may come on.
2. Set "Spreader" switch to "Off".
3. Wait 20 seconds.
4. Set "Power" switch to "Off".
5. To resume spreading, follow steps "To Begin Spreading".

Unloading

1. Spreader may be unloaded while truck is moving or setting still.
2. Turn console "Spread Width" knob to "1".
3. Set "Auto/Stationary Unload" switch to "Stationary Unload".
4. Start truck engine and maintain normal operating RPM.
5. Set console "Power" switch to "On", spreader will run at maximum speed.
6. When finished unloading, set "Auto/Stationary Unload" switch to "Auto".
7. Wait at least 20 seconds.
8. Set "Power" switch to "Off".

Spot Sanding

1. While truck is moving and spreader is operating on "Auto" settings, set "Power" switch to "Off". Spreader will continue to run but conveyor will no longer speed up or slow down automatically as truck speeds up or slows down.

2. Move truck bank valve "On-Off" lever to "On" or "Off" to start or stop spreader as desired.

3. To return to "Auto" spreading, move "ON-Off" lever on bank valve to "On", and set console "Power" switch to "On".

Operating Suggestions

1. Always refer to the Application Rate Chart for maximum truck speed to use, and the "Application Rate" setting to use on the console.

2. Do not drive faster than the maximum speed shown on the Application Rate Chart for the type and amount of material being spread.

3. Using high gear, so less oil will be pumped, which in turn may cause less materials to be spread than what is required.

NOTE: The inaccurate spread alarm will sound.

4. When spreading large amounts of material per mile, use a slower truck speed. Refer to the Application Rate Chart to see what the truck speed range is for a particular amount of material spread per mile.

5. For V-box spreaders, when spreading large amounts of materials per mile than those shown on the Application Rate Chart, increase the gate opening.

6. Use the manual override control on the valve only when absolutely necessary.

Maintenance and Storage

- A light coating of grease spread on all exposed metal parts will help prevent corrosion.
- Cables and components should be kept as clean as possible.
- When removing a spreader, mark the spreader so that it will be replaced on the same truck.
- Dust caps should be snapped over cable connectors whenever cables are disconnected.
- Cables should be coiled and fastened to the truck frame, in an area where they will not be damaged when the spreader is removed from the truck.
- Clean quick disconnects before taking apart or connecting
- Grease all grease fittings.
- Grease pump shaft U-joints.
- Oil or grease spinner hinge rod.
- Check gear boxes for proper lubrication level (add SAE 90 gear lubricant).
- Hose down and clean spreader after each use.
- Repainting or oiling after each season will greatly prolong spreader life.
- Spreader trough should be kept empty to prevent material from freezing around conveyor in severe cold weather.

DjICS2000 ICE CONTROL SYSTEM

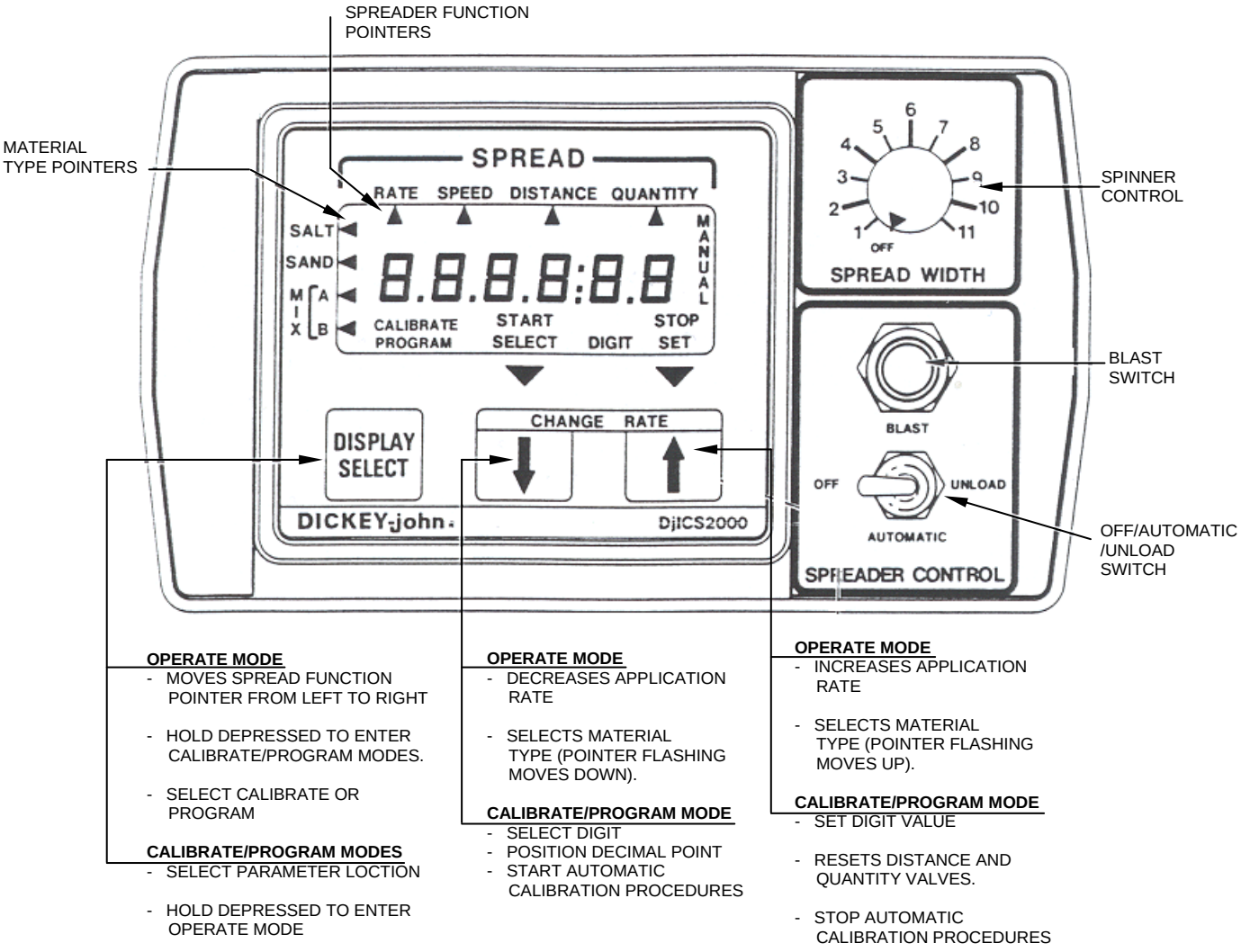
INTRODUCTION

The Dickey-john ICS 2000 Ice Control System was designed to maximize the efficiency of a spreading operation. This Control System with its microprocessor based electronics provides total automatic control of the spreader. Once the desired application rate has been programmed, the system locks it in. The flow of product varies automatically in proportion to changes in ground speed so the application rate remains uniform. Spreading automatically starts when the vehicle begins to move and automatically stops when the vehicle stops.

The ICS 2000 Ice Control System consists of four major components; a control console, a valve actuator (driver), a ground speed sensor, and an application rate sensor. The control console is installed in the vehicle cab within easy reach of the operator. The valve actuator is installed on the hydraulic control valve where it can control the speed of the conveyor motor and spinner motor. The ground speed sensor is installed where it can sense the ground speed of the vehicle (NOTE: There are two types of ground speed sensors available; (1) in line speedometer drive sensor, (2) electronic speedometer adapter.) The application rate sensor is installed on a rotating shaft to sense the speed of the conveyor

The control console receives signal inputs from the ground speed sensor and application rate sensor and compares these signals to the programmed application rate. If the input signals do not compare to the programmed application rate, an output from the control console drives the hydraulic control valve in the direction required to maintain a uniform application rate.

OPERATOR CONTROLS (OPERATE MODE)



DISPLAY SELECT

This switch selects the quantities that are read out on the display. When spreading, the selectable readouts are RATE (application rate), SPEED, DISTANCE SPREAD, and QUANTITY SPREAD. If more than one material type (SALT, SAND, MIX A or MIX B) is to be spread, the DISPLAY SELECT switch also selects the change material pointer function.

CHANGE RATE (↓ ↑ SWITCHES)

The ↓ and ↑ switches are used to change the application rate by the amount, as programmed, in the direction indicated by the switch arrow.

In the Change Material Pointer Function, the ↓ and ↑ switches are used to move the pointer up or down consistent with the arrow direction.

SPREADER CONTROL Switch – Three position switch.

OFF Position – Shuts spreader and spinner off.

AUTOMATIC Position – Provides automatic spreading control based on vehicle ground speed.

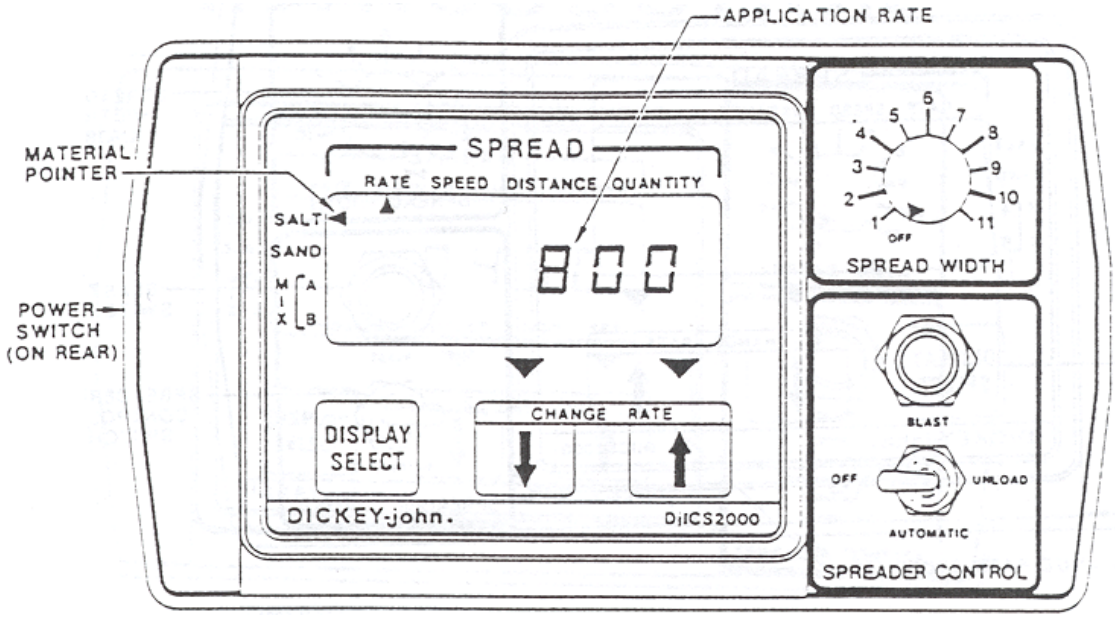
UNLOAD Position – Provides a command that causes the Feed Mechanism to run at maximum speed.

BLAST Switch – Provides a command that causes the spreader to run at the programmed BLAST application rate.

SPREAD WIDTH Knob – This knob adjusts the spinner speed.

POWER Switch – Applies battery power to the control system.

AUTOMATIC MODE



Step 1. Set the SPREADER CONTROL switch to OFF, POWER ON/OFF switch to ON (rear of console).

Step 2. Check material pointer position. If not in correct position refer to MATERIAL POINTER POSITIONING on page 6-17.

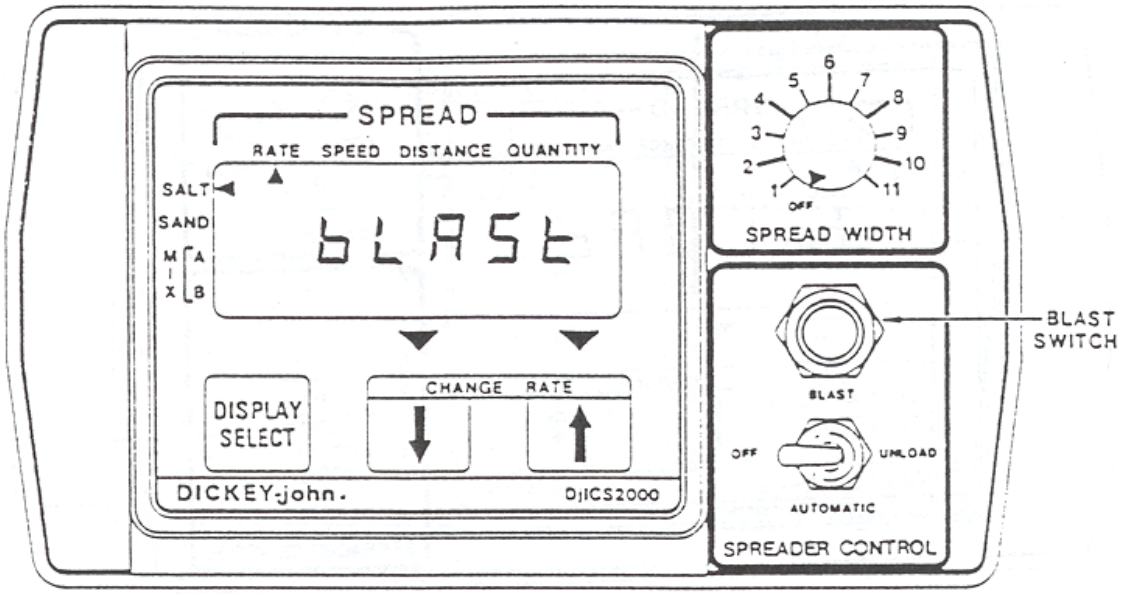
Step 3. Set application rate using the CHANGE RATE (↓, ↑) touch switches. To increase the programmed application rate use the ↑ switch. To decrease the programmed application rate use the ↓ switch.

Step 4. Start vehicle engine, engage PTO and bank valve section lever (if applicable). Drive to start of spread route.

Step 5. To begin spreading, set the SPREADER CONTROL switch to AUTOMATIC
and if necessary set SPREAD WIDTH knob to desired spinner speed. Spreader and spinner will begin operation when vehicle moves and will stop when vehicle stops. To stop spreading set the SPREADER CONTROL switch to OFF.

Step 6. You may select the desired display readout using the DISPLAY SELECT touch switch. The pointer at the top of the display points to the name of the function displayed; RATE, SPEED, DISTANCE or QUANTITY.

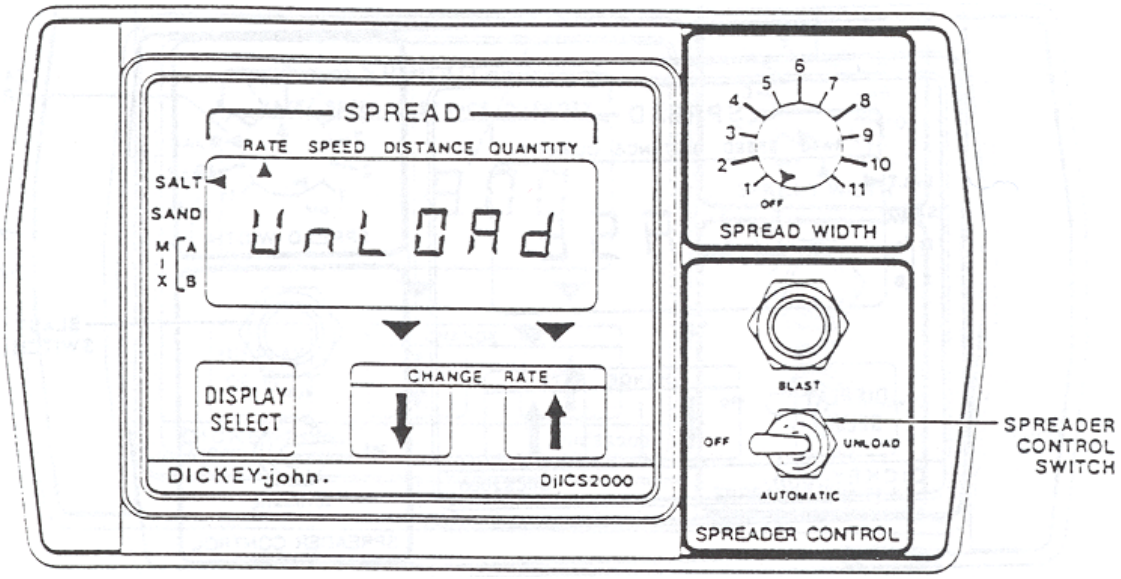
BLAST MODE



Pushing the BLAST switch forces the spreader to operate at the programmed blast application rate. Blast is active for both stationary and moving vehicle conditions. It is active only while the switch is held on.

NOTE: Spot spreading can be accomplished by using the AUTOMATIC MODE (Automatic Application Rate) or by using the BLAST MODE (BLAST Application Rate).

UNLOAD MODE

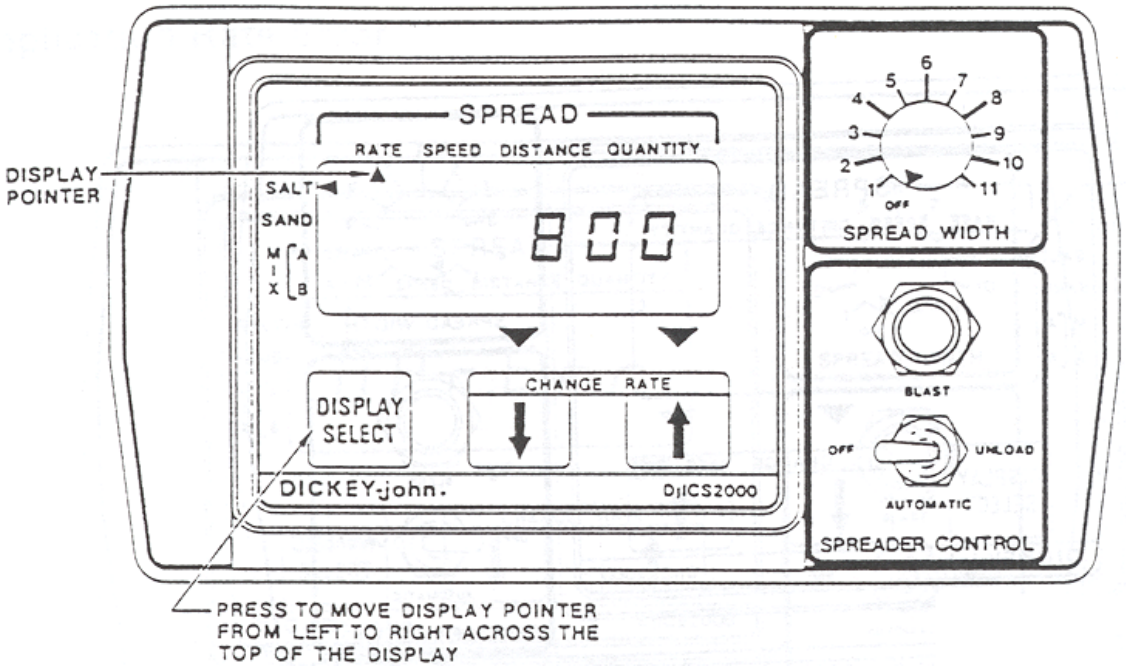


Holding the SPREADER CONTROL switch in UNLOAD causes the spreader to run at full capacity. This mode can be accessed by holding the SPREADER CONTROL switch in the UNLOAD position when the vehicle is stopped. NOTE: The UNLOAD MODE cannot be accessed when the vehicle is moving. The message UNLOAD will appear on the display and flash for 3 seconds after which the display stops flashing and the SPREADER CONTROL switch can be released.

The UNLOAD function can be turned off by setting the SPREADER CONTROL switch to OFF. Also if ground speed is greater than 5 MPT (KPH) for 10 seconds the control system will return to the AUTOMATIC mode.

The SPREAD WIDTH control is used to set the speed of the spinners.

DISPLAY READOUTS



SPREAD RATE – Displays the current application rate in pounds/mile (kilograms/kilometer).

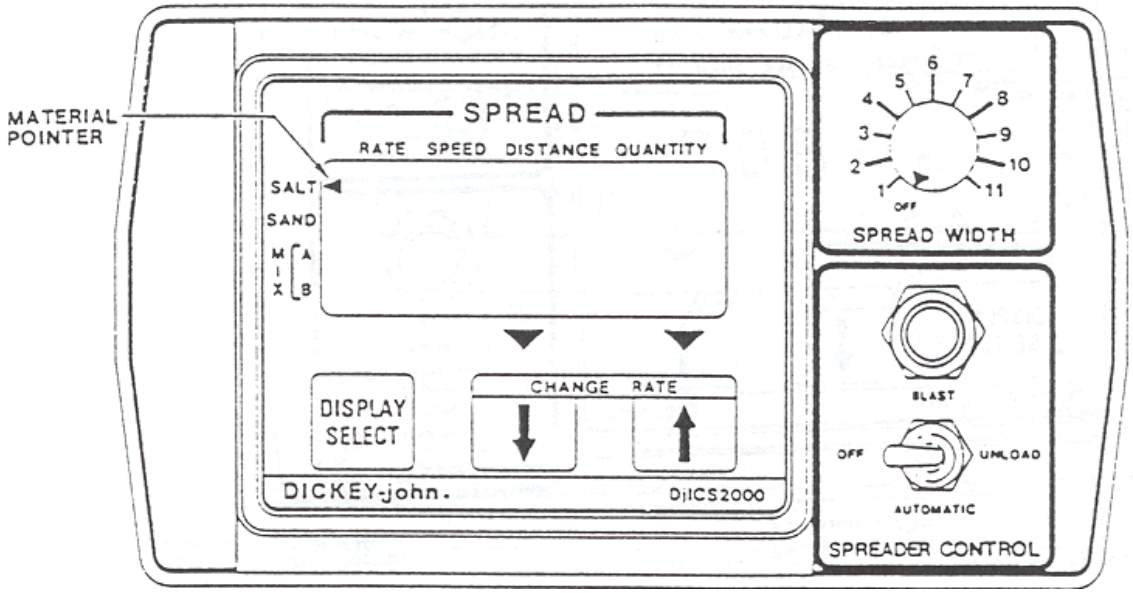
SPREAD SPEED – Displays the current vehicle ground speed in MPH (kph).

SPREAD DISTRANCE – Displays the accumulated in miles (km) since the last reset.

SPREAD QUANTITY – Displays the accumulated quantity in tons (metric tons) since the last reset.

NOTE: Spread Distance and Quantity are accumulated separately for each Material Type (SALT, SAND, MIX A and MIX B).

MATERIAL POINTER POSITIONING



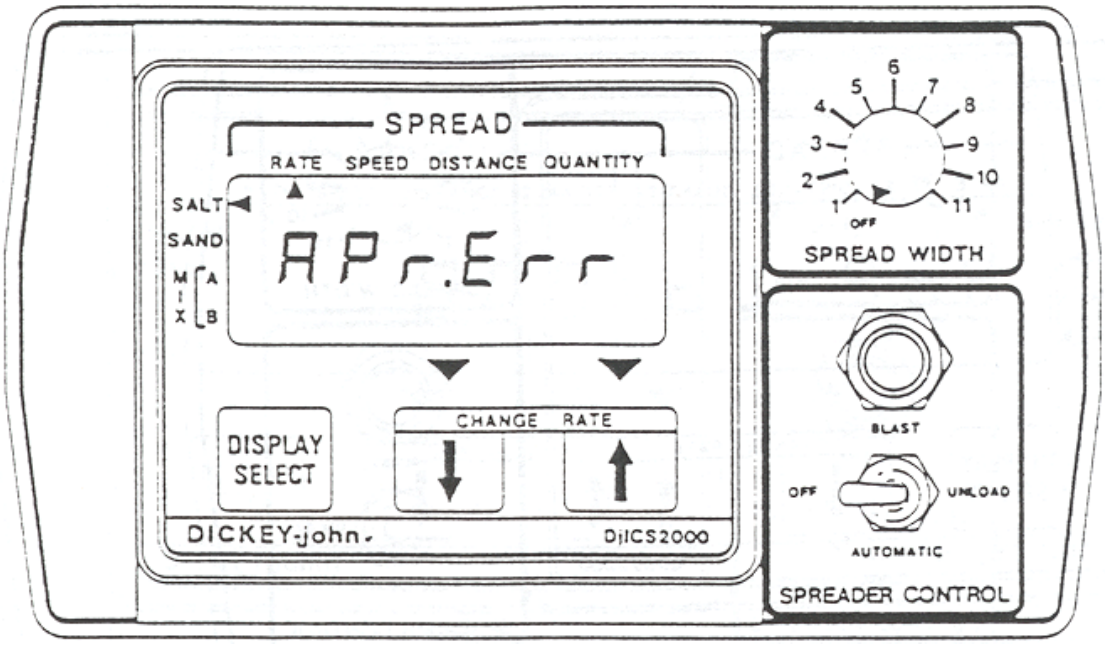
Step 1. Vehicle must be stopped with the SPREADER CONTROL switch in the OFF position.

Step 2. Use the DISPLAY SELECT touch switch to select Material Pointer Position. Note that each time you press the DISPLAY SELECT touch switch, the display pointer moves to the right. Continue pressing the DISPLAY SELECT touch switch until the display looks like the above illustration. NOTE: The only thing on the display will be a "flashing" Material Pointer.

Step 3. Use CHANGE RATE (↓, ↑) touch switches to position the Material Pointer to the material you will be spreading.

When the Material Pointer is properly positioned, press the DISPLAY SELECT touch switch, you are now ready to begin automatic spreading. NOTE: When the console receives ground speed or the SPREADER CONTROL is set to AUTOMATIC the display will go to the RATE position.

DISPLAY WARNINGS AND ALARMS



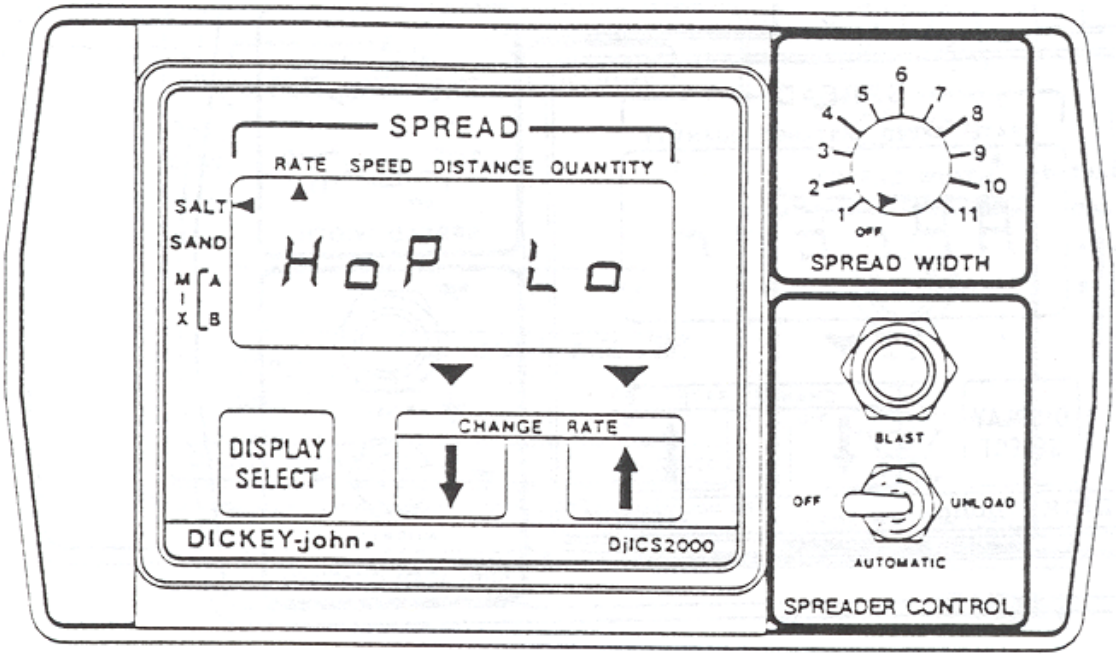
APPLICATION RATE ERROR

APpr.Err (Application Rate Error) – This message is displayed in all operator modes when the spreader is at full capacity (valve has opened fully and the system can no longer regulate to the target application rate). The message is displayed for 2 seconds out of every 6 seconds and is accompanied by the audible alarm.

If this condition exists, slow vehicle down until the display and alarm conditions no longer occur.

IMPORTANT – If slowing down does not help, there could be a hydraulic system malfunction.

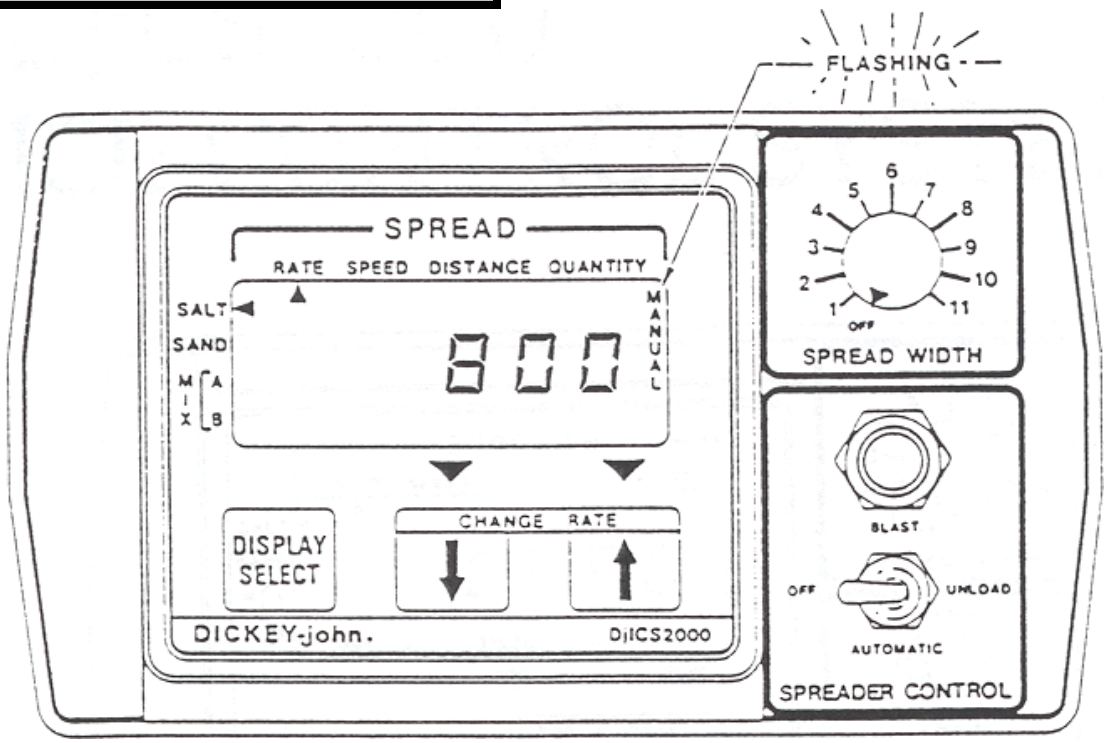
HOPPER LOW ALARM (OPTIONAL)



This alarm applies only if the optional hopper level sensor is installed.

HoP Lo (Hopper Low) – This message is displayed in all operate modes when the contents of the hopper is low enough to uncover the hopper level sensor. The message is displayed for 2 seconds accompanied with a ¼ second burst from the audible alarm every 90 seconds.

FLASHING "MANUAL" DISPLAY



The Control System has an automatic override function, which occurs in the event of a loss of the feedback sensor signal. Under this condition, the Control System reverts automatically from closed loop to open loop operation. This allows you to continue spreading until the condition is corrected.

If "MANUAL" begins to flash on the display: Check to see if the conveyor/auger is still running.

1. If conveyor/auger appears to be operating normally:
    a. Continue spreading.
    b. Report the display to the mechanic after the route is completed.

2. If conveyor/auger is not running:
    a. Check to make sure PTO is engaged.
    b. Turn SPREADER CONTROL to "OFF".
    c. Check for jammed conveyor/auger.
    d. Check for hydraulic system failure.

Techniques and Procedures

Shop policy will determine if the truck operators or the loader operator keeps an accurate load count for inventory control. Unused salt is to be returned to where it was obtained for inventory accuracy.

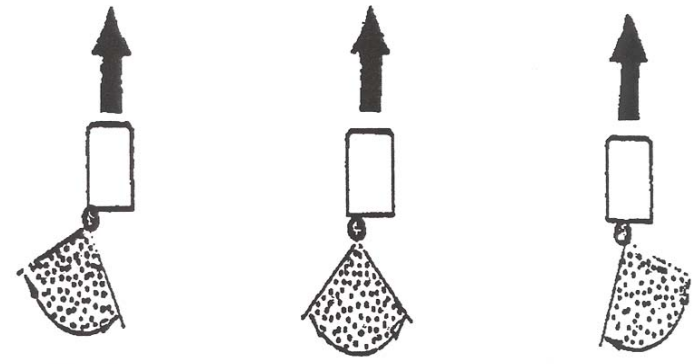
All personnel involved with material loading are to be advised as to who is authorized to obtain materials, particularly which hired trucks are actually working for SHA to prevent the loss of materials due to theft during the confusion of a storm.

When spreading any material, the main idea is to use no more than is necessary to correct conditions. The only reason for applying salt in a snow storm is to form a brine solution to either break the bond of the snow from the road, or to prevent one from forming. Snow that remains on the road and is compacted by traffic forms a condition called "snowpack". This compacted snow is very difficult to remove by any method and may take many hours of repeated plowing to remove.

Salt spreading should NOT begin until at least ½ inch to 1 inch of snow has accumulated on the roadway. This will reduce the overall loss of salt due to bouncing, traffic, and wind. The operator must restrict the use of salt to the correct pounds per lane mile. This rate will vary from 300 to 500 pounds during the first application. If later applications are required, tests have shown that as little as 100 pounds is effective. It may take between ½ and 1 hour for a brine solution to form before the road should be plowed.

When spreading material on a two lane roadway, it is a good practice to salt the center portion of the road (crown) by using the "left" spinner setting. Most of the material should stay in the wheel path where it does the most good. Salting should be done on the high side of banked curves to allow the melting snow to run down hill to mix with the untreated snow.

The salting pattern (illustrated below) can be accomplished by loosening the set screw and moving the spinner right or left along the bar.



Salt loses much of its effect below 20 degrees and stops working altogether at -6 degrees. Salt does not really melt snow/ice but lowers the freezing point of water. Once the brine solution is formed (about 23% salt), it is at its lowest possible temperature. The addition of more salt could actually raise the freezing point, and the roadway "ice over".

Calcium chloride will generate heat and melt snow/ice. This chemical, when mixed with water and placed on the road will continue working until a temperature of –67 degrees is reached.

Any type of abrasive does nothing to melt either snow or ice. Its sole purpose is to provide traction for vehicles.

6. TANDEM DUMP TRUCK OPERATIONS

The purpose of this section is to introduce the FMT III candidates to the basic operations of the tandem axle dump truck. The initial safety and preventive maintenance procedures required for the tandem dump truck are the same as the single axle dump truck.

Transmissions

When engaging the clutch, always start in the proper gear. An empty truck can be started in a higher gear than a fully-loaded one. Starting in a gear too high for the load or grade can cause clutch slippage that will cause too much heat and unnecessary wear. A gear that will start the vehicle moving with the engine at idle speed is usually correct.

Load and grade conditions permitting, the common practice of starting in a higher gear and/or axle speed is okay for units equipped with organic composition clutch facings, which have a longer slip period. Ceramic clutch facings with shorter slip periods are less forgiving, and if misused can deform the flywheel, in addition to the facing and pressure plate.

When starting to move, it is important that the clutch be fully engaged with the engine at idle RPM, then accelerated. Do not slip the clutch by raising engine RPM and riding the clutch. Erratic engagement can cause engine stalling and potential serious damage to the units drive train components (i.e. transmission, drive shaft, rear axle).

Don't shift until the tractor has reached the proper speed. Upshifting before the unit has reached the right speed is almost as bad as starting in too high a gear. When the difference between the vehicle speed and the engine speed is too great, the clutch is forced to slip, resulting in extra heat and wear. All trucks are equipped with tachometers, which show engine RPM and all engines are equipped with governors to prevent engine speeds in excess of the desired maximum or below a predetermined idle rate.

A veteran operator may know by the sound of the engine when to shift to a higher gear. A novice operator should observe the tachometer and upshift at the ideal engine rpm. This is usually between 1200 and 1500 rpm.

Under load on a level road, maintain engine RPM at about 90% of governed engine speed for adequate power and best fuel consumption.

It may be necessary to downshift to a lower gear when the load pulls the engine RPM down, when climbing a hill. The shift point differs from unit to unit. A starting point is to downshift before the engine tachometer falls below 1300 rpm.

Downshift before the engine actually pulls down to shifting speed on a steep uphill grade, because the truck will lose speed while shifting gears. Failure to downshift at the right time will result in the engine failing to reach full power and make another downshift necessary.

The diesel engine is effective as a brake in a downhill operation, but care must be exercised not to over speed the engine going downhill. "Watch that tachometer"! The governor has no control over engine speed when it is being pushed by the load. Operating an engine beyond maximum governed speed can cause severe damage. Use a combination of brakes and gears to keep the vehicle under control at all times and keep the engine speed below rated governed RPM.

Do not attempt to gear down while going down hill. This can prove to be very difficult and dangerous because the truck will pick up speed as soon as you push the clutch in. The faster the truck's ground speed, the higher the engine and transmission rpm must be to get into a lower gear. The transmission must be in neutral with the clutch released while the engine rpm is increased to match the truck's ground speed. Once the ground speed surpasses the possible governed engine speed, it will be impossible to down shift. If you find yourself in this situation, return to a higher gear. A higher gear is better than no gear at all.

Never coast with the clutch disengaged! This can cause clutch failure by the very high rpm encountered when coasting and releasing the clutch in gear. This can result in over 10,000 rpm, which is beyond the bursting strength of facing material.

Never turn off the ignition while going downhill! With the engine still in gear, fuel pressure will build up against the shut-down valve and may prevent it from opening when the ignition is turned on.

In order to properly upshift or downshift you must use the following procedure, known as **"double clutching"**.

Upshifting

1. Depress the clutch pedal to disengage the clutch.
2. Shift the transmission into NEUTRAL.
3. Release the clutch pedal.
4. Depress the clutch pedal immediately and shift into the desired gear.
5. Release the clutch pedal to engage the clutch.

Downshifting

1. Depress the clutch pedal to disengage the clutch.
2. Shift the transmission into NEUTRAL.
3. Release the clutch pedal.
4. Accelerate the engine rpm to synchronize the ground speed with the lower gear.
5. Depress the clutch pedal and immediately shift into the desired lower gear.
6. Release the clutch pedal to engage the clutch.

Road Ranger Transmission

Models in this series provide nine forward speeds and two reverse, consisting of five-speed front section and a two-speed range or auxiliary section.

The LO ratio in the front section is used only as a starting gear. The other four ratios are used once in Low Range and once again in High Range.

After shifting out of LO, you use the easy Road ranger repeat "H" shift pattern. Low Range and High Range are selected with the Range Control Knob. It is used once during the upshift sequence and once during the downshift sequence.

Always pre-select the range shift as shown in the detailed instructions. After pre-selection, the transmission will automatically make the synchronized range shift as the shift lever passes through neutral.

Detailed Shifting Instructions

In the following instructions, it is assumed that the driver is familiar with operating heavy-duty trucks and tractors, and can coordinate the movement of the shift lever and clutch pedal to make smooth gear engagements while upshifting or downshifting. Always double-clutch when making lever shifts.

Upshifting

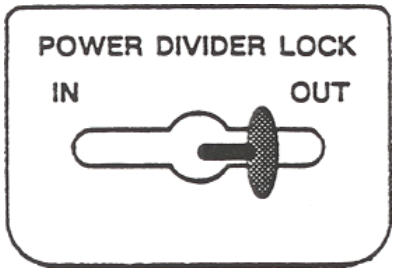
1. Move the gear shift lever into neutral.
2. Start engine and wait for the vehicle's air system to reach normal line pressure.
3. Make sure the Range Pre-selection Lever is DOWN in the LOW range position.
4. With the clutch disengaged, move the shift lever to the LO speed gear position.
5. Release the clutch pedal to start vehicle moving.
6. Upshift, double-clutching, from LO through 1st, 2nd, 3rd, and 4th while in Low Range.

7. PULL UP the Range Pre-selection Lever and move the shift lever, double-clutching, to the 5th speed gear position. As the shift lever passes through neutral, the transmission will automatically shift from Low Range to High Range.
8. Continue upshifting, double-clutching, from 5th through 6th, 7th, and 8th gear while in High Range.

Downshifting

1. Move the gear shift lever, double-clutching, from 8th through 7th, 6th, to 5th while in High Range.
2. PUSH DOWN the Range Pre-selection Lever and move the shift lever, double-clutching, to the 4th speed gear position. As the shift lever passes through neutral, the transmission will automatically shift from High Range to Low Range.
3. Continue downshifting, double-clutching, from 4th through 3rd, 2nd and 1st to LO while in Low Range.

Tandem axle Power Divider



The tandem axle power divider or inter-axle differentials in the forward rear axle are controlled by the dash mounted power divider lock switch.

Under normal highway conditions (good traction), the power divider lock switch should be in the OUT position. This will allow for the differential action between the forward, rear-axle and the rear, rear-axle, which will prevent the inter axle differential from wearing down.

The power divider lock (PDL) should be in the IN position to prevent the inter-axle differential action when operating on slippery surfaces (poor conditions). The idea behind the PDL is to allow better traction capability within the tandem axles and reduce the slipping of the tandem in less than normal conditions.

Remember to switch the PDL to the IN position **ONLY** when the tandem has come to a complete stop or when moving in low low gear. **NEVER** try to switch the PDL in the IN position while the wheels of the tandem are spinning.

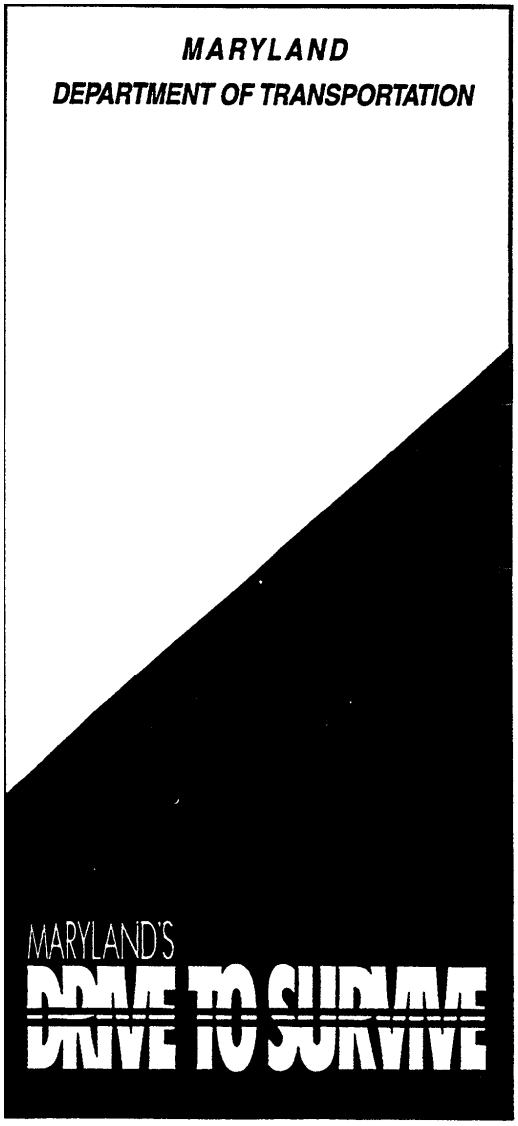
Do not operate the PDL in the IN position on dry pavement (good condition). This will result in excessive tire wear and premature axle wear.

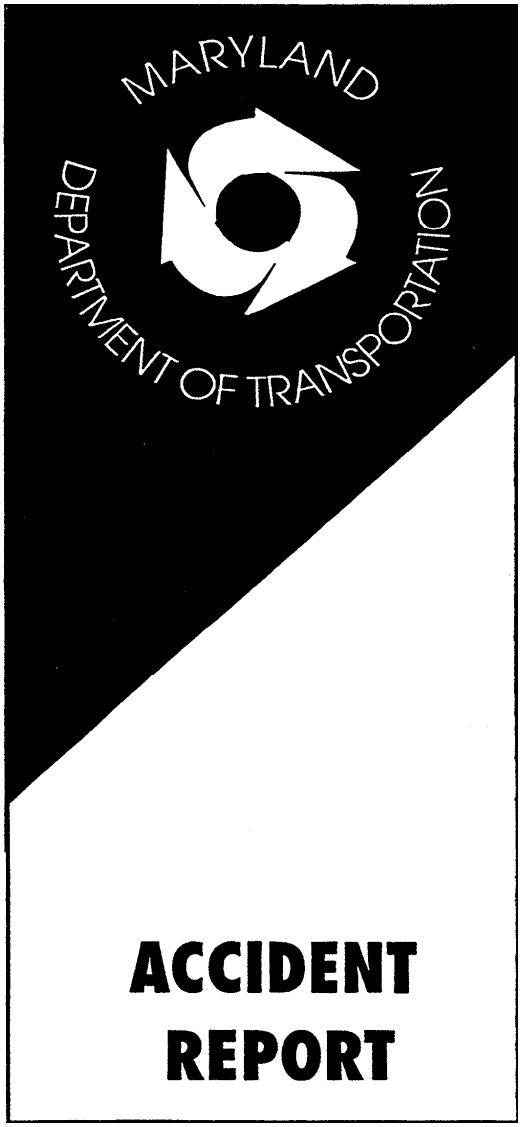
Never attempt to engage the PDL switch to the IN position while shifting from one range to the next. The PDL must be switched only when in low range and at low-low gear.

Remember that the PDL is used only when traction is poor, slippery and in rough terrain.

7. APPENDIX

Accident Report





IN CASE OF TRAFFIC ACCIDENT

1. Stop immediately. Keep calm.
2. Warn oncoming traffic.
3. Help the injured. Do not render first aid unless you are trained. Call a doctor or ambulance if necessary.
4. Do not argue, accuse anyone, nor make any admission of blame for the accident.
5. Call appropriate law enforcement agency (highway patrol, police, sheriff, or other authority).
6. Get the information called for in this booklet.
7. For information on forms, reporting, etc., see instruction sheet in your accident kit.

Your vehicle is designated as No. 1 in all sections of this booklet.

1. GET NAMES & LICENSE NUMBERS

STATE VEHICLE NO. 1

DRIVER'S FULL NAME

ADDRESS

CITY – STATE – ZIP

DATE OF BIRTH	SEX	DRIVER'S LICENSE NO

YEAR & MAKE OF CAR

VEHICLE ID#

LICENSE NO.	YEAR	STATE

OWNER

ADDRESS

CITY – STATE – ZIP

INSURANCE CO. & POLICY NO.

PHONE HOME
BUSINESS

OTHER VEHICLE NO. 2

DRIVER'S FULL NAME

ADDRESS

CITY – STATE – ZIP

DATE OF BIRTH	SEX	DRIVER'S LICENSE NO.

YEAR & MAKE OF CAR

VEHICLE ID#

LICENSE NO.	YEAR	STATE

OWNER

ADDRESS

CITY – STATE – ZIP

INSURANCE CO. & POLICY NO.

PHONE HOME
BUSINESS

OTHER VEHICLE NO. 3

DRIVER'S FULL NAME		
ADDRESS		
CITY-STATE-ZIP		
DATE OF BIRTH	SEX	DRIVER'S LICENSE NO.
YEAR & MAKE OF CAR		
VEHICLE ID#		
LICENSE NO.	YEAR	STATE
OWNER		
ADDRESS		
CITY-STATE-ZIP		
INSURANCE CO. & POLICY NO.		
PHONE HOME BUSINESS		

OTHER VEHICLE NO. 4

DRIVER'S FULL NAME		
ADDRESS		
CITY-STATE-ZIP		
DATE OF BIRTH	SEX	DRIVER'S LICENSE NO.
YEAR & MAKE OF CAR		
VEHICLE ID#		
LICENSE NO.	YEAR	STATE
OWNER		
ADDRESS		
CITY-STATE-ZIP		
INSURANCE CO. & POLICY NO.		
PHONE HOME BUSINESS		

2. GET NAMES OF WITNESSES

WITNESSES

1. FULL NAME	
ADDRESS	
CITY-STATE-ZIP	
TELEPHONE NO.	BIRTHDATE
2. FULL NAME	
ADDRESS	
CITY-STATE-ZIP	
TELEPHONE NO.	BIRTHDATE
3. FULL NAME	
ADDRESS	
CITY-STATE-ZIP	
TELEPHONE NO.	BIRTHDATE
4. FULL NAME	
ADDRESS	
CITY-STATE-ZIP	
TELEPHONE NO.	BIRTHDATE

POLICE

OFFICER'S NAME	BADGE NO.
REPORT NO.	STATION

Citation (ticket) given to: ☐ You ☐ Other

3. GET NAMES OF ALL OCCUPANTS

CAR OCCUPANTS

FULL NAME

ADDRESS

CITY-STATE-ZIP

CAR NO.	AGE	SEX	INJURED
			☐ YES ☐ NO

TAKEN TO

FULL NAME

ADDRESS

CITY-STATE-ZIP

CAR NO.	AGE	SEX	INJURED
			☐ YES ☐ NO

TAKEN TO

FULL NAME

ADDRESS

CITY-STATE-ZIP

CAR NO.	AGE	SEX	INJURED
			☐ YES ☐ NO

TAKEN TO

FULL NAME

ADDRESS

CITY-STATE-ZIP

CAR NO	AGE	SEX	INJURED
			☐ YES ☐ NO

TAKEN TO

4. GET THE DETAILS

DETAILS

DATE	TIME A.M. P.M.

LOCATION-STATE

CITY

STREETS

SPEED OTHER: M.P.H.	YOURS: M.P.H.

VEHICLE DAMAGE

YOURS:

OTHER:

5. TELL WHAT HAPPENED

If more space is needed attach separate sheet to this booklet

STATE OF MARYLAND INSURANCE INFORMATION

The State is self-insured. If you or your attorney wish to file a claim, please contact:

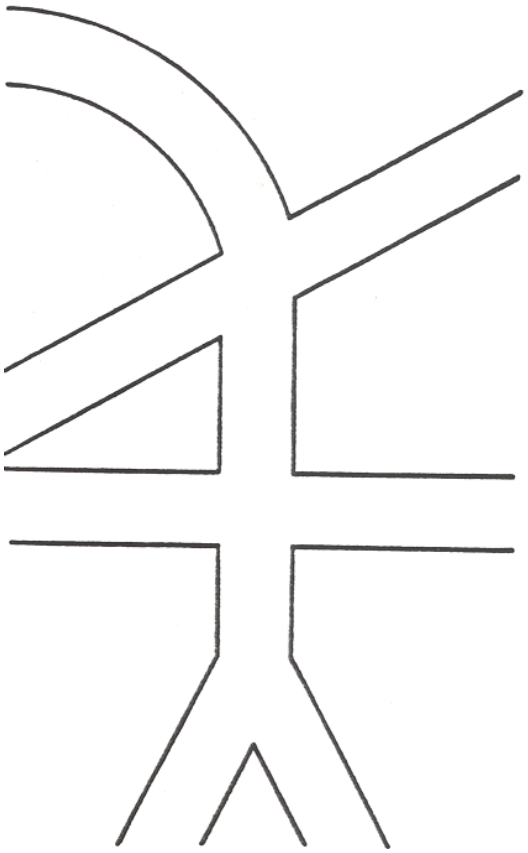
CLAIMS UNIT – INSURANCE DIVISION
STATE TREASURER OF MARYLAND
LOUIS L. GOLDSTEIN TREASURY BUILDING
80 CALVERT STREET
ANNAPOLIS, MARYLAND 21401
TEL: 410/974-3684

The claims Unit will instruct the claimant/attorney as to the proper procedure for filing a formal notice of claim against the State.

Policy No. – SITF
Company – Maryland Automobile Fleet
Agent/Broker – State Treasurer's Office

6. Draw a Sketch

SHOW NAMES OF HIGHWAYS, POINTS OF COMPASS (N.E.S.W.), AND DIRECTION FO VEHICLES INVOLVED.
DESIGNATE YOUR CAR THUS: ■
OTHER VEHICLE: □



IMPORTANT

Report accident promptly to your supervisor in accordance with MDA instructions. Make prompt written report to authorities as required by law. Name and address of person completing this form:

CDL Violations

The following abbreviated quotes are taken from the Maryland Vehicle Law 2002 edition.

✪ **16-812.** – The administration shall disqualify any individual from driving a commercial motor vehicle for a period of 1 year if:

1. The individual is convicted of committing any of the following offenses while driving a commercial motor vehicle.
   - Leaving the scene of an accident.
   - A crime **not** involving a controlled substance.

2. Refuses to undergo testing (breath or blood) for intoxication.

3. Drives or attempts to drive a commercial motor vehicle while the alcohol concentration of the person's blood or breath is 0.04 or more.

Three year suspension if hazardous material requiring placards for above offenses.

Two or more of the previous violations shall disqualify any individual from driving a commercial motor vehicle for life.

✪ **16-812.** – The administration shall disqualify any individual from driving a commercial motor vehicle for life who uses a commercial motor vehicle in the commission or intent of any felony involving the manufacture, distribution, or dispensing of a controlled dangerous substance.

✪ **16-812.** – The administration shall disqualify any individual from driving a commercial motor vehicle (CMV) for 60 days if convicted of any 2 serious traffic violations committed in a CMV or non CMV occurring within a 3 year period. 120 days if convicted of any 3 serious traffic violations committed in a CMV or non CMV occurring within a 3 year period.

Serious traffic violations definitions are taken from the "Federal Motor Carrier Safety Regulations" table 2 of section 383.51. A serious traffic violation consists of:

- Speeding excessively (15 mph or more) above the posted speed limit.
- Reckless driving.
- Erratic traffic lane changes.
- Following the vehicle ahead too closely (tailgating).
- Any violation in connection with a fatal accident.

MEMORANDUM

TO: All SHA Employees

FROM: Neil J. Pedersen
Administrator

DATE: September 22, 2009

SUBJECT: Vehicle and Equipment Engine Idling Policy

Fluctuating fuel costs and the impact that high prices have on the State Highway Administration's (SHA) local and organizational budgets require that we reduce fuel consumption as much as possible. The impact of fossil fuel emissions on air quality and public health also requires that we reduce our use of fuel.

The attached Vehicle and Equipment Engine Idling policy provides direction to all SHA employees on the reduction and eventual elimination of engine idling. This policy seeks to reduce the amount of fuel we use and the resulting emissions from SHA's vehicle and equipment fleet, as well as units owned by our consultant support organizations. While this policy currently only covers SHA employees and consultants, future policies will extend to vehicles and equipment within the contractor community.

Thank you in advance for your part in making Maryland a fiscally responsible and environmentally beneficial place in which to live and work. If you have any questions or concerns regarding this policy, please do not hesitate to contact Mr. Dan Guy, Equipment Division Chief, Office of Maintenance, SHA at 410-582-5575, toll-free 877-624-6863 or via email at dguy@sha.state.md.us. He will be pleased to assist you.

Attachment
cc: Mr. Dan Guy, Chief, Equipment Division, Office of Maintenance
Mr. Gregory Welker, Deputy Administrator/Chief Engineer for Operations, SHA

Maryland State Highway Administration Policy

DOT: TBD
DATE: September 21, 2009

TITLE: Vehicle and Equipment Engine Idling Policy

I. REFERENCES

A. The Maryland Vehicle Law, Annotated 2008 Edition – TR 22-402
B. Environmental Protection Agency, Clean Air Act – Title I
C. Maryland State Highway Administration Business Plan System, KPA Environmental Compliance and Stewardship – 5.6H Fuel Consumption

II. PURPOSE AND APPLICABILITY

A. This policy shall apply to all operators of SHA vehicles and equipment.
B. This policy shall apply to drivers of consultant support vehicles.

III. BACKGROUND

A. Fluctuating fuel costs and the impact high prices have on our local and organizational budget requires that we reduce fuel consumption to the maximum extent possible.
B. Additionally, the ever increasing focus on emissions from fossil fuels and the subsequent impact to air quality and public health issues further requires that fuel use be reduced.
C. The Vehicle and Equipment Engine Idling Policy provides direction to Maryland State Highway Administration (SHA) responsibility centers pertaining to the reduction and eventual elimination of engine idling.
D. The policy seeks to reduce the amount of fuel use and subsequent emissions by the SHA vehicle and equipment fleet, as well as, consultant support organizations.

IV. DEFINITIONS

A. Engine Idling – a motor vehicle engine is operated for more than five (5) consecutive minutes when the vehicle is not in motion.
B. Consumption – the act or process of consuming (use up).
C. Fluctuating – to shift back and forth uncertainly.
D. Emissions – substances discharged into the air (as by a smokestack or an automobile gasoline engine).
E. Fossil Fuel – a fuel (as coal, oil, or natural gas) that is formed in the earth from plant and animal remains.
F. Highways – all Maryland roads owned by the Maryland Department of Transportation and maintained by the State Highway Administration.

G. Deployed – to spread out, utilize, or arrange esp. strategically.
H. Compliance – conformity in fulfilling official requirements.

V. STATEMENT OF POLICY

A. Engine idling shall be restricted to the following circumstances:
- When a unit is deployed along a state route in preparation for winter operations,
- A unit is functioning under an emergency situation or maintaining traffic through the use of emergency lighting.

B. Compliance with this policy becomes effective on the date approved and signed the SHA Administrator.

C. Management shall be responsible for ensuring compliance with this policy.

D. Employees who allow their vehicle to idle under circumstances other than those described above may be subject to disciplinary action or suspension from operating State vehicles or equipment.

Recommended by:
Gregory D. Welker
Deputy Administrator,
Chief Engineer for Operations

Date: 9/21/09

Approved by:
Neil J. Pedersen
Administrator

Date: 9/24/09