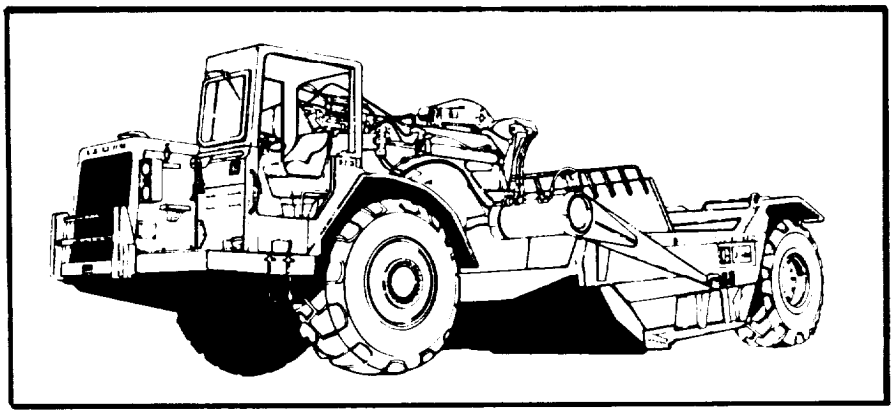
TECHNICAL MANUAL

FOR

SCRAPER, EARTH MOVING, MOTORIZED DIESEL ENGINE DRIVEN

NSN 3805-01-153-1854



OPERATION

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1985

⚠ IMPORTANT SAFETY NOTICE

Most accidents involving machine operation are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs.

Improper operation is dangerous and could result in injury or death.

READ AND UNDERSTAND ALL SAFETY PRECAUTIONS AND WARNINGS BEFORE OPERATING THIS MACHINE.

Basic safety precautions are outlined in the SAFETY section of this Guide and in the description of operations where hazards exist. Warning labels have also been put on the machine to provide instructions and to identify specific hazards which, if not heeded, could cause bodily injury or death to you or other persons. These warnings in the Guide and on the machine labels are identified by the symbol ⚠

Operations that may result only in machine damage are identified by CAUTION labels on the machine and in the Guide.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this Guide and on the machine are therefore not all inclusive. If an operation is not performed as specifically recommended by Caterpillar, you must satisfy yourself that it is safe for you and others. You should also ensure that the machine will not be damaged or made unsafe by the method of operation you choose.

⚠ WARNING

The proper and safe lubrication and maintenance procedures for this machine, recommended by Caterpillar, are outlined in the "Maintenance Guide" for this machine.

Improper performance of lubrication or maintenance procedures is dangerous and could result in injury or death. Read and understand the "Maintenance Guide" before performing any lubrication or maintenance.

WARRANTY STATEMENT

The Caterpillar 621B Tractor-Scraper is warranted by Caterpillar Tractor Co. for 15 months or 1500 hours of operation, whichever occurs first. The warranty starts on the date found on the DA form 2488-9 in the log book. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance shop.

TECHNICAL MANUAL
No. 5-3805-248-14&P-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 19 *Aug* 1985

TECHNICAL MANUAL
FOR
SCRAPER, EARTH MOVING, MOTORIZED
DIESEL ENGINE DRIVEN
NSN 3805-01-153-1854
OPERATION

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander. US Armv Tank-Automotive Command, ATTN: AMSTA-MBP, Warren, Ml 48397-5000. A reply will be furnished direct to you.

TABLE OF CONTENTS

General Description and Specifications

This technical manual is an authentication of the manufacturers commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

Table of Contents

Safety Practices

⚠ WARNING

Do not operate this machine until you have read and understand the instructions in the Operator's Guide. Improper operation is dangerous, and could result in injury or death.

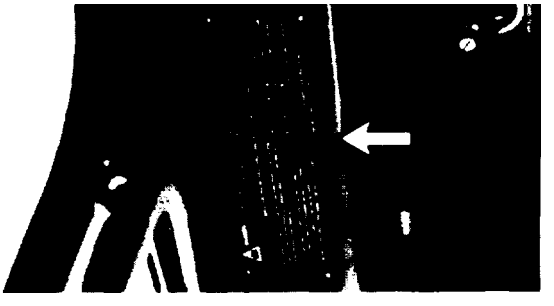
⚠ WARNING

Actuation of the control cause movement - reducing hitch clearances suddenly.

⚠ WARNING

Use steps and grab irons located on the machine. Face the machine when mounting or dismounting. Do not jump off the machine.

Do not use the steering wheel as a handhold. The machine could articulate.



⚠ WARNING

To avoid possible weakening of the Rollover Protective Structure (ROPS), consult a Caterpillar dealer before altering the ROPS in any way.

The protection offered by the ROPS will be impaired if it has been subjected to structural damage.

General

Wear a hard hat, protective glasses and other protective equipment as required by job conditions.

Do not wear loose clothing or rings that can catch on controls or parts of the machine.

Keep the steps and walkways free of foreign material Secure all loose items such as lunch boxes, tools, etc.

Know hand signals and who gives them Accept signals from one person only.

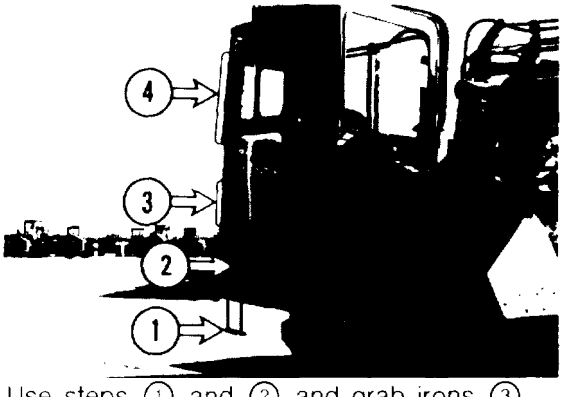
Mounting and Dismounting

Climb on or off the machine only where steps and/or grab irons are provided. Never jump on or off of the machine.

Use both hands and face the machine when mounting or dismounting.

Never get on or off of a moving machine.

Learn the location of the emergency exits.



Use steps ① and ② and grab irons ③ and ④ when entering or leaving the operator's compartment.

Preparing to Start the Engine.

Inspect the condition of the seat belt Replace it if it is worn or damaged.

Make certain all protective guards and covers are secured in place.

Inspect the machine for potential fire hazards.

Make sure the machine is equipped with proper lighting as required by job conditions.

Inspect the machine for potential hazards.

Starting the Engine

Do not start the engine or move any of the controls if a DO NOT OPERATE or warning tag is attached to the controls.

Make sure no one is working on, under, or close to the machine before starting the engine.

Move all implement controls to hold or neutral before starting the engine.

Shift the transmission control lever to neutral and engage the transmission neutral lock and parking brake.

Start and operate the engine only in a well ventilated area in an enclosed area, vent the engine exhaust to the outside.

Preparing to Operate

Adjust the seat so that full brake pedal travel can be obtained with the operator's back against the seat back.

Fasten the seat belt securely.

Safety

Check all controls and protective devices to make sure they are working properly while moving slowly in an open area

1. Steering
2. All brakes
3. Governor control
4. Hydraulic functions
5 .Devices such as lights, travel alarm, horn. etc.

See the “Service Manual” for adjustments if they are needed.

Operating

Operate the controls only while seated.

Do not allow riders on the machine unless an additional seat, seat belt and rollover protection is provided for each rider.

The operator must satisfy himself that no one will be endangered before moving the machine.

Be careful to avoid tipping when working on hills, banks or slopes and also when crossing ditches, ridges or other obstructions.

Stay a safe distance from the edge of cliffs, overhangs or slide areas.

If the machine begins to slide on a grade dispose of the load Immediately and turn the machine downhill.

Know the exact location of buried cables and pipes. Mark them clearly.

Parking the Machine

Lower the equipment to the ground with slight down pressure. Move the transmission control to neutral and engage the lock Apply the parking brake. Stop the engine. Turn off the disconnect switch and remove the key.

If the machine must be parked on a steep grade, block all wheels.

Fire Prevention

Do not smoke while refueling or when near batteries.

Always have a fire extinguisher on hand and know how to use it inspect and service the extinguisher as recommended on the instruction plate.

Do not start the machine or move any of the controls if there is a warning tag attached to the controls or starter switch.

Do not carry flammable fluids such as starting fluid (ether), gasoline or fuel on the machine in loose containers.

Before operating, inspect for trash or leaks which could cause a fire. See “Before Starting” for the walk-around inspection procedure.

Loose or damaged lines, tubes or hoses which leak, can cause fires.

Do not bend or strike high pressure lines. Do not install bent or damaged lines, tubes or hoses.

Inspect all lines, tubes and hoses carefully. Tighten all connections to the recommended torque.

Make sure that all clamps, guards and heat shields which protect hot exhaust components from oil or fuel spray, are installed correctly. This will help to prevent vibration, rubbing against other parts , or excessive heat during operation. And it will help prevent fires in the event of a line. tube or seal failure.

⚠ WARNING

Explosions of air-inflated earthmoving tires have resulted from heat-induced gas combustion inside the tires. The heat generated by welding or heating rim components, external fire, or excessive use of brakes, can cause gaseous combustion.

A tire explosion is much more violent than a blowout. The explosion can propel the tire, rim, and final drive components as far as 460 m (1500 feet) or more from the machine. Both the force of the explosion and the flying debris can cause personal injury or death, and property damage.

Although the risk of an explosion is very low, the hazard is very great, particularly with large tires used on wheel tractor-scrapers.

All personnel should be made aware of this danger and the actions to take to minimize the risk.

Heat from any source is transferred to the tire causing deterioration of the bead. Normally, the burned bead causes loss of air, and the tire goes flat without hazard to anyone in the vicinity.

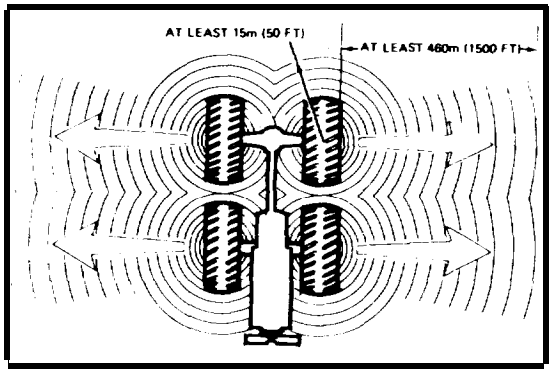
Bead burning can result in the release of an explosive gaseous mixture inside the tire. In some cases the gaseous mixture inside the tire ignites. The internal burning causes a rapid increase in pressure, resulting in a violent tire explosion. The explosion produces a blowout at the tire bead which reacts against the machine to propel the tire, rim assembly and final drive components a considerable distance from the machine.

The danger of a tire explosion is greatest after the machine stops, because of the loss of the cooling effect of the circulating air due to wheel rotation.

If smoke, excessive heat, the smell of burning rubber or hot brakes, or other indications of bead burning are noticed, take action to prevent personal injury.

Move the machine to a remote area, but only if it can be done without endangering the operator or other personnel in the area

Remove all personnel from the area where the machine is located.



⚠ WARNING

Do not approach a tire closer than the outside of the area represented by the shaded area in the above drawing.

If it is absolutely necessary to approach a machine with a suspected tire, do not get closer to the tires than 15 m (50 feet) at the front or rear of the machine, nor closer to the side of the tire than 460 m (1500 feet).

Do not approach any tire on the machine if there is a brake fire, burning rubber or other indications that excessive heat was generated by the brakes. Brake-generated heat probably affects all other tires on the machine, even though the visual evidence is only at one tire.

If there is evidence of a brake fire or the smell of burning rubber, don't go near the machine.FIGHT THESE FIRES FROM A REMOTE LOCATION. (Too often, the immediate response to a fire involving tires or brakes, is for people to grab a hand-held fire extinguisher and rush up close to the machine to help put out the fire.) Stay away from the machine until the tires cool Allow at least eight hours for the tires to cool before approaching the machine.

Keep observers out of the area, and at least 460 meters (1500 feet) away from the side of the tire and 15 meters (50 feet) away from the front or rear of the machine. See the above drawing.

There is no absolutely safe approach when fighting a machine fire. Approach only at the front or the rear of the machine and use a large dozer as a shield.

Inflation of Tires with Nitrogen

Caterpillar recommends using dry nitrogen (N_2) gas for both tire inflation, and tire pressure adjustments on all current and past production rubber tired machines. Nitrogen IS an inert gas and will not support combustion inside the tire.

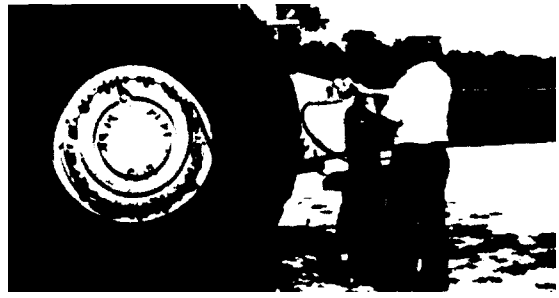
⚠ WARNING

Proper nitrogen inflation equipment and training in its use are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or **misused equipment.**

In addition to reducing the risk of an explosion, using nitrogen instead of air to inflate tires lessens the slow oxidation of the rubber and the accompanying gradual tire deterioration. This is especially important for tires that have an expected long service life (4 or more years). It also reduces the corrosion of rim components and the resultant disassembly problems

Because a fully charged nitrogen cylinder's pressure is approximately 15 000 kPa (2200 psi), a tire blowout and/or rim failure can occur if the inflation equipment is not used correctly See "Nitrogen lnflation Information." which follows.

Nitrogen Inflation Information



⚠ WARNING

Stand behind the tread when inflating a tire.

CAUTION

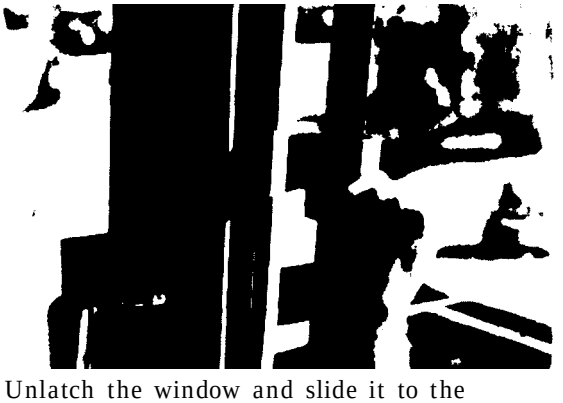
Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Use only a Caterpillar Part Number 6V4040 Nitrogen Tire lnflation Group, or equivalent, to inflate tires from a nitrogen gas cylinder.

Use the same tire pressures for nitrogen inflation as would be used for air inflation. Consult your tire dealer for operating pressures.

Emergency Exit

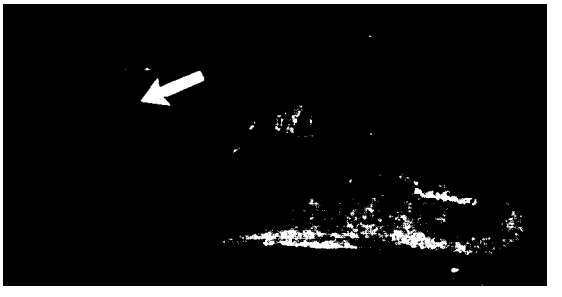
Use the sliding window on the right side of the cab as an emergency exit.



Unlatch the window and slide it to the rear.

Backup Alarm

The backup alarm, located at the rear of the scraper, sounds to warn nearby personnel of machine movement.



The alarm should sound any time the transmission control is moved to REVERSE position, when the disconnect switch is ON.

Adjust the alarm sound level to ① HIGH, ② LOW or ③ MEDIUM, to meet job requirements.

The alarm is usually set at the ① HIGH sound level when the machine is shipped from the factory.

TM 5-3805-248-14&P-1

Seat Belt

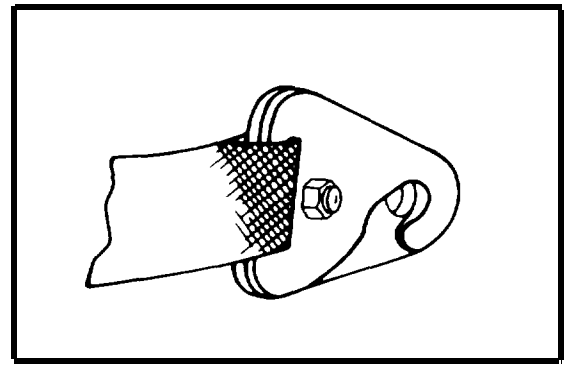
⚠ WARNING

Replace the seat belt or mounting hardware if they are damaged or worn. Replace the belt at least every three years.

Adjust and fasten the seat belt before operating the machine.

Inspect for worn or frayed webbing. Check for worn or damaged buckle or anticreep slide, on each half of the belt. Replace the belt, buckle or slides if they are worn or damaged.

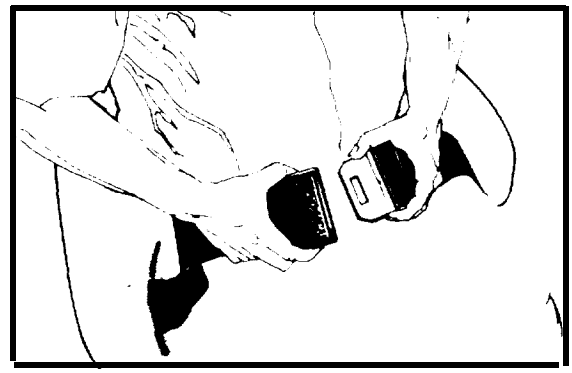
Inspect the belt mounting hardware. Replace any worn or damaged hardware.



⚠ WARNING

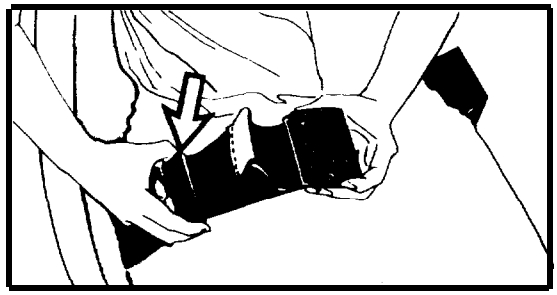
If the bolt and nut that holds the two parts of the seat belt mounting hooks together are not correctly installed, the hooks can separate from their mounting.

Inspect the hooks of each half of the belt to make sure the bolt and nut are secure and correctly installed. See illustration.

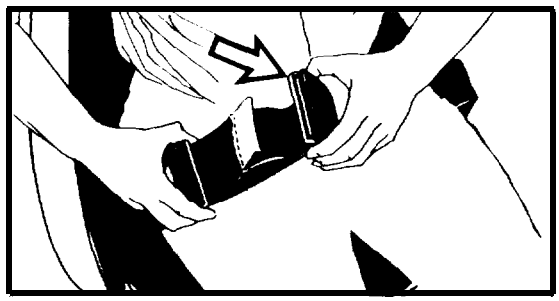


Adjust both ends of the belt. The belt should be snug but comfortable.

To Lengthen the Belt

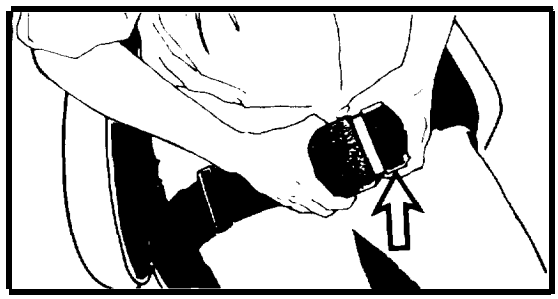


1. With the belt unfastened, move the anticreep slide toward the buckle.



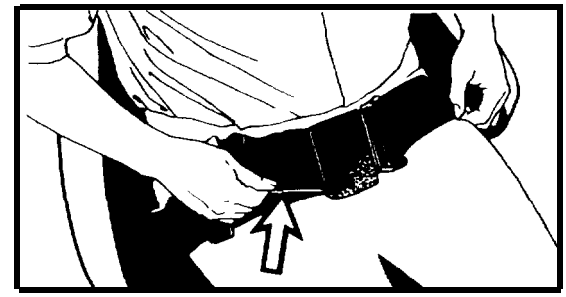
2. To remove the slack in the outer loop, rotate the buckle to free the lock bar. This permits the belt to move through the buckle.

3. Pull on the buckle until the outer and inner belt loops are tight.

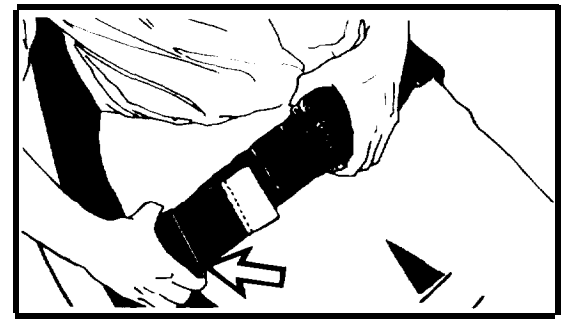


4. Loosen the other half of the belt in the same manner. Readjust the belt if it does not fit properly with the buckle in the center.

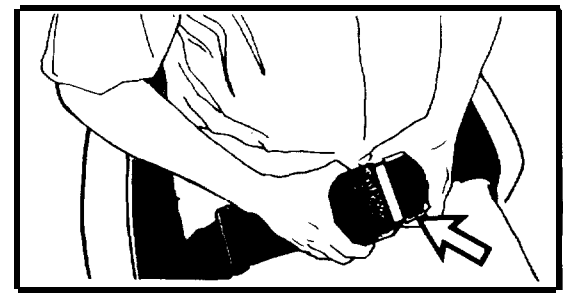
To Shorten the Belt



1. With the belt fastened, pull on the outer loop to tighten the belt.



2. Move the anticreep slide toward the anchor end of the belt to take up the slack in the outer loop.



3. Adjust the other half of the belt in the same manner.

4. Readjust the belt if it does not fit properly with the buckle in the center.

Seat Adjustment

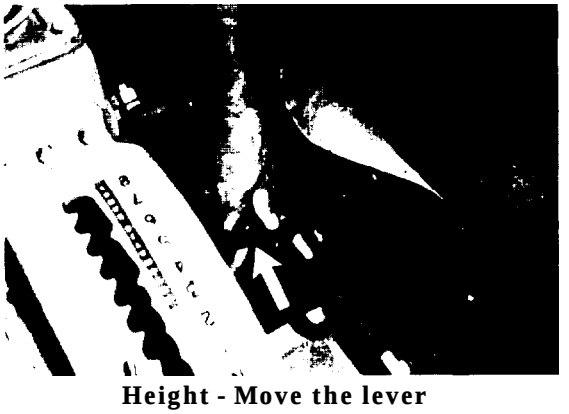
⚠ WARNING

Adjust the seat at the beginning of each shift, or when changing operators.

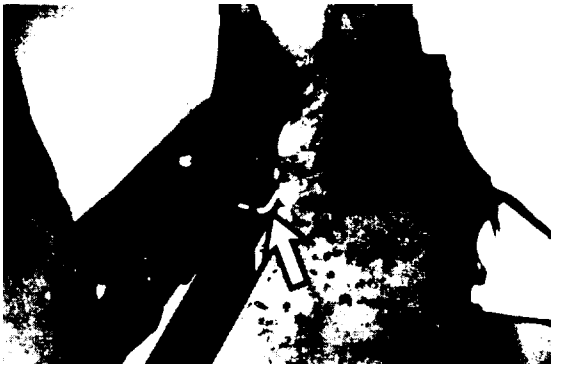
Adjust the seat to allow full brake pedal travel, with the operator seated against the seat back.

The seat must be adjusted with the operator seated, and the engine running.

Fore and Aft - Lift the lever. Move the seat forward or rearward. Release the lever. Move the seat slightly to lock it.



Height - Move the lever forward to raise the seat. Move the lever to the rear to lower the seat.

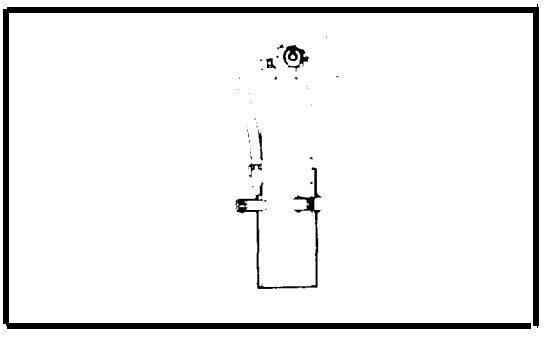


Suspension - Move the lever up for a firmer ride or down for a softer ride.

Fire Extinguisher

Always have a fire extinguisher on the machine and know how to use it.

Have the extinguisher inspected as recommended on the instruction plate.



A fire extinguisher and mounting bracket is available from your Caterpillar dealer.

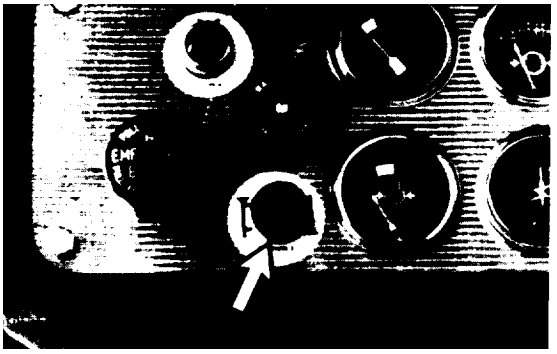
Have the extinguisher recharged after use.

Mirrors

Adjust the overhead mirror. . .

. . .and the right side mirror before operating the machine. They provide better vision to the rear.

Horn

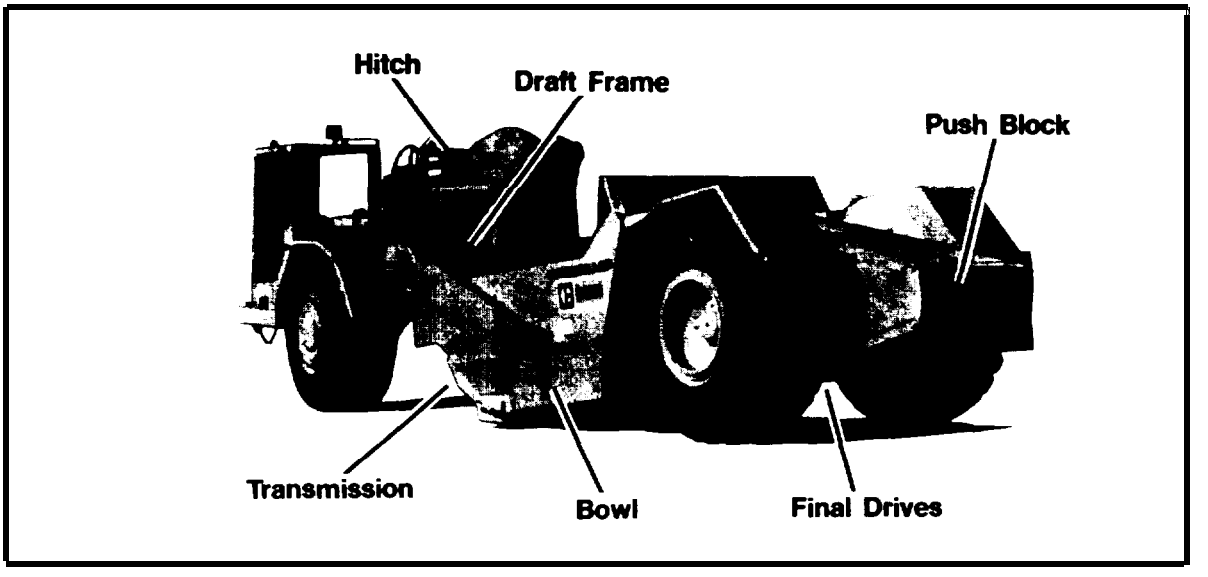


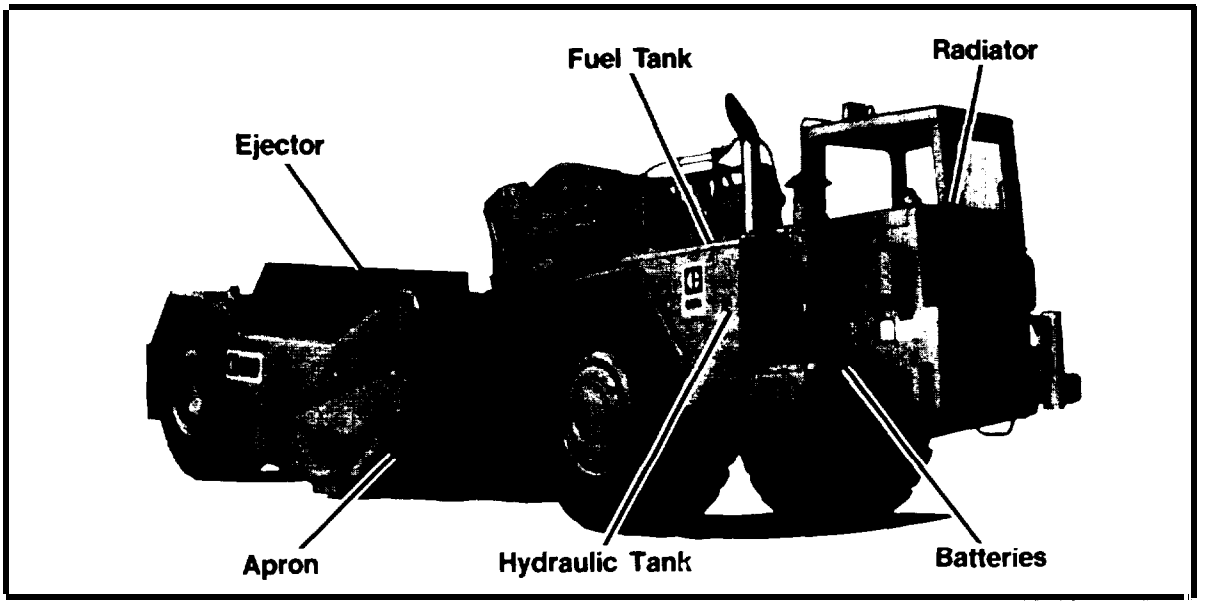
Push the button down to sound the air horn.

Use the horn to warn or signal personnel.

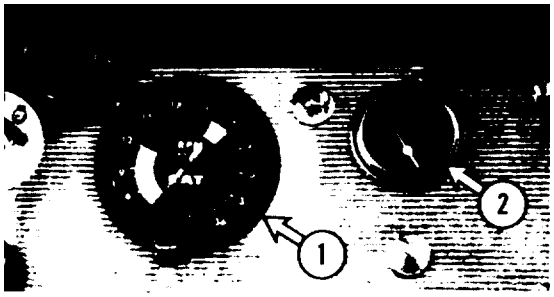
Model Views

TM 5-3805-248-14&P-l



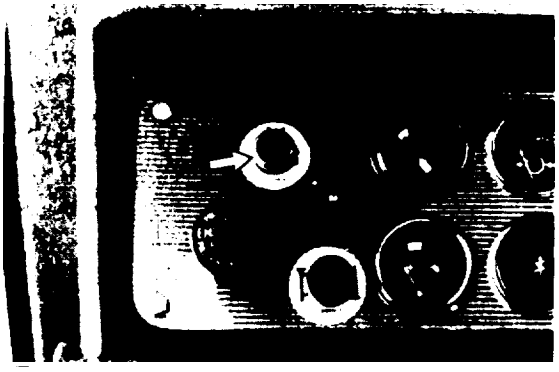


Indicators and Gauges

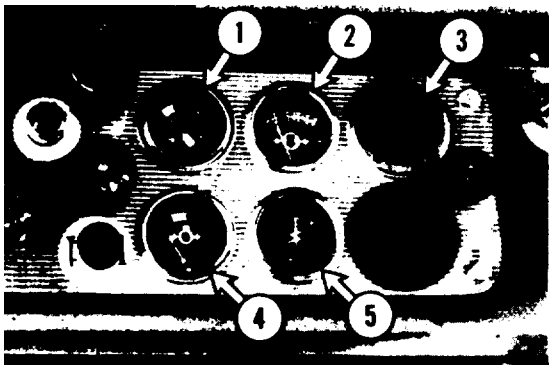


1. Tachometer - Indicates the engine revolutions per minute (rpm) in hundreds. The normal operating (GREEN) range is 1200 to 2200 rpm.

2. Converter and Retarder Temperature Gauge - Indicates the torque converter and retarder oil temperature. The gauge should be in the GREEN range during operation.



Low Air System Pressure Light (Red) - When it lights, it indicates that air pressure in the reservoirs is low. Below 415 kPa (60 psi) the light should go on and the electric warning horn should sound.



1. Engine Coolant Temperature Gauge - The gauge should register in the green range during operation.

2. Air System Pressure Gauge - Indicates the air pressure in the reservoirs. The gauge should register in the GREEN range during operation.

3. **Service** Meter - Indicates the total service hours on the engine. Use it to determine service intervals.

4. Engine Oil Pressure Gauge - The gauge should register in the WHITE range at low idle engine speed, or in the GREEN range at operating speed.

5. Ammeter - Indicates the condition of the battery charging circuit. The gauge should read ZERO soon after the engine starts.

Operator's Compartment

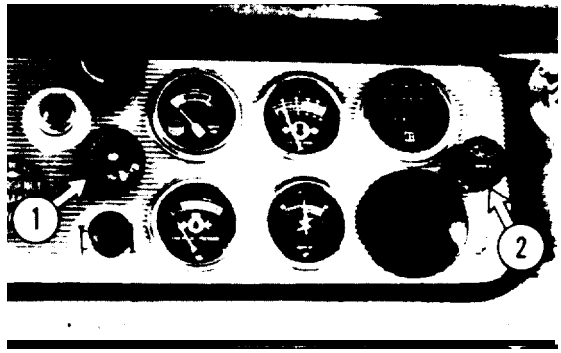
TM 5-3505-248-14&P-1

Switches

Battery Disconnect Switch - To activate the electrical system, insert the key and turn the switch to the right. When parking the machine, turn the switch to the left to open the electrical circuit, and remove the key. This will prevent battery drain.

Headlight Dimmer - Push the button and then release it for low beam headlights when they are on high beam. Repeat, to return to high beam.

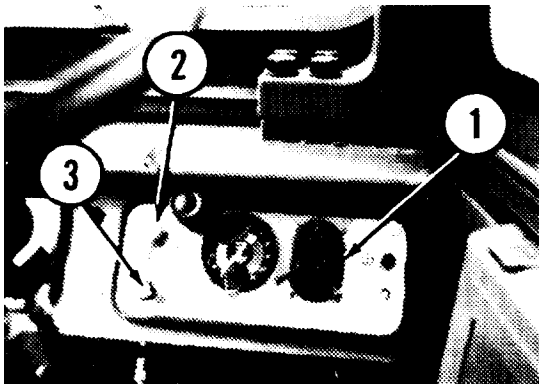
Use the low beam headlights when meeting oncoming traffic.



1. Warning Horn Shutoff - Push in and hold the button to stop the electric warning horn from sounding.

Use the button when starting or at times when the horn is not needed and becomes annoying.

2. Windshield Wiper - Turn the switch to the right to the first position for slow wiper speed. Turn the switch to the right for fast speed. Turn the switch to the left to stop the wipers.



1. Light Switch - Turn the switch to the right to the first position. The instrument panel lights, only, will go on. Turn the switch to the right to the second position. The headlights, and floodlights will also go on. To turn the lights off, turn the switch to the left.

2. Start Switch - Push the switch in and turn it to the right to crank the engine.

3. Starting Aid Switch - Used in cold weather only, to inject starting fluid (ether) into the intake manifold to aid in starting the engine. Push the button only while cranking the engine, to inject a metered amount of starting fluid.

Circuit Breaker and Fuses

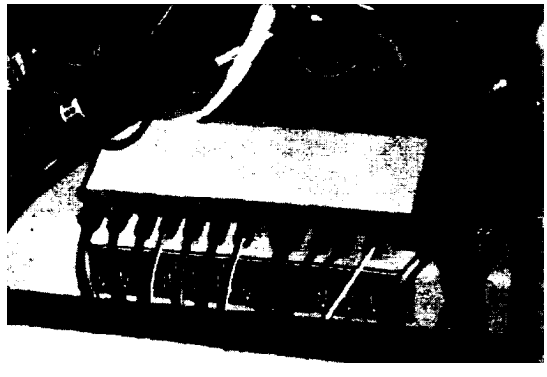
Main Circuit Breaker (60A) - Protects the electrical system from damage caused by overloads. Push the button to reset the breaker if it opens. Have the circuit checked if the breaker again opens.

Fuses - Fuses protect the individual circuits from damage caused by overloads.

Change a fuse if the element separates. If the element of a new fuse separates, have the circuit checked.

CAUTION

Replace fuses with the same type and size.

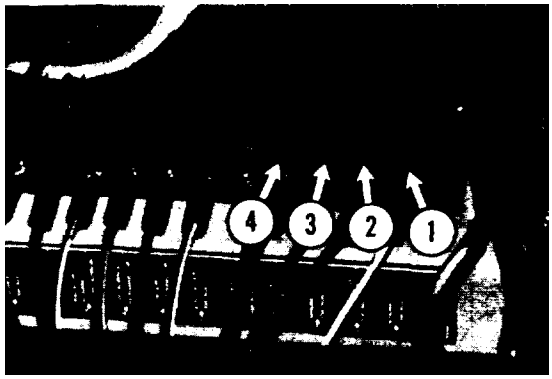


Open the door at the front of the operator's compartment for fuse block access.

The circuit for each fuse is identified on the diagram on the fuse block Fuses for the various circuits are indicated below.

Operator's Compartment

TM 5-3805-248-14&P-1

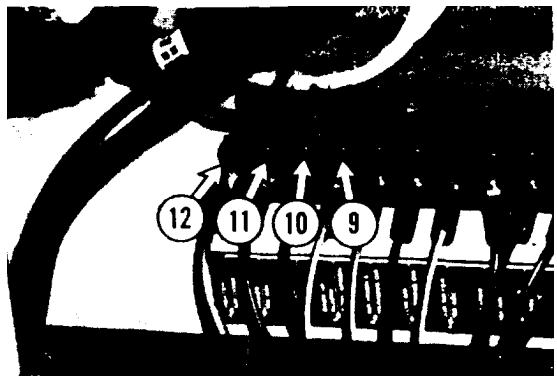


1. Rear Flood-10A AGC

2. Starting Aid-10A AGC

3. Defroster Fan-10A AGC

4. Spare

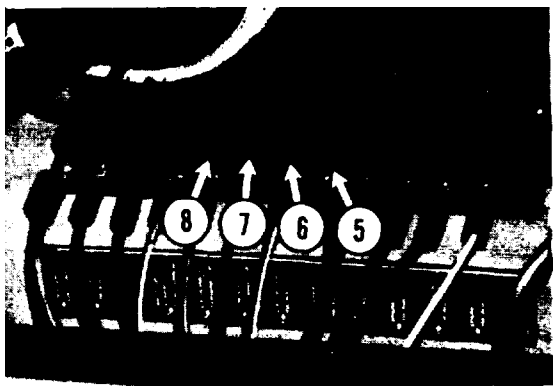


9. Spare

10. Wiper-10A AGC

11. Gages-10A AGC

12. Heater-15A **AGC**



5. Spare

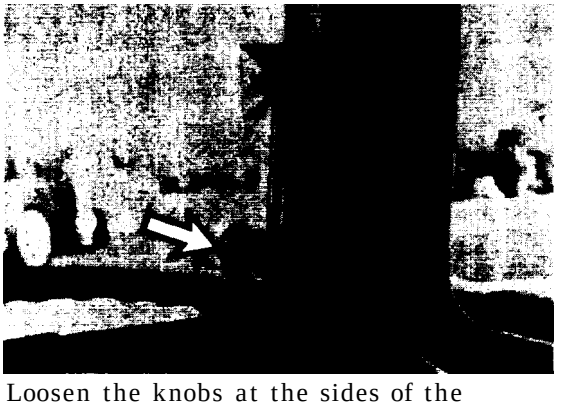
6. Air Dryer-10A AGC

7. Low Air Alarm-10A AGC

8. Backup Alarm and Air Horn-10A AGC

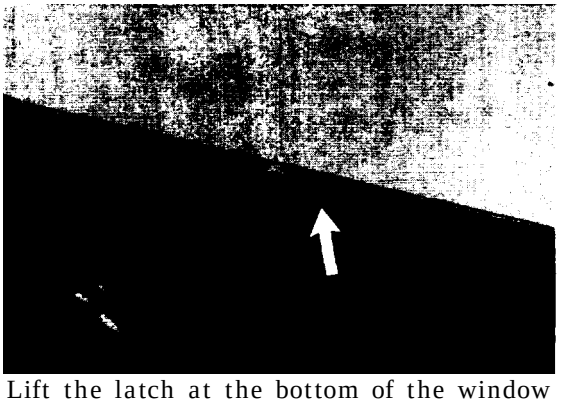
Windows and Vents

The right side cab window can be used for ventilation. Unlatch the window and slide it to the rear.



Loosen the knobs at the sides of the window.

The windshield can be swung out to provide air flow.



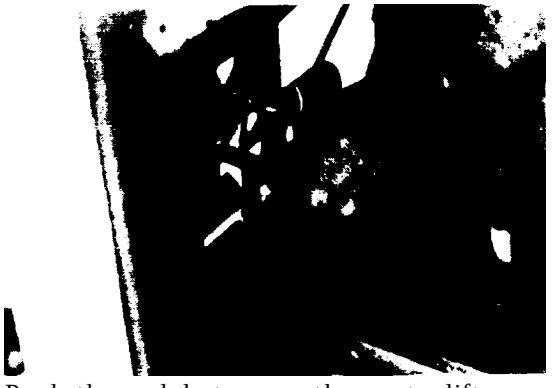
Lift the latch at the bottom of the window and push out.

When the window is at the desired position, tighten the knobs.

Operator's Compartment

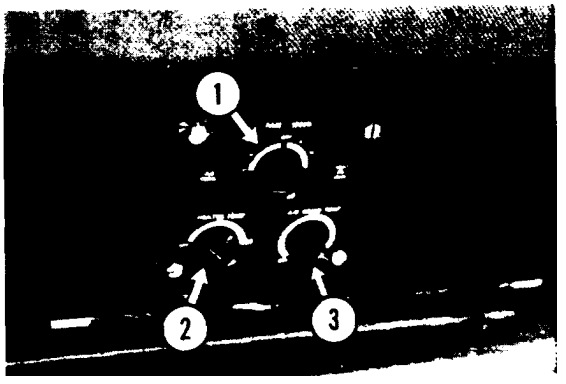
TM 5-3805-248-l4&P-1

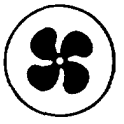
Open the vents at the floor of the cab for more air flow.



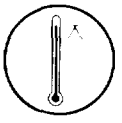
Push the pedals to open the vents. lift the pedals and pull them close to the vents.

Heater





1. Fan Switch - Move it to the right to one of three positions for heat or ventilation.

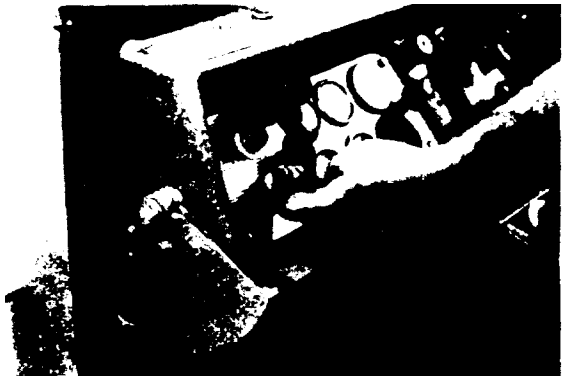


2. Heater Temperature - Move the switch to the desired temperature with the Fan Switch in the Heat and Vent range.

Pressurizing - Pressurizing provides a clean atmosphere for the operator when heating is not required. Move the Fan Switch to the Heat and Vent range. Move the Heater Temperature switch to the lowest temperature.

Vehicle

Parking /Emergency Brake



Park or Emergency - Pull the button to set the parking brake. The parking brake should be set any time the operator leaves the operator's compartment.

Pull the button to apply the emergency brake if the service brakes fail to stop the machine.

The emergency brakes will apply automatically if air pressure drops to 280 kPa (40 psi).

Release - Push the button in to release the brakes. The air pressure must be in the normal (GREEN) range. Be sure the button stays in, to keep the brakes released, before moving the machine.

Service Brake

Apply - Push the pedal down to apply the service brakes.

Release - Release the pedal to release the brakes.

Accelerator Pedal

Increase Engine Speed - Push down the pedal to increase engine speed.

Decrease Engine Speed - Release the pedal to decrease engine speed.

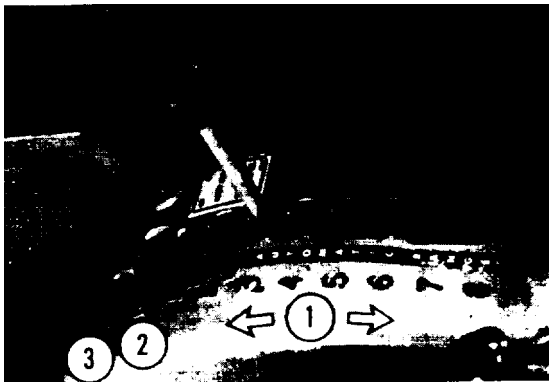
Stop Engine - Lift the toe of the pedal to stopped detent to stop the engine.

TM 5-3805-248-14&P-1

Transmission Range Selector

CAUTION

The machine must be stopped, and the engine at low idle, when changing direction.



1. Forward - The transmission will shift automatically between 2nd and any other speed (3rd through 8th) selected in the automatic range.

Manual shifting is not recommended during normal operation cycles.

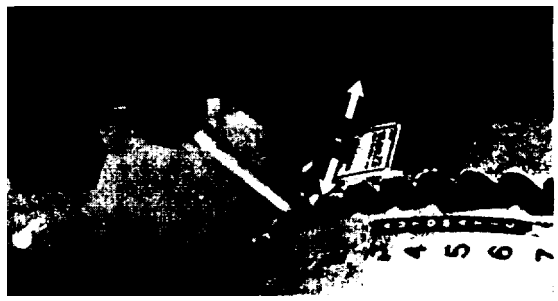
1st speed is selected manually.

Select the highest of the 8 forward speeds that is practical for your application.

2. Neutral - Move the lever to NEUTRAL when parking the machine, or when starting the engine.

3. Reverse - For reverse, move the lever to the front of the console.

Transmission Neutral Lock

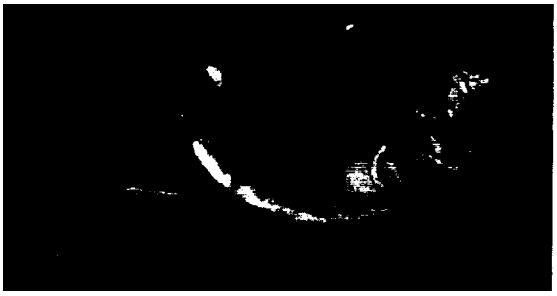


Locked - Move the range selector to NEUTRAL. Push the lever down and move it to the left to lock the transmission in NEUTRAL.

Unlocked - Push the lever down and move it to the right to unlock the transmission range selector.

The Neutral Lock prevents the range selector lever from being moved out of NEUTRAL.

Transmission Hold Pedal



Engage - Push the pedal down The transmission will not shift.

Release - Release the pedal. The transmission will shift normally.

Differential Lock Pedal

CAUTION

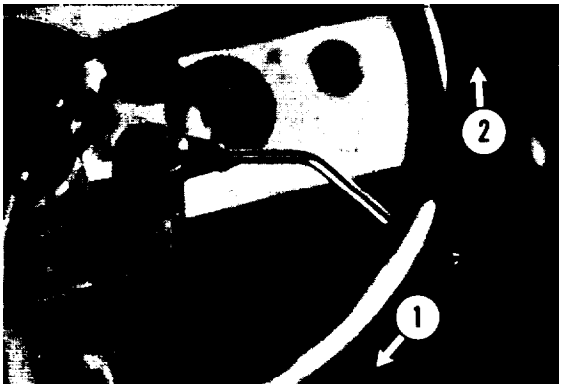
Do not lock the differential with a wheel spinning.

Decrease the rpm momentarily when locking the differential.

Lock - Push the pedal down to lock the differential. This will help prevent wheel slippage. Use it when loading or on soft or wet ground.

Unlock - Release the pedal to unlock the differential.

Turning the machine slightly or decreasing rpm momentarily may be necessary to aid in unlocking.



Retarder

1. Engage - Pull the lever to engage the retarder. The farther the lever is pulled, the greater the braking action.

2. Disengage - Push the lever to stop the braking action.

CAUTION

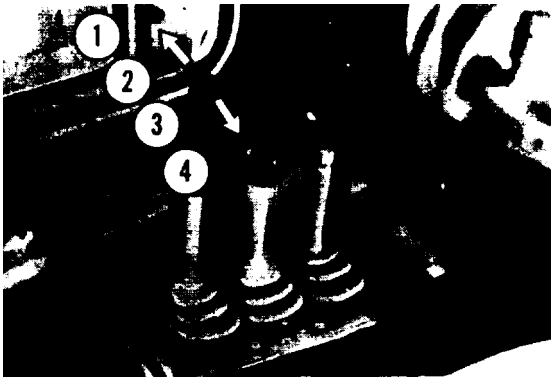
The retarder must be used at least once a week to keep the seals lubricated.

NOTE: Anticipate retarder use. It requires 3 or 4 seconds for the retarder to engage after the lever is moved.

Controls

TM 5-3805-248-14&P-1

Implement



Bowl Control

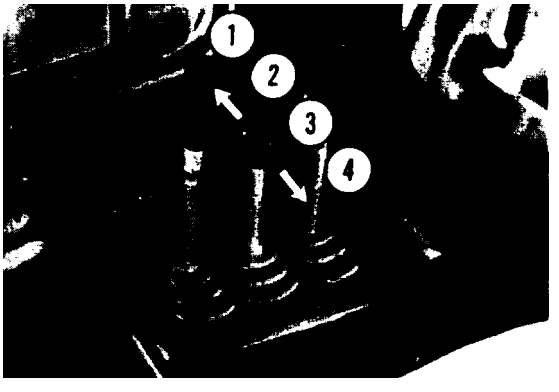
1. Quick Drop - Push the lever all the way to the right to drop the bowl quickly.

2. Lower - Move the lever part way to the right to lower the bowl slowly. The lever will return to hold when released.

3. Hold - The bowl will not raise or lower.

4. Raise - Pull the lever to raise the bowl. The lever will return to hold when released.

Apron Control



1. Float - Push the lever all the way to the right to allow the apron to seek its own level (float).

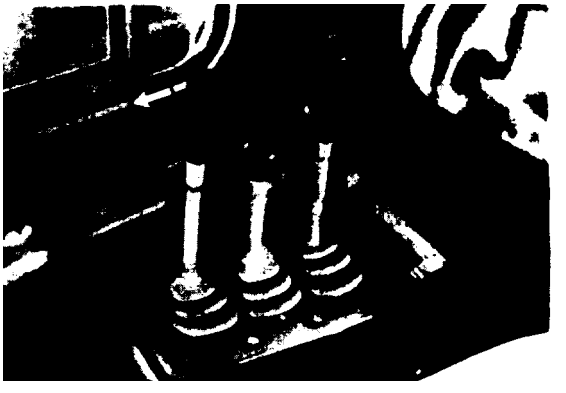
2. Close - Move the lever part **way** to the right to close (lower) the apron. The lever will return to Hold when released.

3. Hold - The apron will not open or close.

4. Open - Pull the lever to open (raise) the apron. The lever will return to Hold when released.

Apron Close Feature

This feature permits one hand control of the bowl and apron close (lower) functions.

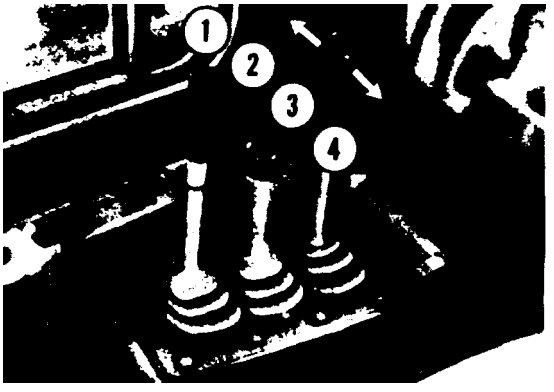


Move the lever, that is used for bowl control, toward the front of the console. The apron will close. The lever will return to HOLD when released.

Ejector Control

CAUTION

Do not move the ejector forward with the bowl loaded, and the apron closed.



1. Return Detent - Push the lever all the way to the right and release it The lever will remain in detent until the ejector is at the rear of the bowl. Then, it will return to HOLD.

2. Return - Push the lever part way to the right to move the ejector to the rear. The lever will return to hold when **released.**

3. **Hold -** The ejector will stay where it is.

4. Forward - Pull the lever to the left to move the ejector forward. The lever will return to Hold when released.

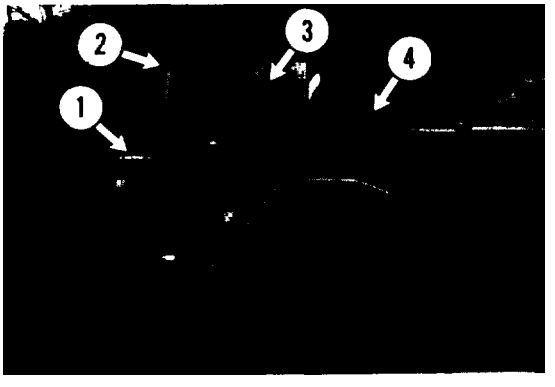
Before Starting

TM 5-3805-248-l4&P-1

Walk-Around Inspection

⚠ WARNING

For personal safety and maximum component service life, it is important that the following machine areas be inspected. These areas should be visually inspected daily, and thoroughly inspected at least Every 2000 Service Hours or 1 Year.

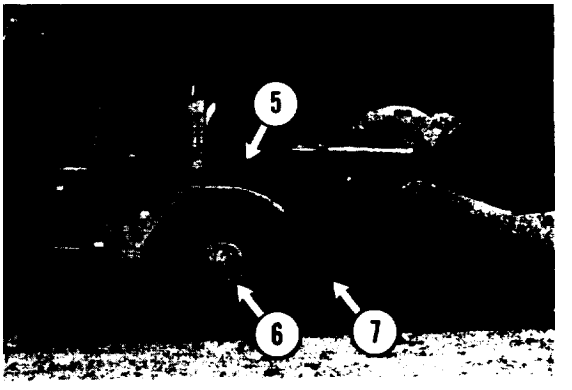


1. Engine Compartment
Look for oil and fuel leaks and trash buildup. Repair oil and fuel leaks. Keep the compartment clean.

2. Rollover Protective Structure (ROPS)
Look for bent, cracked or damaged structure, and for loose mounting bolts. A bent, cracked or damaged ROPS should be replaced.

3. Operator's Compartment
Look for cleanliness, loose items and damage. Inspect the seat belt for damage or wear.

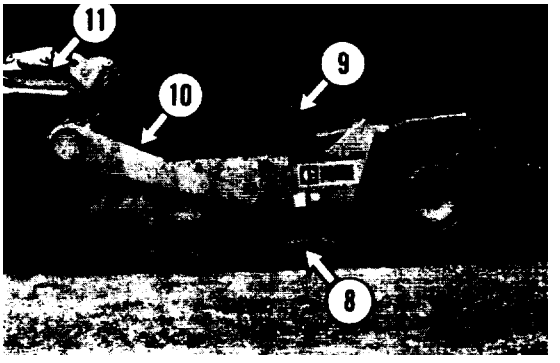
4. Hitch Component
Look for cracks in castings, worn pin joints and damaged stops.



5. Hydraulic Tubes and Hoses
Check for worn or frayed hoses, for loose clamps or mounting bolts, and for oil leaks.

6. Differentials and Final Drives
Look on the ground for signs of leakage.

7 . Transmission
Look on the ground for signs of oil leakage.

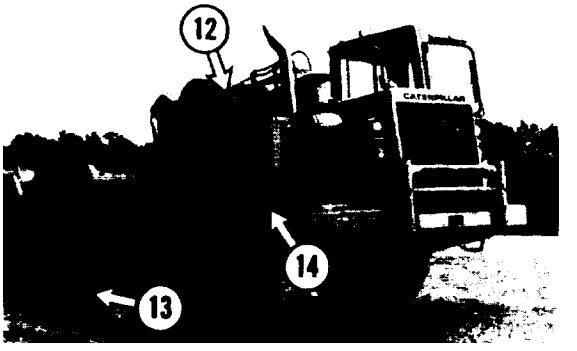


8. Bowl
Look for damage or distortion.

9. Ejector
Look for damage or distortion.

10. Draft Arms
Look for cracks or distortion. The clearance between the draft arm wear plates and the bowl side should not exceed 6 mm (.25 inch) total for both sides.

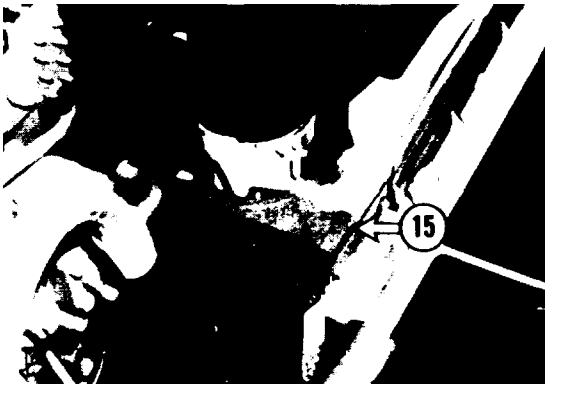
11. Draft Frame Gooseneck and Cross Tube
Look for cracks, damage or distortion. Look for loose or missing draft arm mounting bolts.



12. Steering Linkage
Check for cracks and worn or damaged components.

13. Cutting Edges
Look for wear or damage. Check for missing bolts.

14. Hydraulic and Fuel Tanks
Check for cracks, oil leaks and loose mounting bolts.



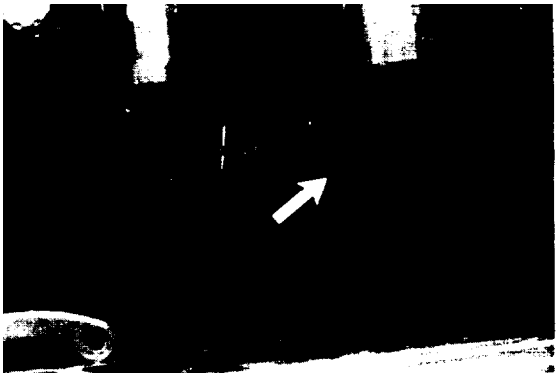
15. Engine Compartment Spray Shields
Look for loose, damaged or missing shields.

Before Starting

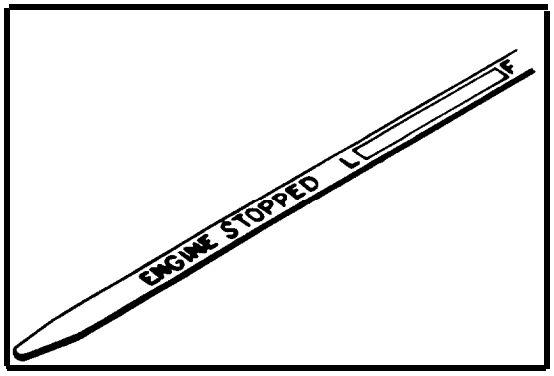
TM 5-3805-248-l4&P-1

Operator Checks

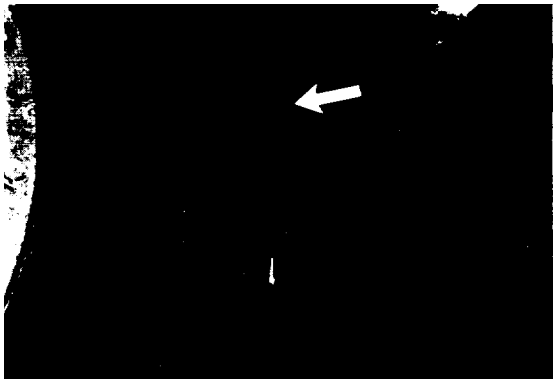
The bowl and apron must be lowered, the elector forward, the parking brake applied and the engine stopped and cool.



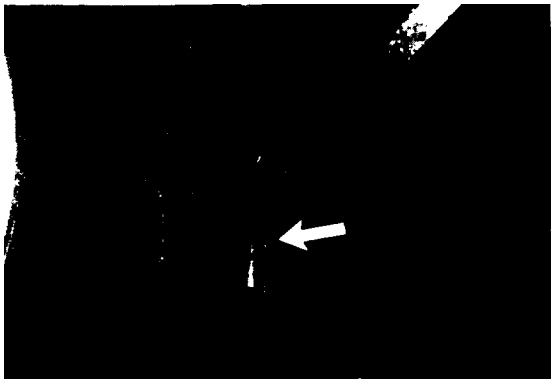
Check the engine oil level.



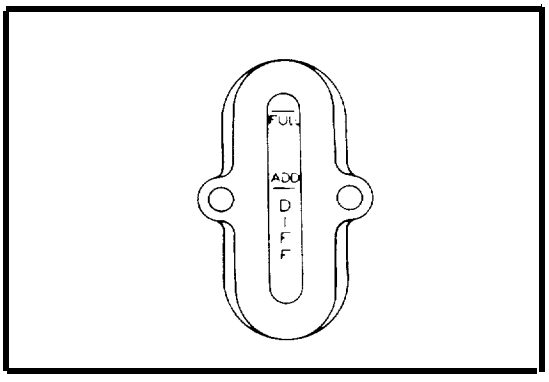
The level should be in the area indicated, on the ENGINE STOPPED side of the dipstick.



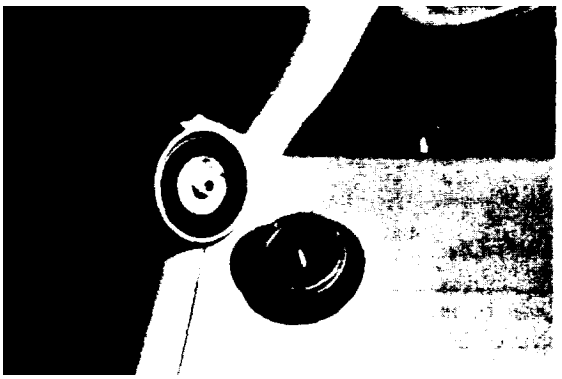
Check transmission oil level.



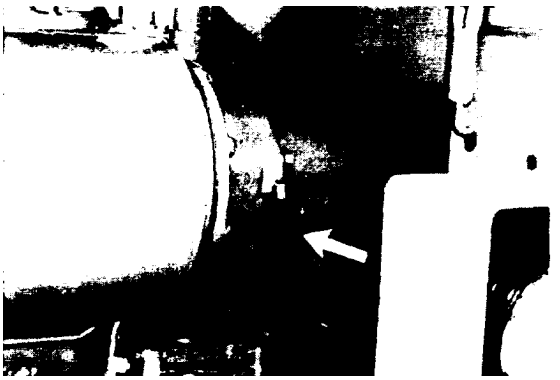
Check differential oil level.



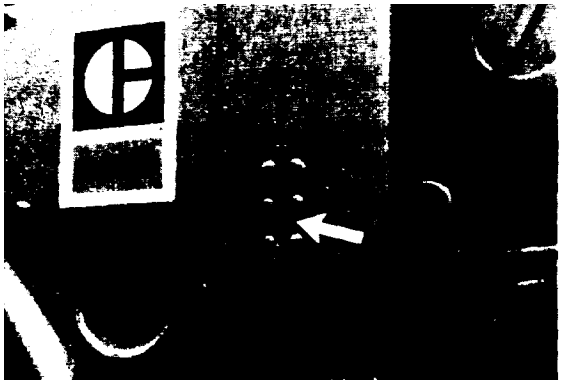
Maintain level between ADD and FULL marks on the sight gauge.



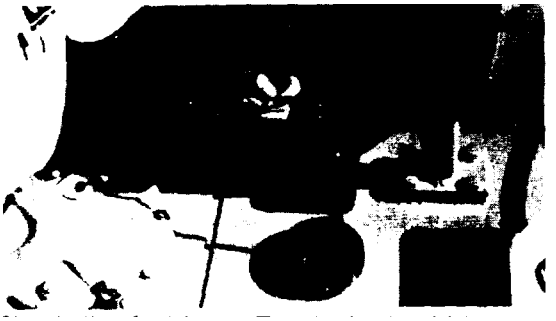
Check the coolant level with the engine cold. Maintain the level to within 1/2 inch of the bottom of the fill pipe.



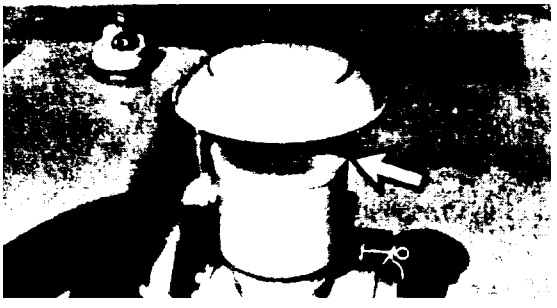
Have the air cleaner serviced if the YELLOW piston in the indicator reaches the red zone.



Maintain the hydraulic oil level between the ADD and FULL marks in the sight gauge.



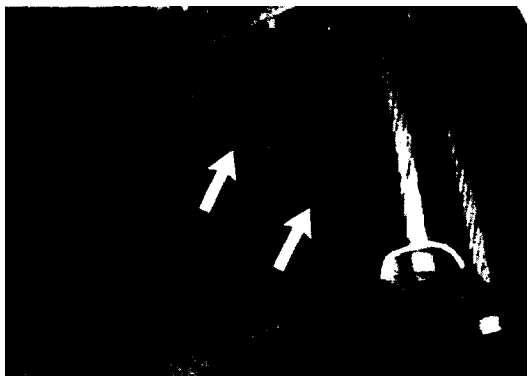
Check the fuel level. The tank should be full at the beginning of each shift.



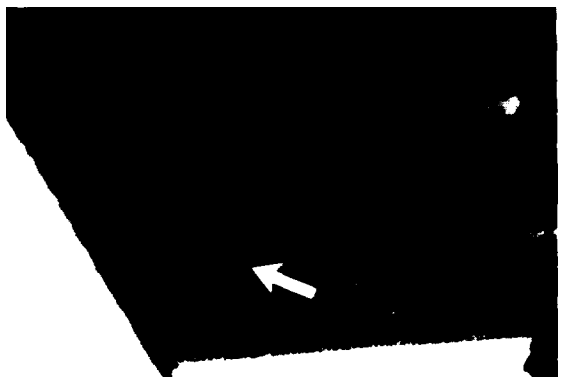
If the air precleaner screen is dirty, remove and clean the screen.

Drain any moisture and sediment from the fuel tank. Open the bleed valve and allow the moisture to drain. Close the valve.

NOTE: It is not usually necessary to drain the air tanks daily on an air dryer equipped machine.



Drain the moisture and sediment from the two tractor air reservoirs. Close the drain valves.



Drain the moisture and sediment from the one scraper air reservoir Close the drain valve.

Visually inspect the tires for cuts and gouges, and for proper inflation.

⚠ WARNING

Improperly inflated tires can cause excessive heat buildup, resulting in blowouts.

CAUTION

Over or under inflated tires can cause excessive or uneven tire wear, or rim damage.

Keep the valve caps on to prevent dirt from entering the valve stems. Otherwise, valve damage can occur.

Inspect tires with deep cuts or gouges.

Measure the tire pressure if a tire appears improperly Inflated.

Check the inflation pressure with the tires cold, and at the same outside (ambient) temperature in which the machine will operate. Use a Caterpillar Part Number 9S6524 or 1P545 Tire Pressure Guage, or equivalent.

Caterpillar recommends using dry nitrogen (N) gas for both tire inflation, and tire pressure adjustments on all current and past productron rubber tired machines. Nitrogen is an inert gas and will not support combustion inside the tire.

In addition to reducing the risk of an explosion, using nitrogen instead of air to inflate tires lessens the slow oxidation of the rubber and the accompanying gradual tire deterioration. This is especially important for tires that have an expected long service life (4 or more years) It also reduces the corrosion of rim components and the resultant disassembly problems.

⚠ WARNING

Proper nitrogen inflation equipment and training in its use are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or misused equipment.

Because a fully charged nitrogen cylinder's pressure is approximately 15 000 kPa (2200 psi), a tire blowout and/or rim failure can occur if the inflation equipment is not used correctly.

⚠ WARNING

Stand behind the tread when inflating a tire.

CAUTION

Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Use only a Caterpillar Part Number 6V4040 Nitrogen Tire Inflation Group, or equivalent, to inflate tires from a nitrogen gas cylinder.

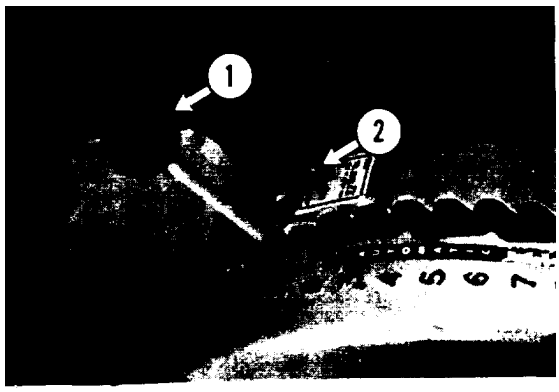
Use the same tire pressures for nitrogen inflation as would be used for air inflation.

When inflating tires in a heated area, make allowances in pressure for cold outside ambient temperatures.

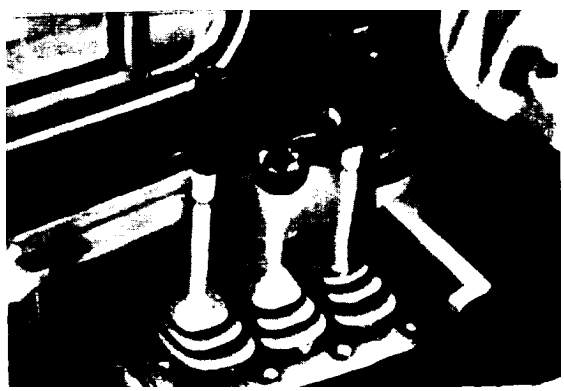
Starting the Engine

TM 5-3805-248-14&P-1

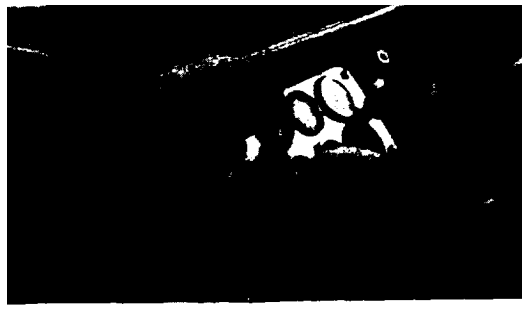
Above 16°C (60° F)



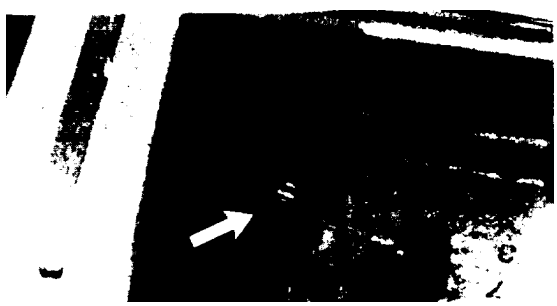
1. Move the transmission range selector ① to NEUTRAL and the lock ② to ON



2. Move all scraper hydraulic controls to HOLD.



3. Apply the parking brake.



4. Insert the key and turn the battery disconnect switch ON.

CAUTION

Never turn the disconnect switch OFF when the engine is running.

6. Push the accelerator pedal to just past ENGINE STOPPED detent.

7. Push in and turn the start switch to START. Release the switch when the engine starts.

CAUTION

After every 30 seconds of cranking, allow 2 minutes for the starting motor to cool.

8. If the engine oil pressure gauge doesn't register within 10 seconds, stop the engine by pulling up on the accelerator pedal. Have corrections made.

9. Keep the engine at low idle until the systems are warm.

10. Watch all gauges and indicators. They must have correct readings before moving the machine.

Starting the Engine

TM 5-3805-248-14&P-1

Cold Weather Starting

16ºC (60º F) to -12ºC (10ºF)

1. Follow the steps under “Above 16°C (6OºF)."

CAUTION

If the engine does not start after two attempts, use starting fluid. This will prevent excessive battery drain and starting motor overheating.

2. Use starting fluid by pushing the button located below the start switch, at 2 second Intervals, while cranking the engine See “Ether Aid” under “Starting Aids.”

-12ºC (l0°F) to -26ºF (-15ºF)

1. Follow the steps under “Above 16°C (6OºF).”

2. Coolant heaters are required.

3. An external battery source may be required if the battery charge is not maintained. See “Boost Start" under “Starting Aids.”

4. Starting fluid is required See “Ether Aid" under “Starting Aids."

Below -26ºC (-15ºF)

1. Follow the steps under "Above 16ºC (60ºF)."

2. Coolant heaters are required.

3. An external battery source may be required. See “Boost Starting” under “Starting Aids."

4. Starting fluid is required. See “Ether Aid” under “Starting Aids.”

Starting Aids

Winter Oils

The use of SAE10W viscosity oil in the compartments listed on the chart below will aid in cold weather starting.

CAUTION

Use SAE10W oil only in the temperature ranges indicated.

Compartment	SAE10W Viscosity Temperatures
Engine Crankcases	10°C (50°F) to -20°C (-4°F)
Transmissions	10°C (50°F) to -29°C (-20°F)
Hydraulic System	32°C (90°F) to -23°C (-10°F)

Batteries

Keep batteries charged to a corrected specific gravity of 1.250 or above. Otherwise, an external electrical source may be required.

Ether Aid

⚠ WARNING

Ether is a poison and is flammable.

Use it only in well ventilated areas.

Use it with care to avoid fires.

Avoid breathing the ether vapors, or repeated contact of ether with skin.

Do not use ether in environments above 90°C (200°F).

CAUTION

Use ether only while cranking the engine. Use it sparingly. Excessive ether can cause piston and ring damage. Ether is to be used for cold weather starting purposes only.

Push the button only while cranking the engine.

A metered amount of starting fluid (ether) is released each time the button is pushed.

After pushing the button, allow 2 seconds before pushing it again.

Continue the use of starting fluid every 2 seconds after the engine starts until it is running smoothly.

Starting the Engine

TM 5-3805-248-14&P-1

Boost Starting

⚠ WARNING

Do not allow cable ends to contact each other or the machine.

Prevent sparks near the batteries. They could cause battery vapors (hydrogen) to explode.

CAUTION

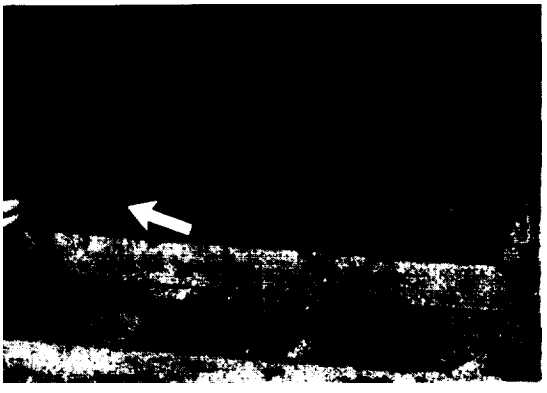
When using an external electrical source to start the machine, turn the disconnect switch off and remove the key before attaching booster cables.

This machine has a 24 volt starting system. Use only an equal voltage for boost starting. Use of a welder or higher voltage will damage the electrical system.

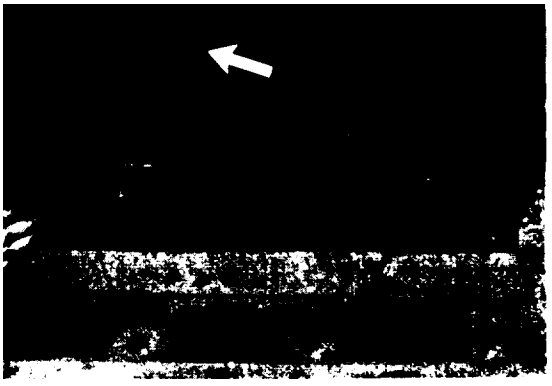
Connect cables in parallel, POSITIVE (+) to POSITIVE (+) and NEGATIVE (-) to NEGATIVE (-).

Using Booster Cables:

1. Turn off the battery disconnect switch. Remove the key.



2. Connect one end of a cable to the POSITIVE (+) (ungrounded) terminal of the battery of the machine to be started. Connect the other end to the POSITIVE (+) terminal of the starting source.



3. Connect one end of the second cable to the NEGATIVE (-) (grounded) terminal of the power source. Connect the opposite end to the starter ground terminal of the machine to be started.

4. Insert the key and turn on the disconnect switch.

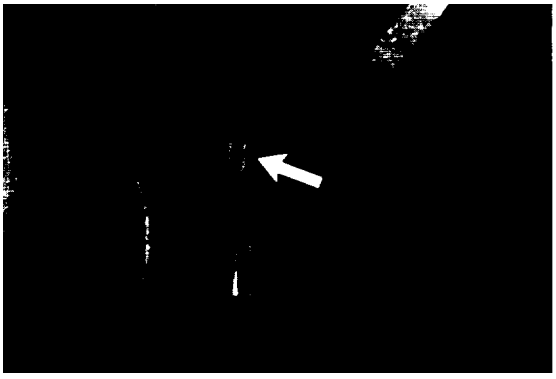
5. Start the engine.

6. Disconnect the cable from the starter ground terminal of the machine being started, first. Disconnect the other end from the NEGATIVE (-) terminal of the power source.

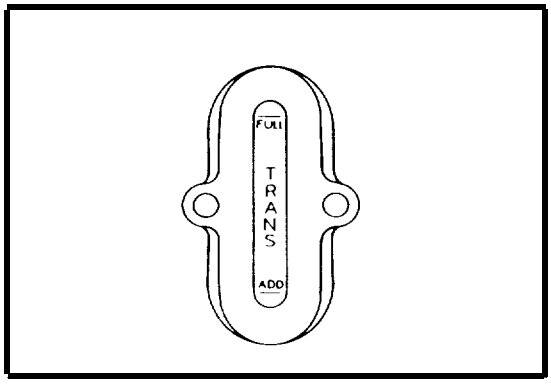
7. Disconnect the cable from the POSITIVE (+) terminal of the battery of the machine being started. Disconnect the other end from the POSITIVE (+) terminal of the power source.

After Starting

Be sure all gauges are in the normal operating range. Make sure the parking brake is applied.

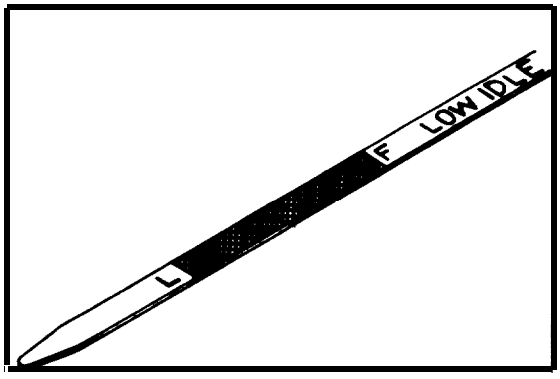


Check the transmission oil level with the engine running at low idle.



Maintain level between ADD and FULL marks on the sight gauge.

Check the engine oil level between shifts with the engine running, if it is not to be stopped.



Maintain the oil level in the area shown on the LOW IDLE side of the dipstick.

Operate the engine at low idle until the hydraulic oil is warm.

Test the hydraulic controls. Allow extra warmup time if they are sluggish.

Moving the Machine

TM 5-3805-248-14&P-1

⚠ WARNING

Be sure no one is working on or near the machine.

1. Adjust the seat as shown in the "Safety" section.

2. Fasten and adjust the seat belt.

CAUTION

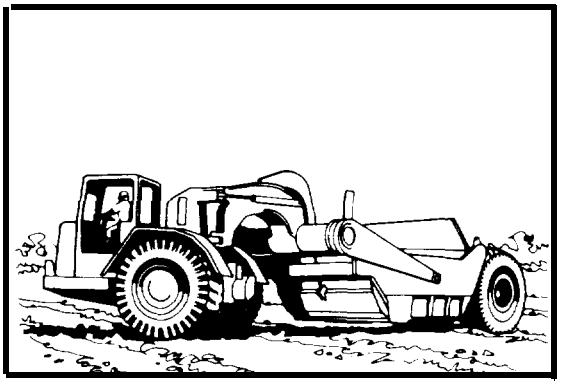
The air pressure gauge must be in the operating (GREEN) range.

3. Apply the service brake.

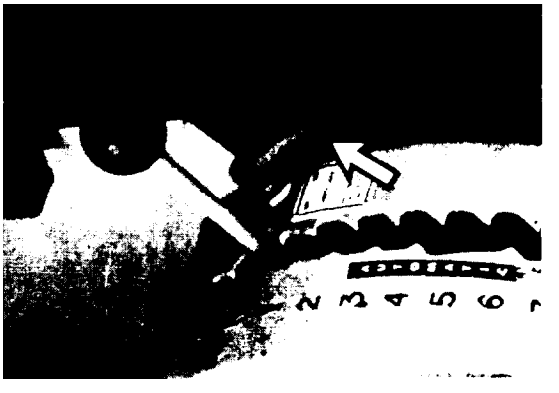
4. Release the parking brake.

CAUTION

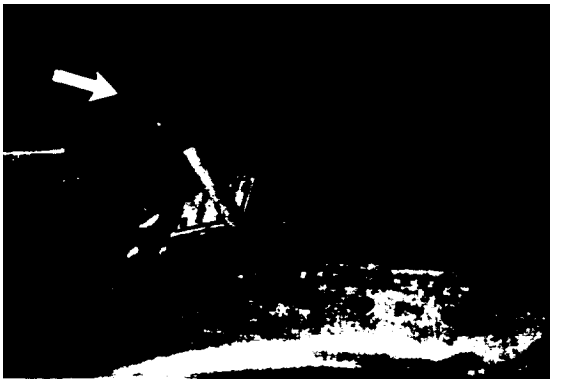
Brake damage can occur if the machine is moved with the brake applied.



5. Raise the scraper bowl just high enough to clear obstacles.



6. Turn the neutral lock OFF.



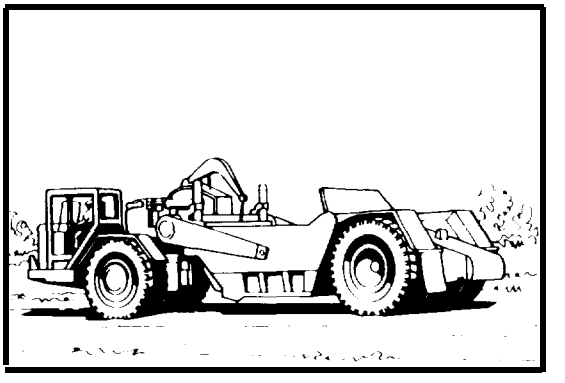
7. In one quick motion, move the transmission range selector to the highest desired speed.

NOTE: The engine can be started with the transmission in other than NEUTRAL. However, the machine will not move. Should this occur, move the transmission range selector to NEUTRAL then to the desired speed.

8. Release the brake pedal and push the accelerator down.

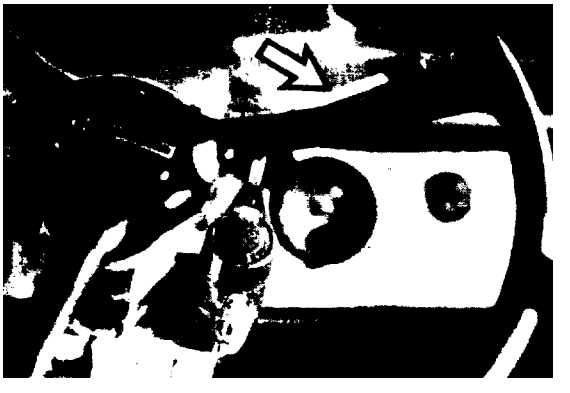
⚠ WARNING

Never coast on a down grade. Keep the transmission engaged.



9. Move th**e machine to an open area. Operate all the hydraulic controls, the brakes, and the steering to check for proper function. Stop and move the transmission control to reverse to check the operation of the backup alarm.**

10. The transmission will shift automatically until the highest speed selected is reached.



11. Use the retarder on downgrades, when entering turns, fill areas or the cut.

12. Apply the service brakes to stop the machine.

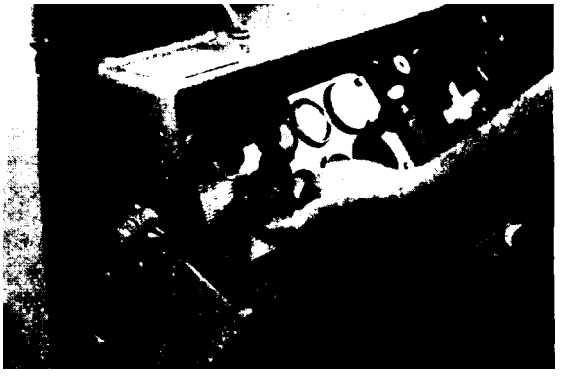
Emergency Stops

⚠ WARNING

Stop the machine immediately if the low air pressure indicator goes on, or the electric warning horn sounds. There may be a malfunction of the air and brake system.

CAUTION

After an emergency stop, be sure the air pressure is in the operating range before moving the machine.



Pull the button out to apply the emergency brakes if the service brakes fail.

The emergency brake will be applied automatically if the air pressure in the reservoirs drops below 280 kPa (40 psi).

CAUTION

If the air pressure drops, or if the emergency brakes are applied, be prepared for a sudden stop.

Have your seat belt properly adjusted at all times.

Changing Speed and Direction

Transmission Range Selector

First, second and reverse are torque converter driven. Third through eighth speeds are direct drive.

First and reverse must be selected manually. The transmission will shift automatically between second and any other speed selected in the automatic range (third through eighth).

Manual shifting during loading, hauling or spreading is not necessary or recommended. Select the highest usable speed for job conditions.

However, if more wheel torque is required, manually shift to first speed.

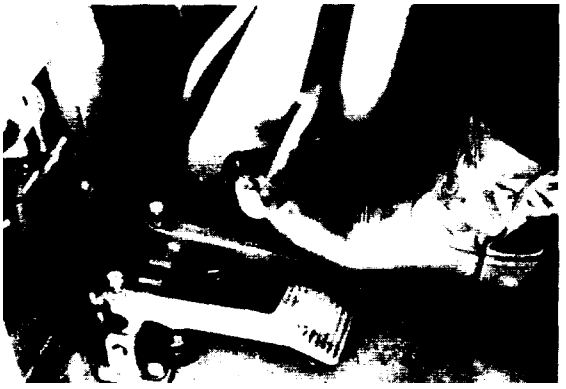
CAUTION

First speed is not protected by downshift inhibitor. Engine overspeed could result if the transmission is shifted into first speed at over 8 kph (5 mph).

The machine must be stopped and the engine must be running at low idle when changing direction.

For more information on the most efficient use of the transmission, see “Operating Techniques for the Caterpillar Eight Speed Transmission,” Caterpillar Form Number SEBU5459.

Transmission Hold Pedal



Use the transmission hold pedal to prevent undesired shifting of the transmission.

Apply the transmission hold to prevent upshifts while loading or dumping.

Slow the machine and depress the pedal, to hold the transmission in low gear, before starting down a grade.

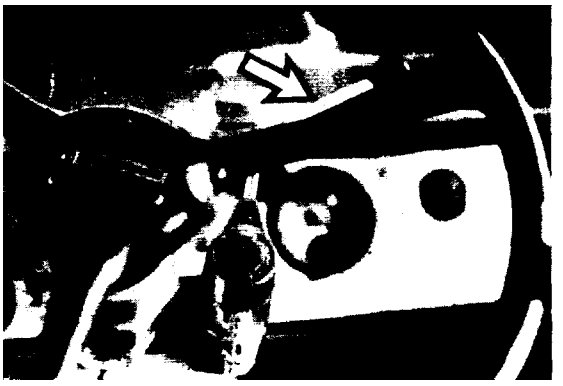
Hold the transmission in a lower gear to increase engine rpm when approaching an upgrade.

In rough terrain it prevents continuous upshifting and downshifting.

The transmission hold pedal may be used to skip gears for operator comfort, when slowing to enter the cut or fill area. Skip only one gear at a time. Do not skip gears below 5th

To skip a gear, push down the pedal. Allow the ground speed to slow enough to cause the transmission to downshift two times. Release the pedal.

Hydraulic Retarder



Use the retarder to slow the machine, or prevent engine overspeed.

CAUTION

The retarder will not completely stop the machine.

Keep engine rpm under 2300.

Use the retarder on downgrades to prevent engine overspeed. It also helps prevent excessive heating and wear of brakes.

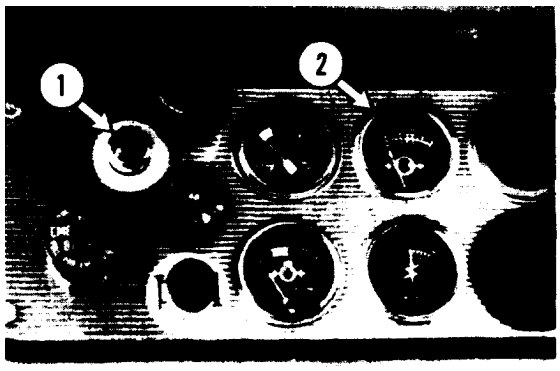
Use the retarder when entering a cut or fill area to slow the machine. This will allow the transmission to downshift. When the desired speed is reached, depress the transmission hold pedal.

Use the retarder to help stop the machine, to save brakes and help prevent brake overheating.

CAUTION

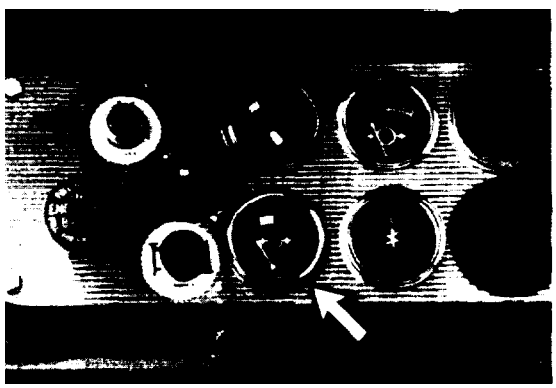
If continuous overheating of retarder oil is a problem, use a lower transmission speed.

Gauges and Indicators

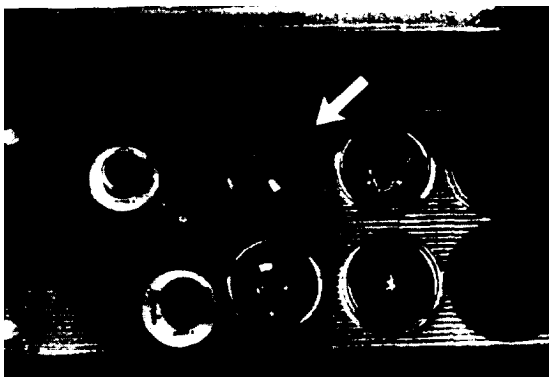


Stop the machine immediately if the low air system warning light ① goes on, the low air warning horn sounds, or the air pressure gauge ② is in the red range.

Have repairs made if air pressure will not build up.



Stop the machine and stop the engine if the engine oil pressure gauge drops into the red range. Have repairs made.



If the engine coolant temperature gauge reaches the red range, stop the operation.

If no coolant leak is apparent, operate the engine at high idle (with no load). This will dissipate heat through the radiator.

If coolant is leaking, stop the engine and have repairs made.

CAUTION

Do not add coolant to an overheated engine. Allow it to cool first.

If the converter and retarder oil temperature is in the red range, stop operation and discontinue retarder use.

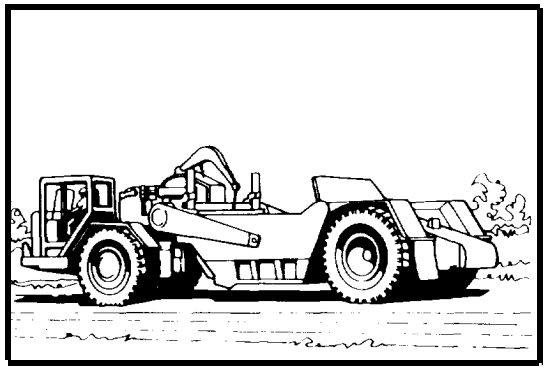
Operate the engine at high idle (with no load) to dissipate heat.

If the oil constantly overheats, use a lower transmission speed for operation.

If the temperature remains high, stop the engine. Have repairs made.

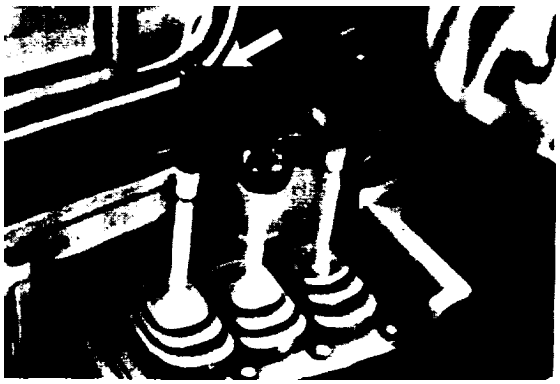
Parking the Machine

Stopping the Machine



1. Move the machine to a safe, level location. Use the retarder and service brakes to stop the machine.

2. Move the transmission range selector to NEUTRAL and the transmission neutral lock to ON.



3. Lower the bowl and close the apron.

4. Pull the button out to apply the parking brake.

Stopping the Engine

CAUTION

Stopping the engine immediately after it has been working under load, can result in overheating and accelerated wear of the engine components. Follow the stopping procedure outlined below, to allow the engine to cool. This will also prevent excessive temperatures in the turbocharger centerhousing, which would cause oil coking problems.

1. Park the machine and operate the engine at low idle for 5 minutes.

2. Lift the toe of the accelerator to stop the engine.

3. Turn the disconnect switch OFF and remove the key.

4. Fill the fuel tank at the end of the shift This will drive out moisture laden air.

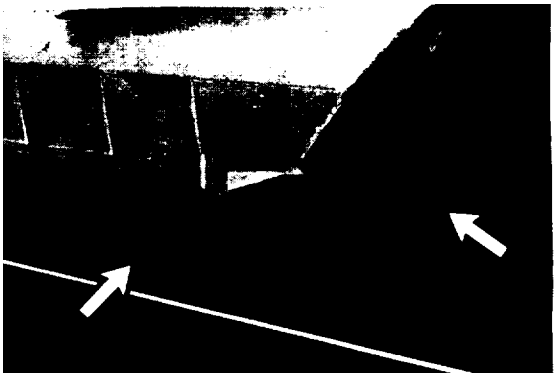
5. In freezing weather, drain the air reservoirs.

6. When leaving the machine, close and lock the cab door and windows. Lock all vandalism guards and covers in place.

⚠ WARNING

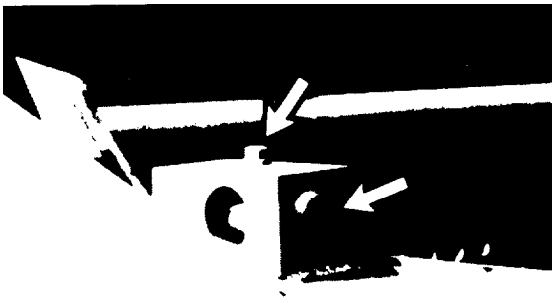
Lower or block the bowl and apron when making adjustments, or doing maintenance in the bowl area.

To Block the Bowl



Lower the bowl to the ground or lower it onto blocks.

To Block the Apron



1. Raise the apron. Remove the blocking pin locking bolt ① and the blocking pin ②

2. Turn the pin 90º and install it through the block, under the raised apron. Install the locking bolt. Lower the apron onto the pin.

Apron Adjustment

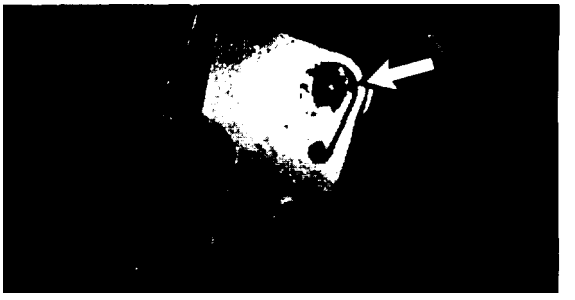
⚠ WARNING

Apron adjustment is a two-person operation.

Operate the apron control slowly and cautiously to prevent pin binding, or personal injury. Make sure the operator has full view of the adjustment area.

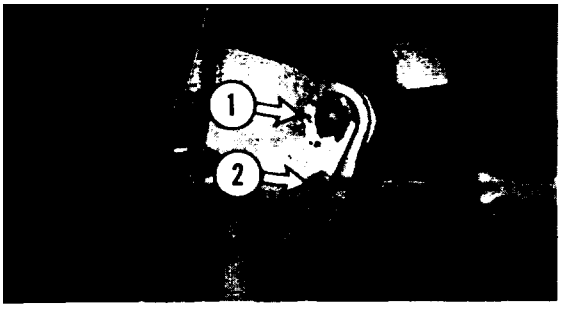
Wear protective glasses. Use caution when inserting or striking the pin.

1. Use the lower pin position to permit a wider apron opening. Use it for heavy material.



2. Use the upper pin position to allow the apron to be closed fully. Use it when hauling sand or other loose material.

To Adjust:



1. With the apron blocked, remove the retaining bolt ②. Remove the shaft assembly ①.

2. Align the rod with the alternate hole in the bracket. Install the shaft and the bolt.

3. Raise the apron. Remove the blocking and install it in the storage position.

Operating Adjustments

TM 5-3805-248-14&P-1

Replace or Rotate Cutting Edges

Replace or rotate cutting edges, or router bits, before the mounting surfaces become worn.

CAUTION

Do not weld on cutting edges. Welding will reduce the service life.

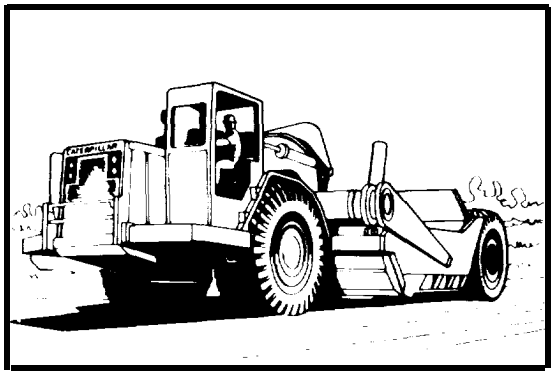
See the "Maintenance" Guide for the correct maintenance procedures and bolt torques.

Each section has two cutting edges. Rotate the sections 180º for double wear.

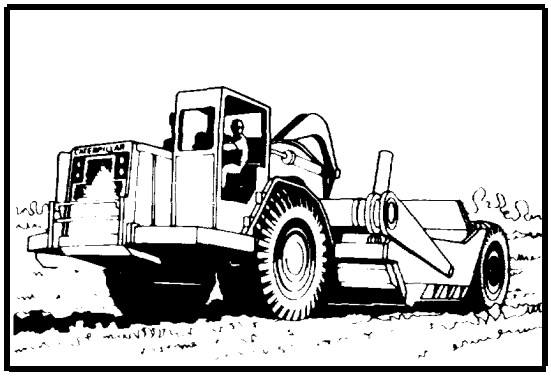
For additional wear, the end sections can be moved from one side to the other.

Each router bit has two cutting edges. For double wear, rotate them 180º, and install them on the opposite sides.

Loading



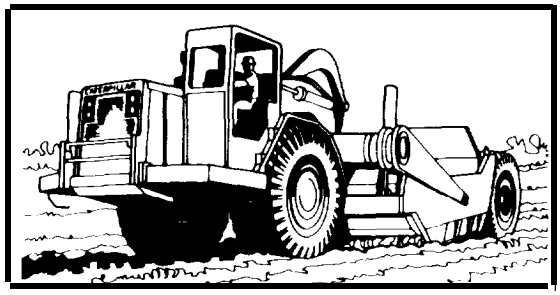
1. When coming to the cut, reduce your travel speed with the service brakes, or retarder. The transmission will downshift to 2nd speed automatically.



2. Move the elector to the rear. Open the apron part way.

3. When the transmission shifts to 2nd speed, push down the hold pedal.

4. Keep the engine rpm in the operating range. Start the cut. Maintain a steady speed while the pusher makes contact.

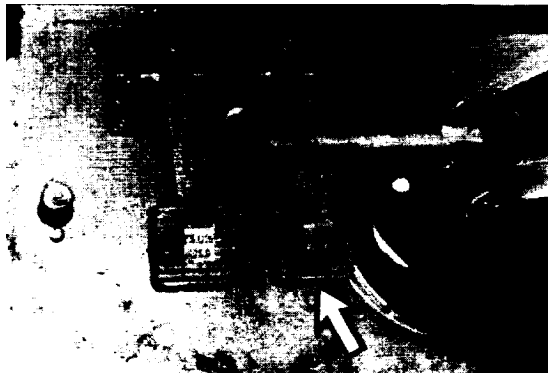


5. Lower the bowl to an efficient cut depth.

The cut should be as deep as possible. It should allow the machine to move at a constant speed, without lugging the engine.

Decrease the cut depth if the machine or pusher engine lugs, or the drive wheels slip.

Use 1st speed if more torque is required at the wheels.



6. Wheel slippage can increase tire wear drastically. A great amount of slipping can occur, unnoticed by the operator. Use the differential lock to prevent one wheel from spinning.

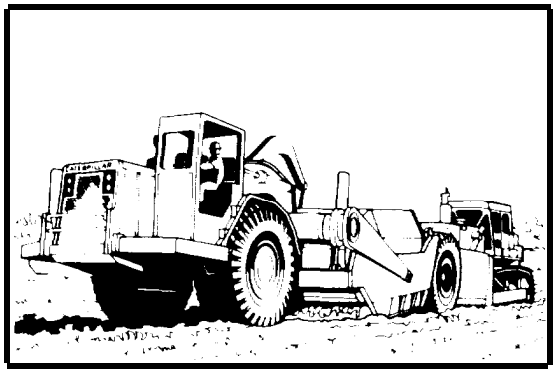
⚠ WARNING

Do not attempt to turn the machine with the differential lock applied.

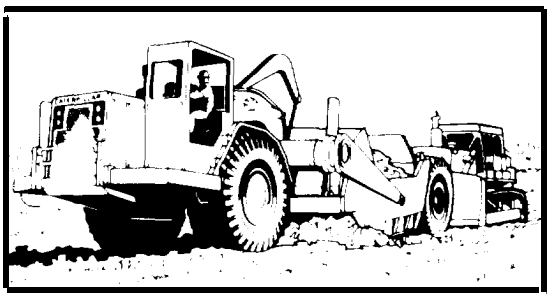
CAUTION

Do not engage the differential lock with one wheel spinning. Decrease engine rpm until the wheels stop spinning.

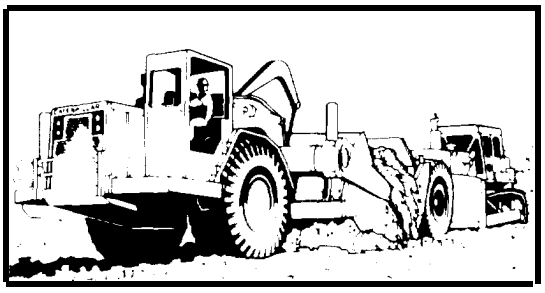
If the wheels slip in soft or very hard material, neutralize the transmission Allow the pusher to do the work.



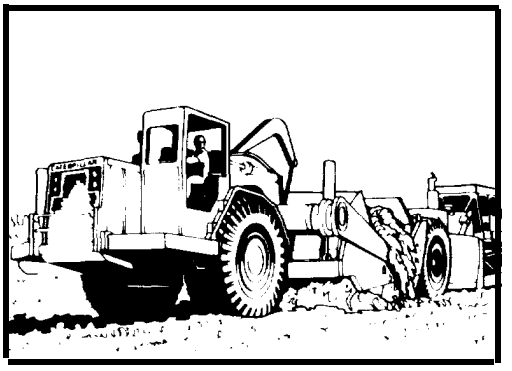
8. Gauge the most efficient depth of cut by the depth of the router bits. Use this depth on successive passes.



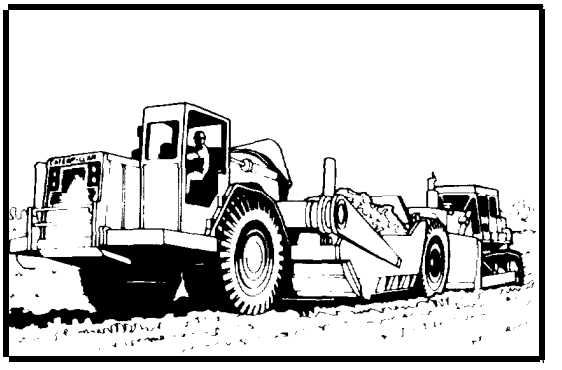
9. Regulate the apron opening to prevent material from piling in front of the lip, or falling out of the bowl.



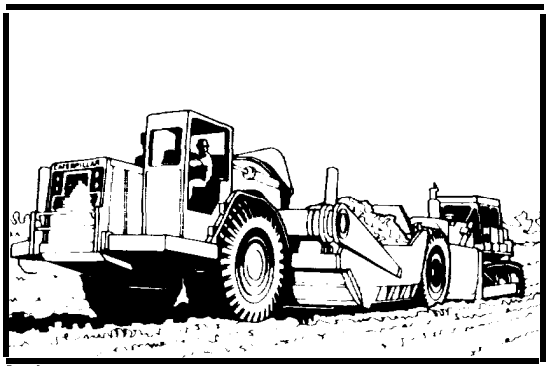
10. Keep the machine moving in a straight line. Keep the pusher in line with the machine.



11. Do not overload the bowl. It lowers efficiency It will also cause machine overloading.



13. Allow the pusher to help the machine out of the cut area, if necessary.

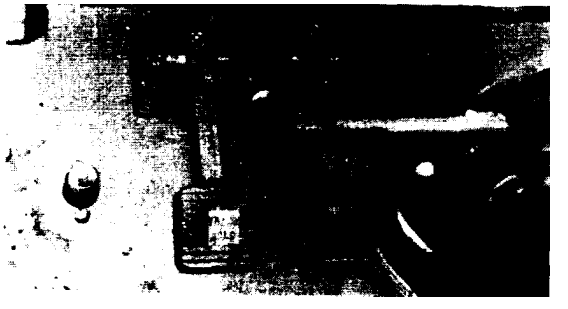


12. When the bowl is full, raise it slowly to leave the cut smooth. Close the apron.

CAUTION

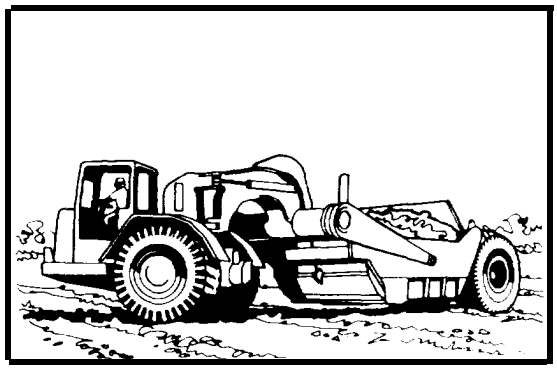
Maneuver around large objects to load or unload them. Driving over them could damage the transmission case.

Raise and lower the bowl rapidly to load loose material. When loaded, close the apron as the bowl is raised. This prevents spillage.

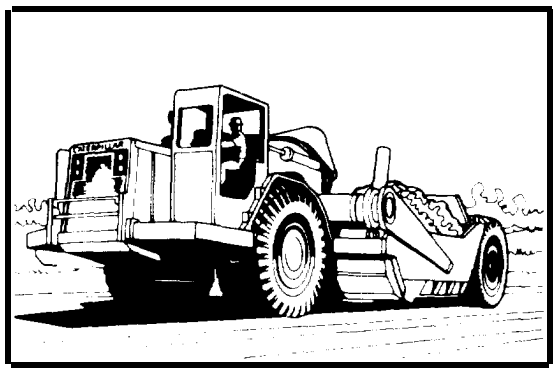


14. Release the transmission hold and/or differential lock. Accelerate to travel speed as quickly as possible. Move the hitch control to CUSHION RIDE position.

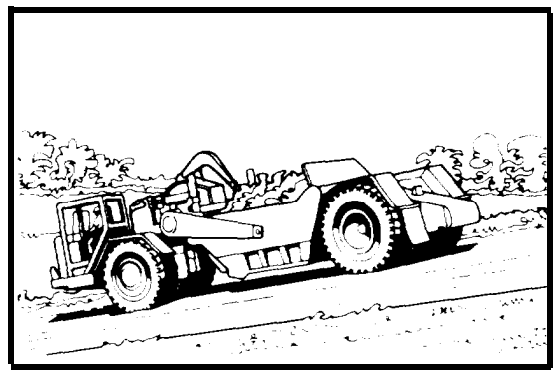
Hauling



Carry the bowl just high enough to clear obstacles.



2. Travel at the highest safe speed.



3 . Use the retarder and service brakes to control speed on a downgrade.

⚠ WARNING

Never coast on a downgrade. Keep the transmission engaged.

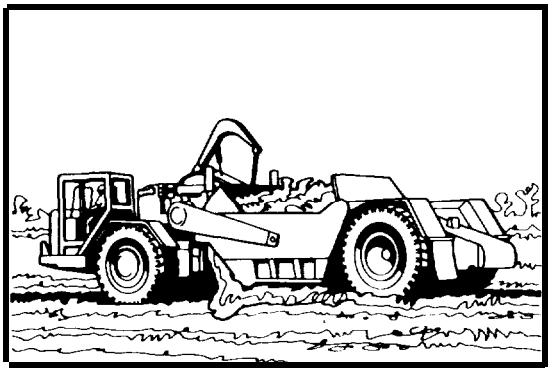
CAUTION

Keep retarder temperature in the normal (GREEN) range.

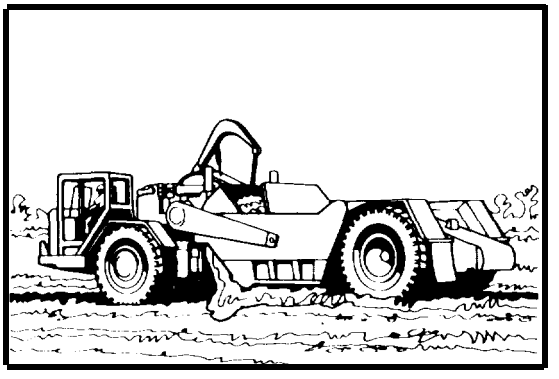
Keep engine speed below 2300 RPM.

4. When approaching a downgrade, slow down to allow the transmission to downshift. Use the transmission hold on the downgrade to prevent upshifting.

5. Use the transmission hold to prevent unwanted upshifts. Use it when approaching an upgrade, or in rough underfooting.

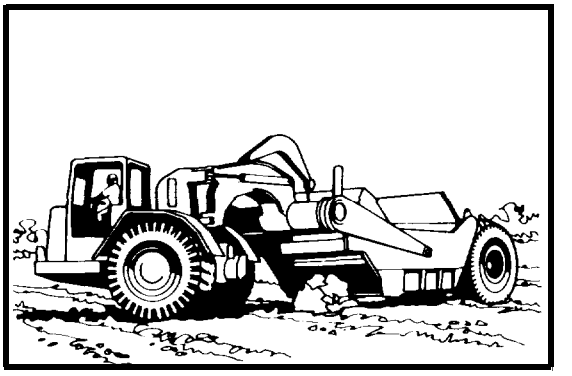


1. Dump material at the highest practical travel speed.

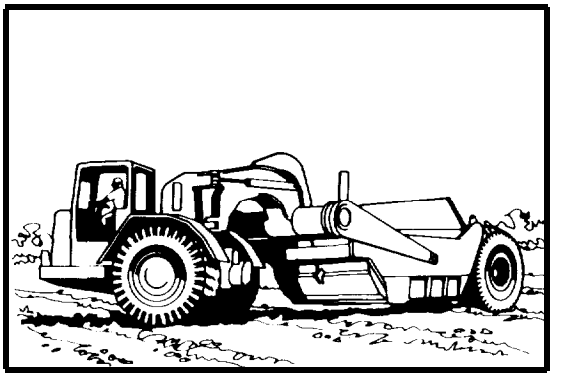


2. Lower the bowl to the desired spread height. Open the apron at the start of the dump area.

3. When the material has fallen from the back of the apron, move the elector forward.



4. When the bowl is empty, close the apron. Return the ejector to the rear.



5. Raise the bowl slowly to leave the fill area smooth. Then raise it high enough to clear obstacles.

6. Return to the cut at the highest safe speed.

Transporting Hints

TM 5-3805-248-14&P-1

CAUTION

Check the regulations covering transportation of cylinders containing compressed gas.

Check the travel route for overpass clearances. Be sure that there will be adequate clearance if the machine being transported is equipped with a ROPS (Rollover Protective Structure) or cab. Observe laws for width, weight and hauling permits.

Transporting on a Trailer or Flatcar

⚠ WARNING

Do not depend on the brake system to hold the machine on the trailer or flatcar.

Always block and adequately secure the machine.

CAUTION

Block the trailer or flatcar wheels before loading the machine onto it. Remove ice, snow or slippery material from the loading dock and trailer or flatcar before loading.

1. Lower the bowl and apron.

2. Stop the engine.

3. Turn OFF the disconnect switch and remove the key.

4. Block the tractor and scraper wheels. Secure the machine with adequate tie downs.

CAUTION

Protect the engine cooling system with anti-freeze, to the lowest expected temperature on the travel route, or drain cooling system completely.

5. Install and lock vandalism guards, covers, and caps.

6. Cover the engine exhaust opening to prevent turbocharger "windmilling" in transit.

7. Cover the operator's seat, or 11 equipped with a cab, close and lock the cab door.

Transporting with the Tractor on a trailer and the Scraper Wheels on the Ground

⚠ WARNING

When hauling the machine with the scraper wheels on the ground, brake air pressure could bleed down and cause the emergency brakes to be applied.

If scraper brakes are applied the machine could be pulled off the trailer.

To prevent this, remove the pin connecting each scraper rotochamber to the brake slack adjuster and remove the rotochamber.

CAUTION

Do not exceed 32 km/h (20 mph). Stop every three hours or 64 km (40 miles) for 30 minutes to allow tires and bearings to cool.

Tire Pressures

Use the tire shipping pressures shown in the chart when transporting the machine on a flatcar or trailer.

Tractor

Size	Type and Rating	Shipping Pressure	
		kPa	psi
29.5 x 29	28 ply bias	415	60

Scraper

Size	Type and Rating	Shipping Pressure	
		kPa	psi
29.5 x 29	28 ply bias	275	40

CAUTION

Consult manual for the operating pressure when the machine is put into operation.

Caterpillar recommends inflation of tires with dry nitrogen (N_2). See the "Before Starting" section for nitrogen inflation information.

Abnormal Conditions

Roading

1. Bring the coolant, oil in all compartments, wheel coolant, and fuel to proper levels.

2. Clean the windshield, side and rear glass Clean all lights and reflectors.

3. Make sure all headlights, taillights, turn signals and hazard warning lights function properly.

4. Have a fire extinguisher, flares and reflectors with machine.

5. When roading long distances, stop every three hours for 30 minutes to allow the brakes, wheel bearings and tires to cool.

6. If it is necessary to leave the machine unattended:

a. Lower all equipment.

b. Neutralize the transmission and apply lock.

c. Set the parking brake.

d. Stop the engine. Turn off the disconnect switch and remove the key.

e. Install and lock vandalism guards, covers and caps. If equipped with a cab, close and lock the cab door and windows.

f. At night set out flares and/or reflectors.

Towing

These instructions are for an emergency only. Always haul the machine if long distances must be traveled.

⚠ WARNING

When towing, attach the tow line only to the tow connection on the frame.

Do not tow faster than 5 mph (8 kph).

Shielding must be provided on the towing and towed vehicle to protect the operators if the tow line should break.

Be sure the line is of sufficient capacity and in good condition. Do not have tension on the towline when inspecting it. Do not jerk the tow line. It may break.

Use a machine of sufficient size to provide braking.

Use a tow bar if the machine is to be moved more than a few feet. If a tow bar is not available, attach a machine of equal size to the rear of the towed machine to provide braking when going downhill.

CAUTION

Do not move the machine with the parking brake applied. The brake will be damaged.

If the machine was moved with the brakes applied, inspect the brakes before operating it.

1. Keep the tow line straight. Do not exceed a 30º angle from straight ahead position.

2. Do not inspect the cable when it is taut. Inspect the tow line connections before taking up the slack. Refasten the line if necessary.

3. After attaching the line securely, move the towing vehicle slowly to take up the slack.

With the Engine Running:

The machine may be pulled out of mud or to the side of the haul road if the power train and steering system are operable. The operator on the towed vehicle must steer in the direction of the tow line.

With the Engine Stopped:

⚠ WARNING

Do not allow riders on the machine being towed.

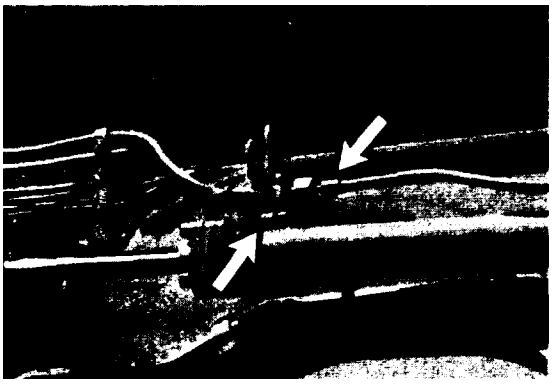
Block the wheels before releasing the brakes, or when parking the machine with the brakes released.

---

1. If the power train is damaged, do not operate the engine.

2. Remove the axle shafts from the drive wheels.

3. Release the braking system with an external air source. Consult your Caterpillar dealer for the correct procedure.



CAUTION

To allow the steering cylinders to move freely, reverse the hydraulic hose connections on one steering cylinder only.

Be sure to connect the steering hoses correctly after towing. With the hoses reversed, the steering will be inoperable.

If the brakes have been released, block the wheels when stopped.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, ***United States Army***
Chief of staff

Official:

DONALD J. DELANDRO
Brigadier **General,** ***United*** **States** ***Army***
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25 B-R (Quantity required blocks 405, 406, 407) Operator's, Organizational, Direct Support and General Support Maintenance Manual Requirements for Scrapers, Earth Moving.

*U.S. GOVERNMENT PRINTING OFFICE: 1994. 300-421/82249

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

Your Mailing Address

DATE SENT (Date Sent In)

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-3805-248-14&P-1	AUG 1985	Scraper, Earth Moving

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
43	2	15	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Turn widgett 180 degrees to install, not 90 degrees as stated in the TM.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

PFC John Doe AV 786-7419

SIGN HERE John Doe

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P S --IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOL

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

SAMPLE

COMMANDER
U.S. ARMY TANK-AUTOMOTIVE COMMAND
ATTN: AMSTA-MB
WARREN, MI 48397-5000

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-3805-248-14&P-1	AUG 1985	Scraper, Earth Moving

BE EXACT . . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBERS

SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. ARMY TANK-AUTOMOTIVE COMMAND
ATTN: AMSTA-MB
WARREN, MI 48397-5000

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

THEN . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-3805-248-14&P-1	AUG 1985	Scraper, Earth Moving

BE EXACT . . PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBERS

SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. ARMY TANK-AUTOMOTIVE COMMAND
ATTN: AMSTA-MB
WARREN, MI 48397-5000

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-3805-248-14&P-1	AUG 1985	Scraper, Earth Moving

BE EXACT . . PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBERS

SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. ARMY TANK-AUTOMOTIVE COMMAND
ATTN: AMSTA-MB
WARREN, MI 48397-5000

TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

5/9(°F − 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5(°C + 32) = °F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621