



**CHAMPION**  
**MOTOR GRADERS**

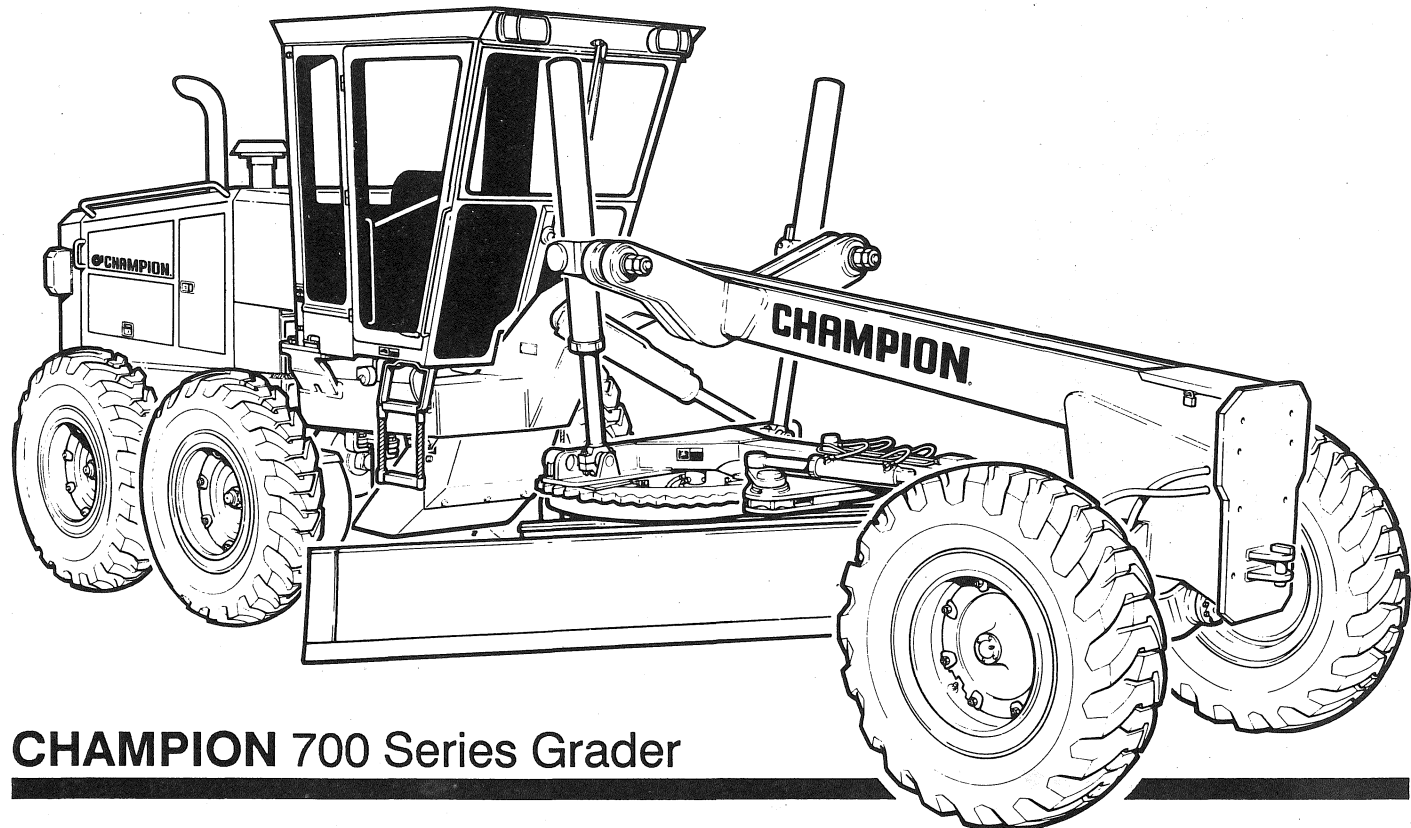
**700 SERIES GRADER**

# **Series III Operator's Manual**

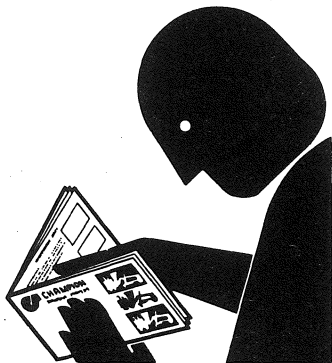
**Contains Important Operating,  
Safety and Maintenance Instructions**

**Keep with the grader at all times**





**CHAMPION 700 Series Grader**

**! WARNING**

Do not operate this machine unless you have read and understood the instructions and warnings in the Champion Operator's Manual and the CIMA Grader Safety Manual.

Failure to follow the instructions or heed the warnings could result in injury or death. Proper care is your responsibility.

Contact your distributor or Champion for replacement manuals and decals.

48630

In case of difficulty in obtaining Parts or Service for your motor grader, please contact Champion Road Machinery, Goderich, Ontario, Canada.

**Telephone: 519-524-2601**

**Telefax: 519-524-3021**

**Telex: 069-55175 CHAMPARTS GDCH**



PRINTED ON RECYCLED PAPER

This is your **700 Series Operator's Manual**. It contains important safety, operating, and maintenance information. Keep it with your grader at all times.

Your safety, and the safety of those around you, depends on using care and judgement when operating and servicing your grader. Safety instructions and warnings are listed in the "**Safety Precautions**" section of this manual. Do not operate the grader until you read and understand the warnings and instructions in this manual. Failure to follow the instructions or heed the hazard alerts, safety signs and precautions could result in injury or death.

Your Operator's Manual includes information on how to use your grader. It will help you to understand the positions and functions of all controls as well as the operating characteristics of the grader. If any questions arise concerning the operation of the grader, consult your supervisor or your Champion Distributor.

Proper operation and maintenance are the two most important ways to avoid downtime. The "**Maintenance and Lu-**

**brication**" section tells you how to take care of your grader. Champion grader repairs should only be done by qualified service personnel. If a problem occurs, report it to your supervisor or your Champion Distributor as soon as possible. Detailed service information is in the "**700 Series Shop Manual**", part number **L 2005**, available from your Champion Distributor.

Every new Champion grader is shipped with a "**CIMA Grader Safety Manual**" published by the Construction Industry Manufacturers' Association and an "**Engine Manual**". Read them carefully before operating or servicing your grader.

The information in this Operator's Manual is current at the time of publication. Some items described in this manual are optional. Champion Road Machinery reserves the right to make product improvements without notice. Extra manuals are available from your Champion Distributor or Champion Road Machinery Service Department, Goderich, Ontario, Canada N7A 3Y6.

Changes of any kind to this Champion product including the fitting of unauthorized attachments, accessories, assemblies or parts could affect the integrity of the product and/or the ability of the product to perform as designed or intended.

IT IS CHAMPION'S POLICY THAT NO MODIFICATION OF ANY KIND IS TO BE MADE TO CHAMPION PRODUCTS UNLESS THE MODIFICATION IS OFFICIALLY APPROVED BY CHAMPION. A MODIFICATION INCLUDES, BUT IS NOT RESTRICTED TO, THE USE OF ATTACHMENTS, ACCESSORIES, ASSEMBLIES AND PARTS NOT APPROVED BY CHAMPION AND/OR NOT INSTALLED IN A FACTORY APPROVED MANNER.

Modifications are officially approved if at least one of the following conditions is met:

1. The attachment, accessory, assembly or part is manufactured or distributed by Champion and affixed in a factory approved manner; or
2. The modification has been approved in writing by the Engineering Department of Champion.

Champion Road Machinery Limited disclaims responsibility for any situation which may arise as a result of a non approved modification. If any person or organization modifies or contributes in any way to a non approved modification, the person or organization will be deemed to have assumed all the risks associated with such a modification, including but limited to, product failure, product damage, property damage, loss of production, injury or death.

If any claims against Champion result from a non approved modification, Champion will protect its interest by taking whatever action is appropriate.

Champion's warranty shall not apply to any product or part which fails or is damaged by or whose functioning or operation is adversely affected by non approved modification.

## 700 Series Operator's Manual

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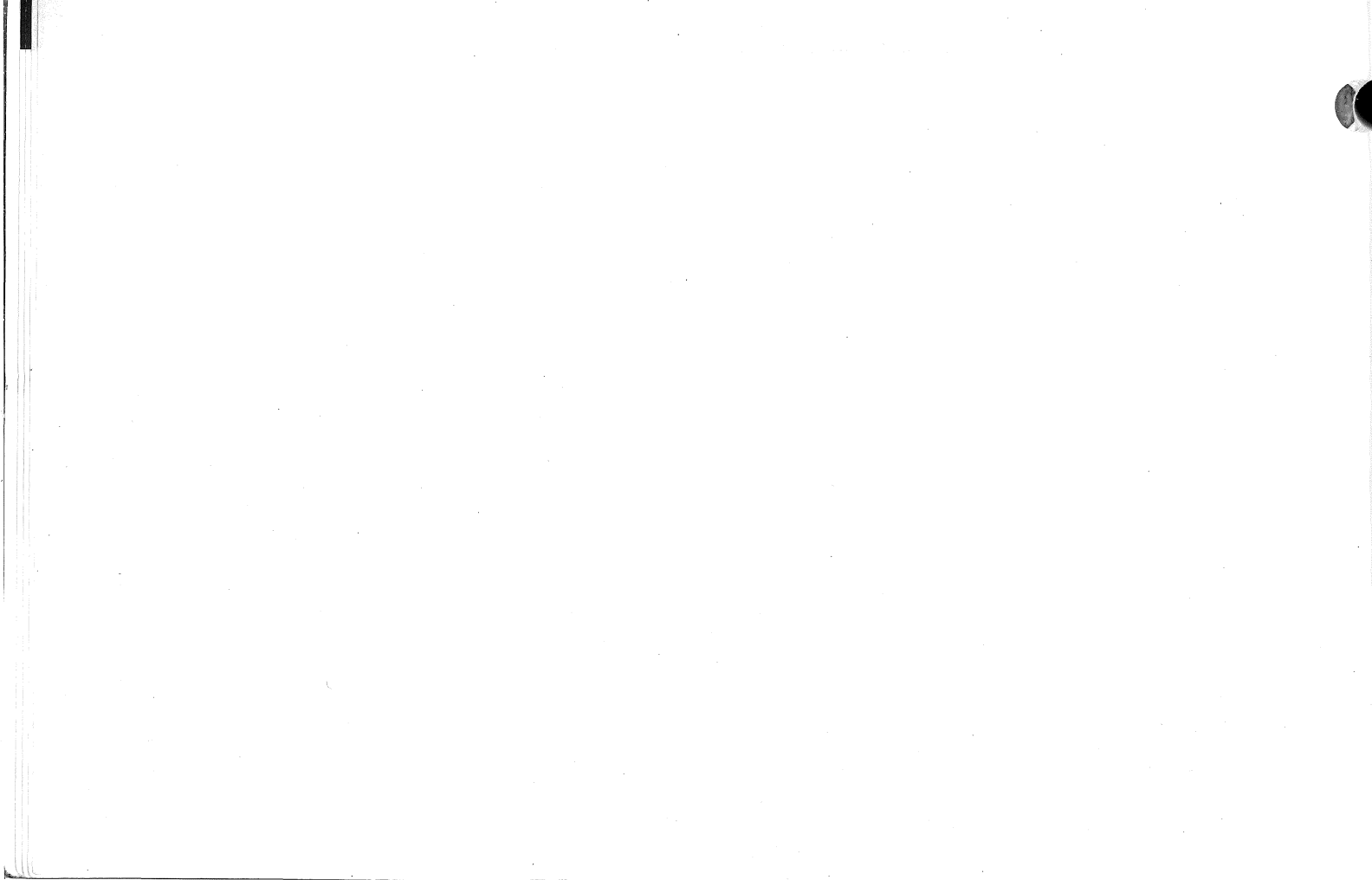


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# Hazard Alerts


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**DANGER, WARNING, and CAUTION** are hazard alerts used in this manual and on grader safety signs to identify hazards on or near the grader.

**SAFETY INSTRUCTIONS** indicate procedures which must be followed to avoid hazards.

The hazard alerts are identified by word, and the symbol .



**DANGER** - Immediate hazards which **WILL** result in severe personal injury or death if the proper precautions are not taken.



**CAUTION** - Hazards or unsafe practices which **COULD** result in product or property damage if the proper precautions are not taken.



**WARNING** - Hazards or unsafe practices which **COULD** result in personal injury or death if the proper precautions are not taken.



**SAFETY INSTRUCTIONS** - Indicate procedures that must be followed for the safe operation of the grader.

Champion cannot anticipate every possible circumstance that might involve a hazard. The hazard alerts and safety instructions in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by Champion is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the grader will not be damaged or made unsafe by the operation, maintenance or repair procedures you choose.

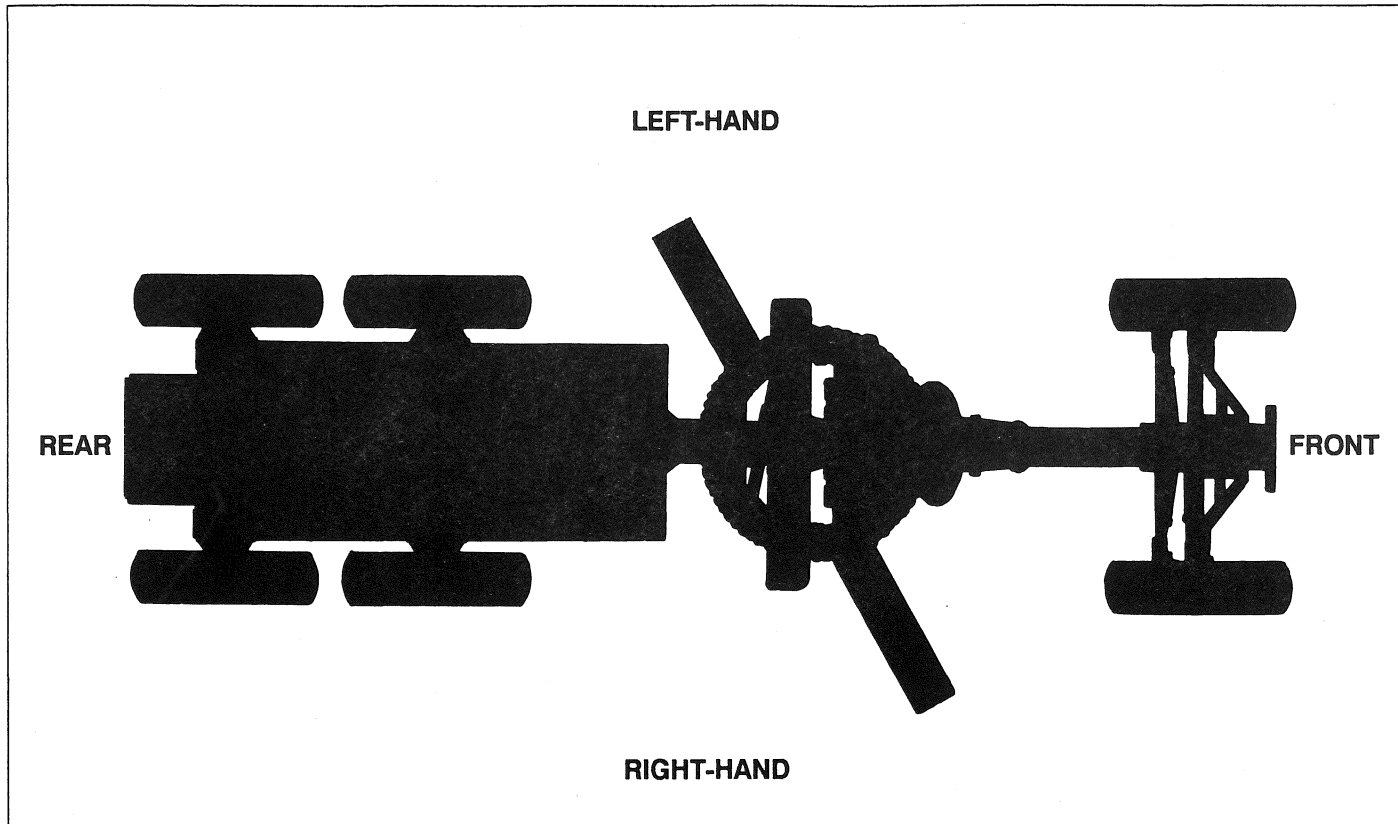


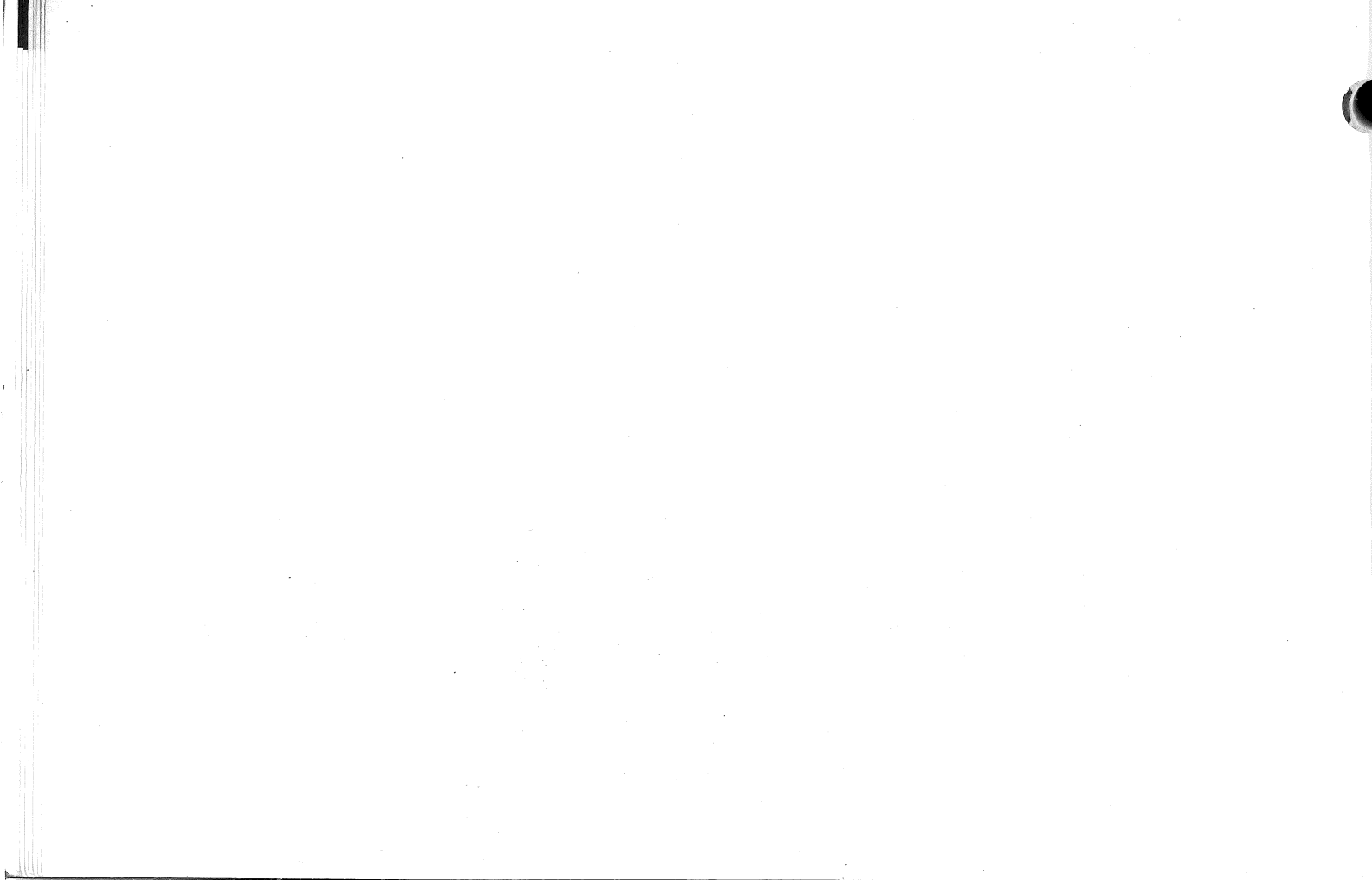
# Grader Orientation

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The terms left-hand and right-hand, indicate the directions when in the operator's cab looking toward the front of the grader.



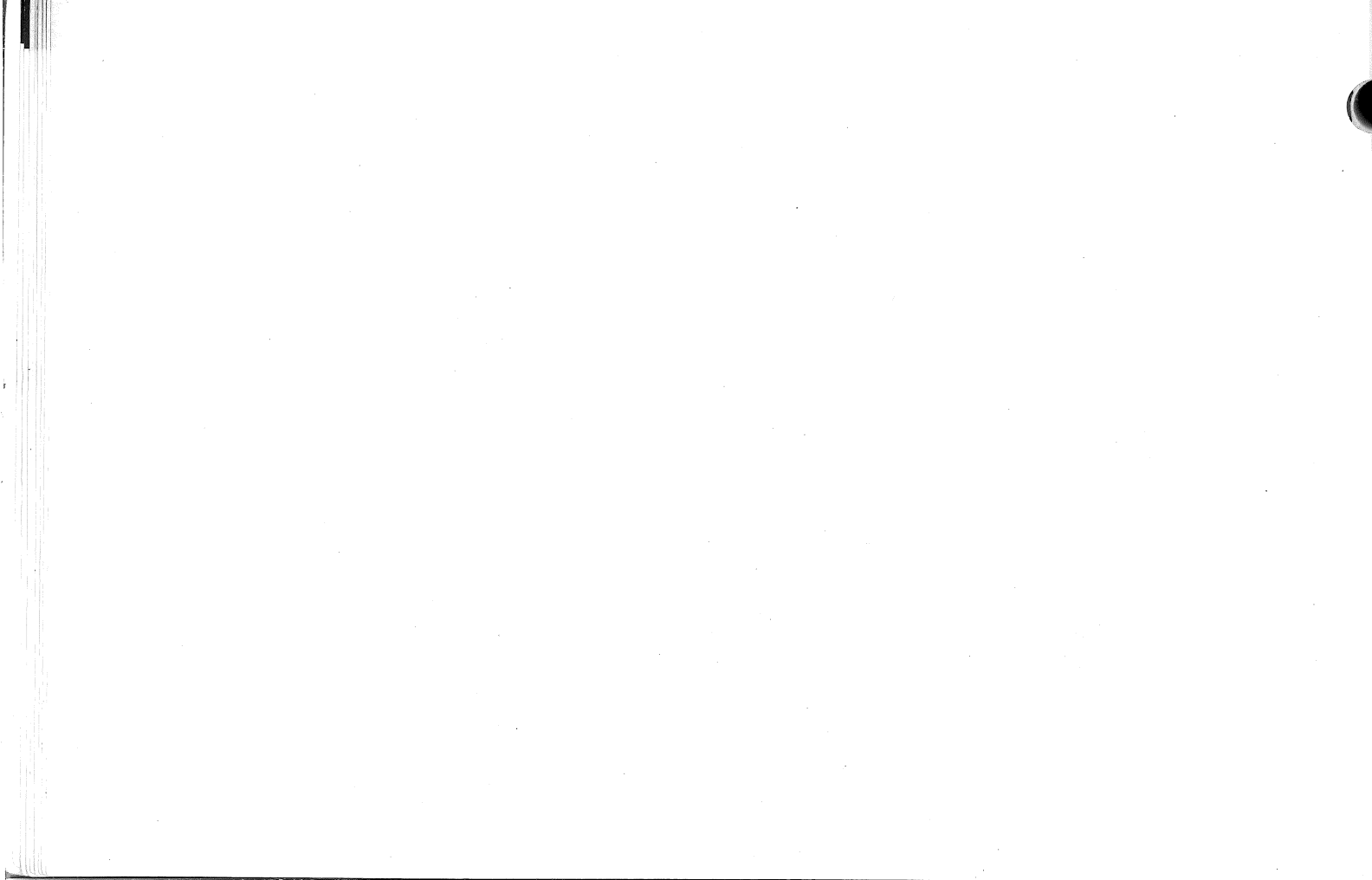


## **Safety Sign Locations**

Read and obey all safety signs on the grader. Ensure they are kept clean and in good condition. Replace the safety signs if they are damaged, missing or illegible.

Each safety sign is identified by a part number. Replacement safety signs are available from your Champion Distributor.

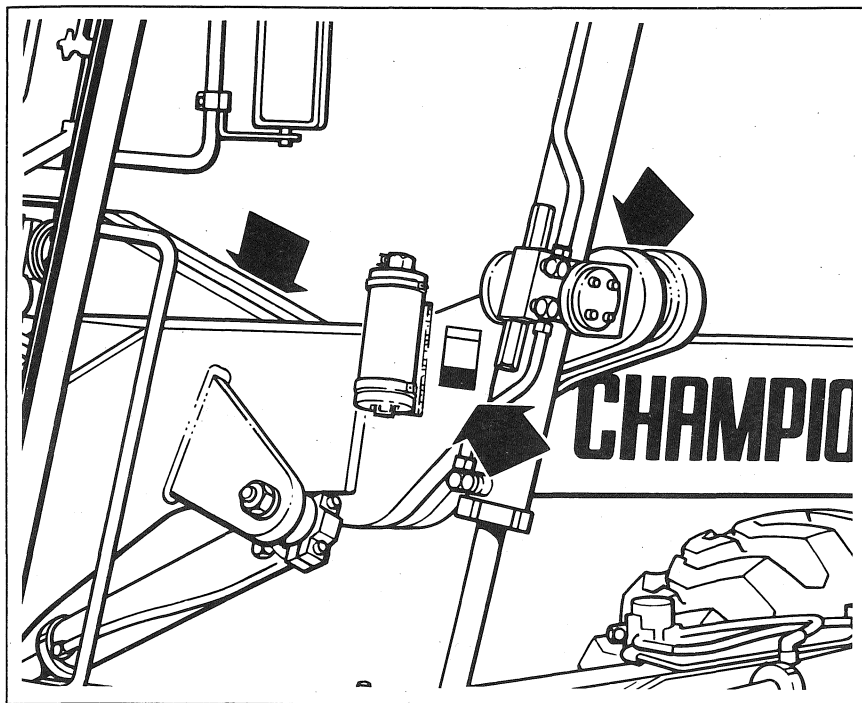




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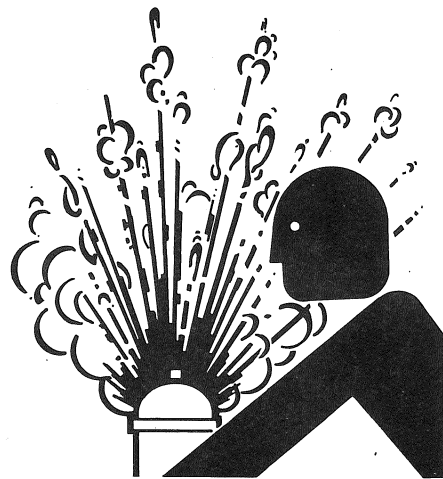
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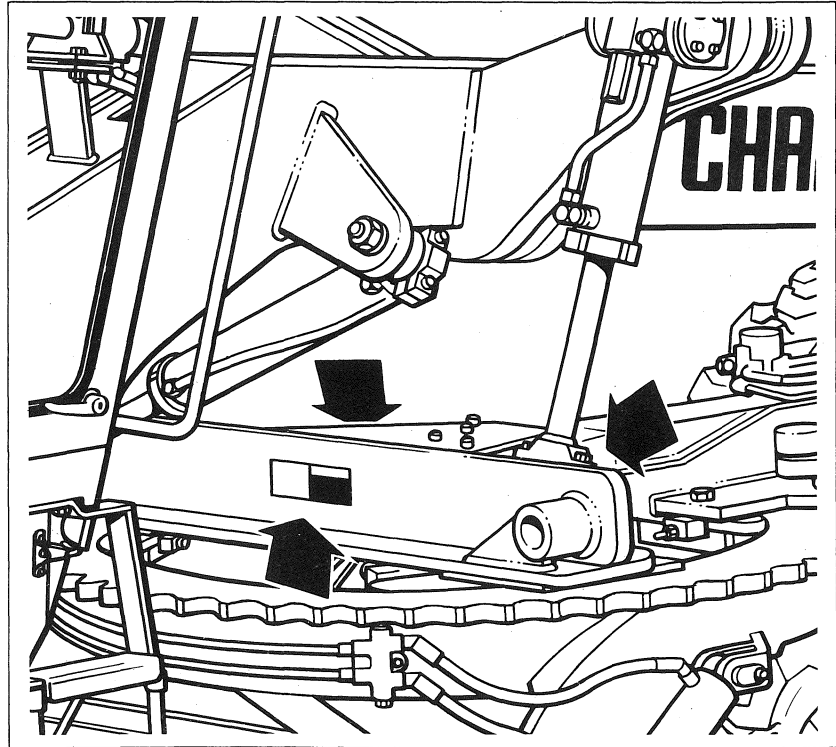
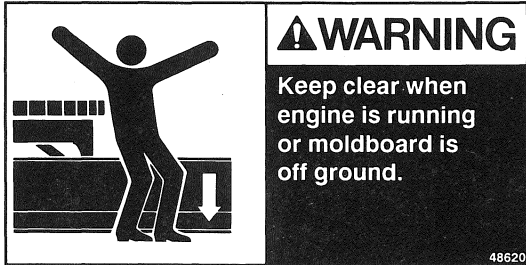


This safety sign appears on or near the accumulator used with blade lift or side shift hydraulic cylinders or oil disc brakes.

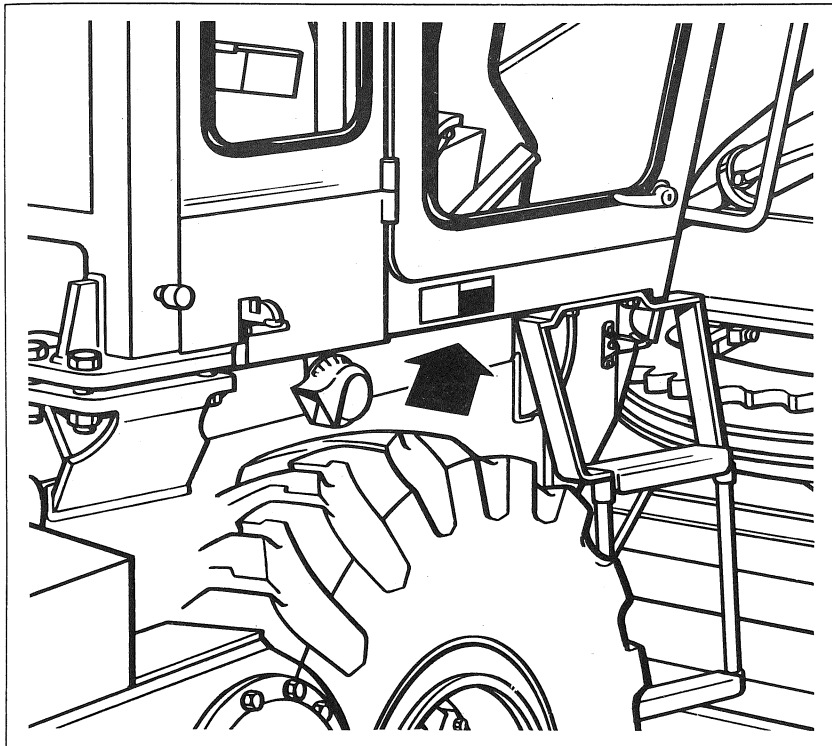
## **WARNING**



**Accumulator contents under pressure. Service by qualified personnel only.**



This safety sign is located on the left, right and rear faces of the drawbar.

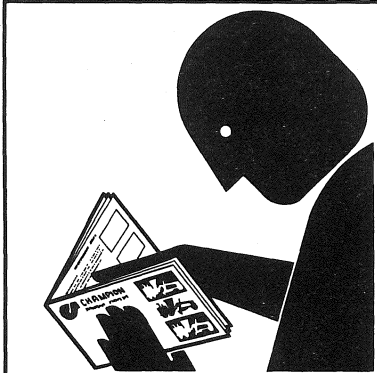


## SAFETY INSTRUCTIONS

Use handholds and steps. Maintain 3 points of support.

48621

This safety sign is located on both sides of the cab.

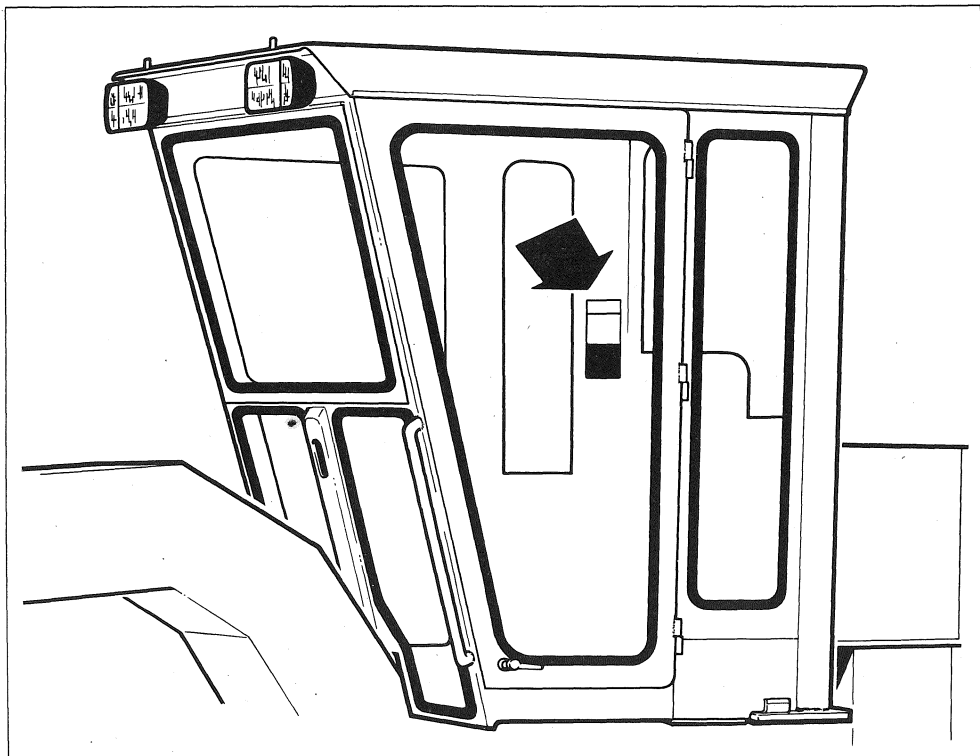
**! WARNING**

Do not operate this machine unless you have read and understood the instructions and warnings in the Champion Operator's Manual and the CIMA Grader Safety Manual.

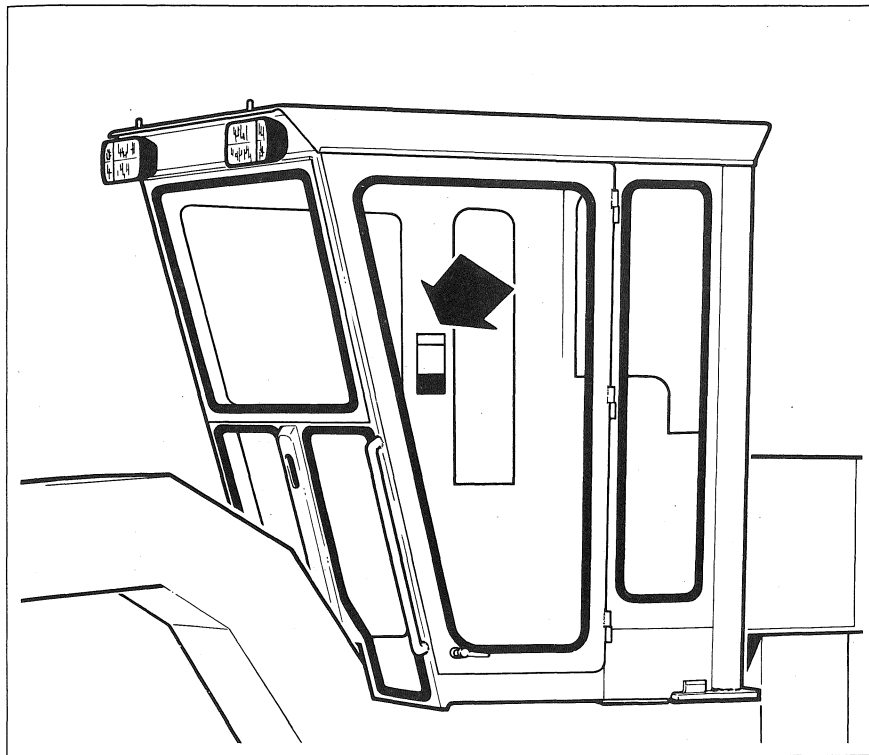
Failure to follow the instructions or heed the warnings could result in injury or death. Proper care is your responsibility.

Contact your distributor or Champion for replacement manuals and decals.

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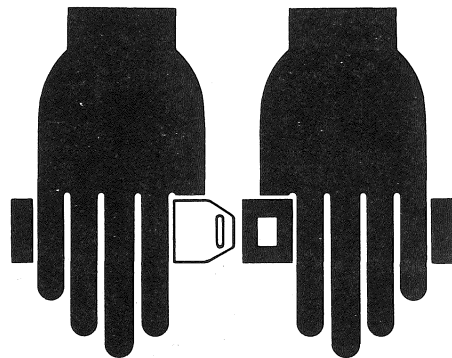


This safety sign is located on the right-hand rear cab post.



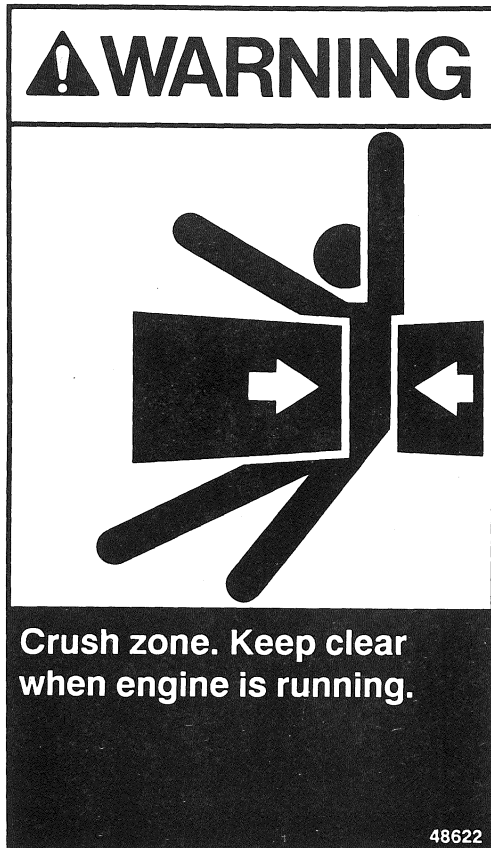
This safety sign is located on the auxilliary switch panel, on the right-hand door post.

**! WARNING**

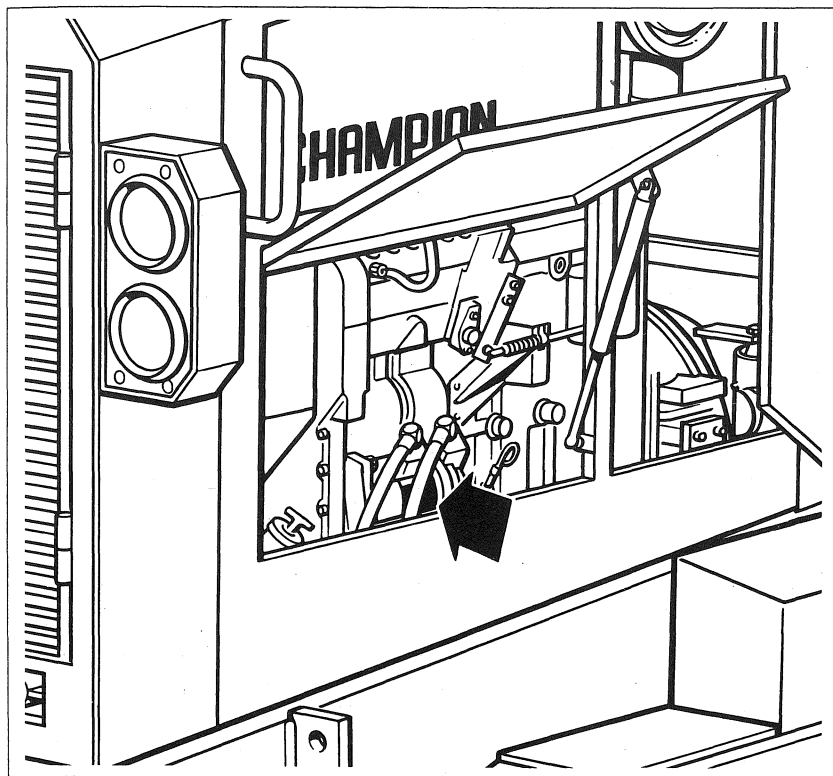


**Wear seat belt when  
operating the grader.**

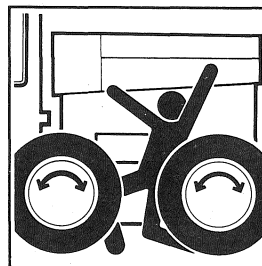




This safety sign is located on each side of the cab.



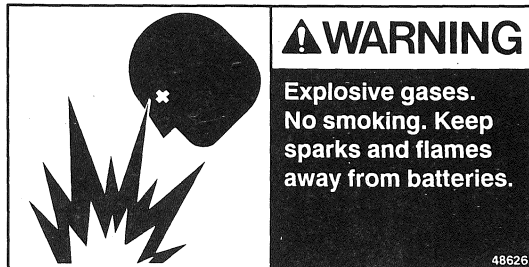
This safety sign is located on or near the engine starter.



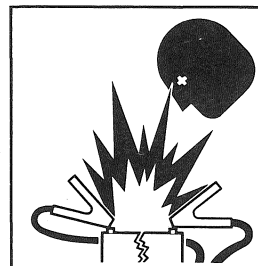
## **⚠ WARNING**

Never short across starter terminals. Grader could move unexpectedly. See Operator's Manual.

48624



This safety sign is located inside each battery box.

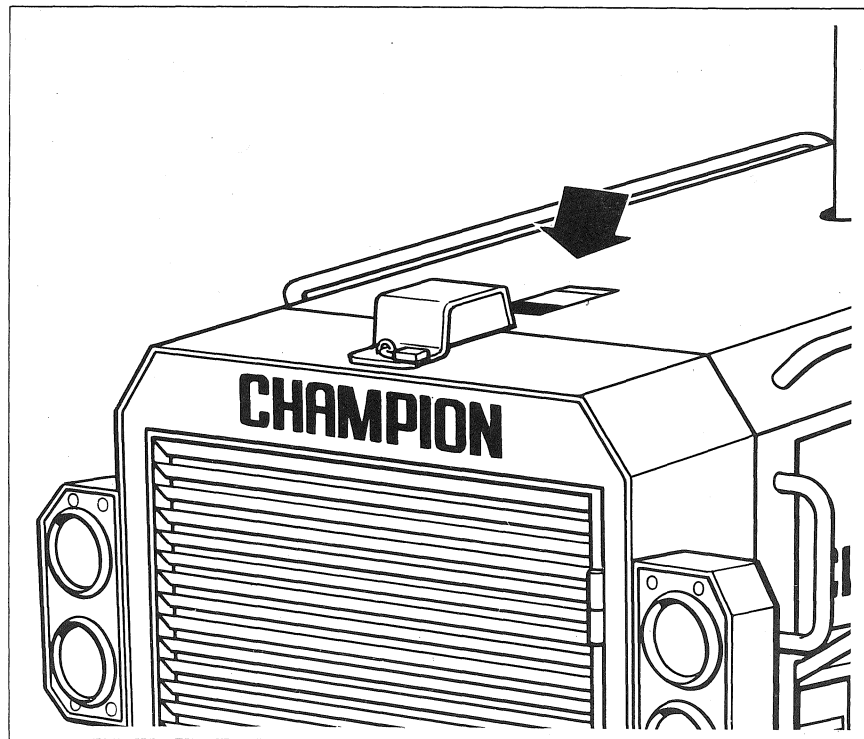
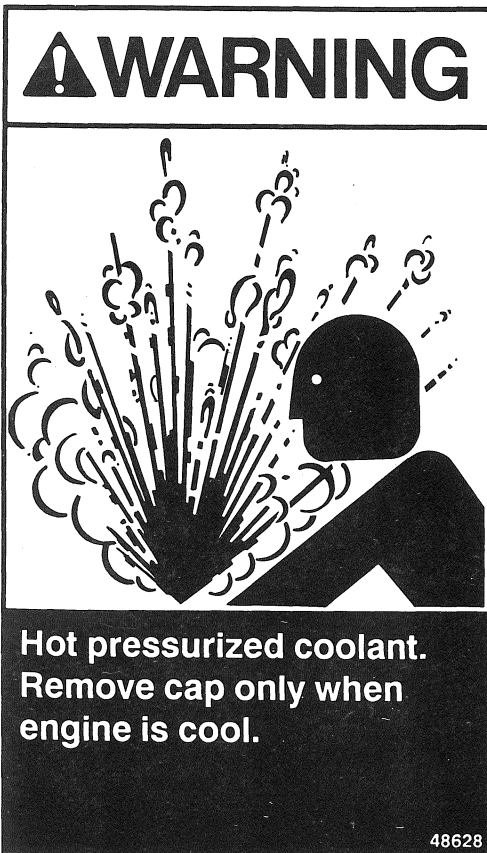


## **⚠ WARNING**

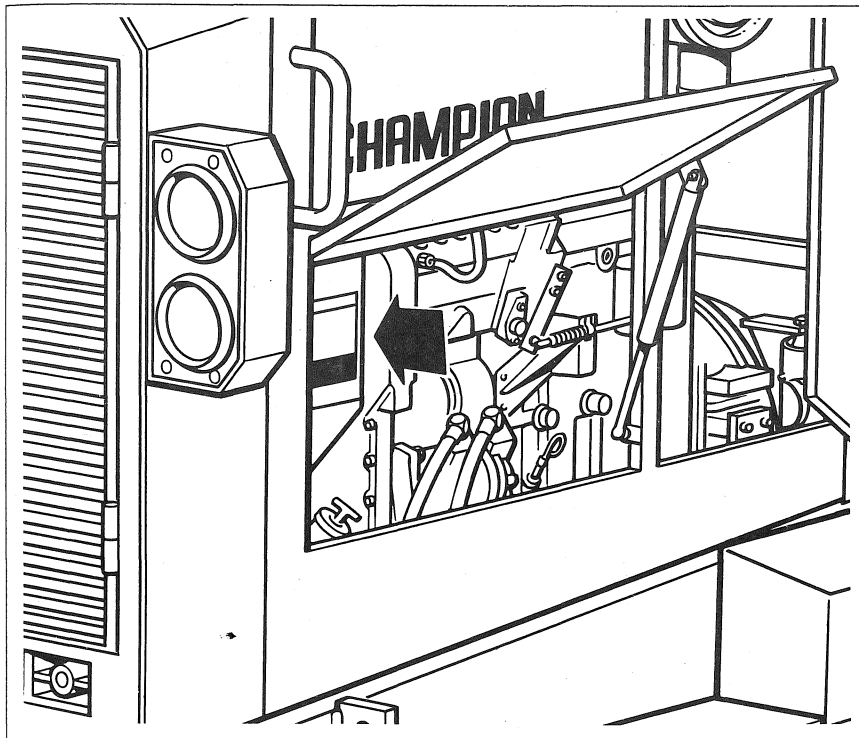
Equipped with 12/24 volt start system. Do not jump start. See Operator's Manual.

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Graders equipped with the optional 12/24 volt electrical system have this safety sign located in each battery box.

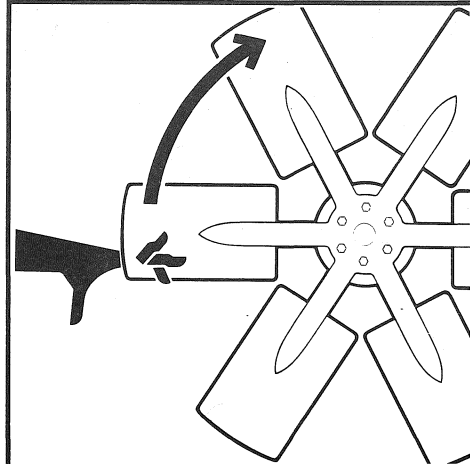


This safety sign is located on the top of the engine hood.



This safety sign is located on both sides of the fan shroud. On some models it is located on the frame.

**⚠ WARNING**



**Rotating fan, driveshaft  
and belts. Keep hands away  
when engine is running.**

**⚠ WARNING**

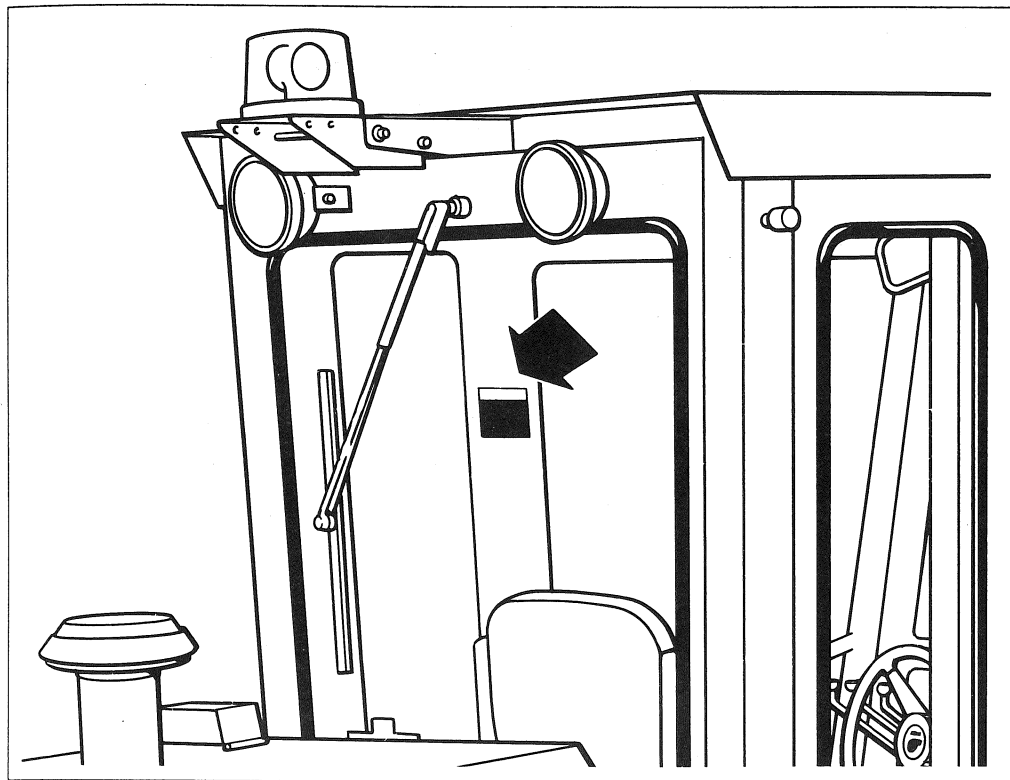
Use only petroleum base fluid in the brake reservoir. Other liquids may cause brake failure. Severe personal injury or death could result. See Operator's Manual for fluid options.

58441

This warning only applies to graders equipped with OIL DISC BRAKES.



This safety sign is located on the rear right-hand side of the cab.



One of these safety signs is located on the left-hand door post.

## SAFETY INSTRUCTIONS

This vehicle is equipped with **OIL DISC BRAKES**. See Lubrication instructions for important service information.

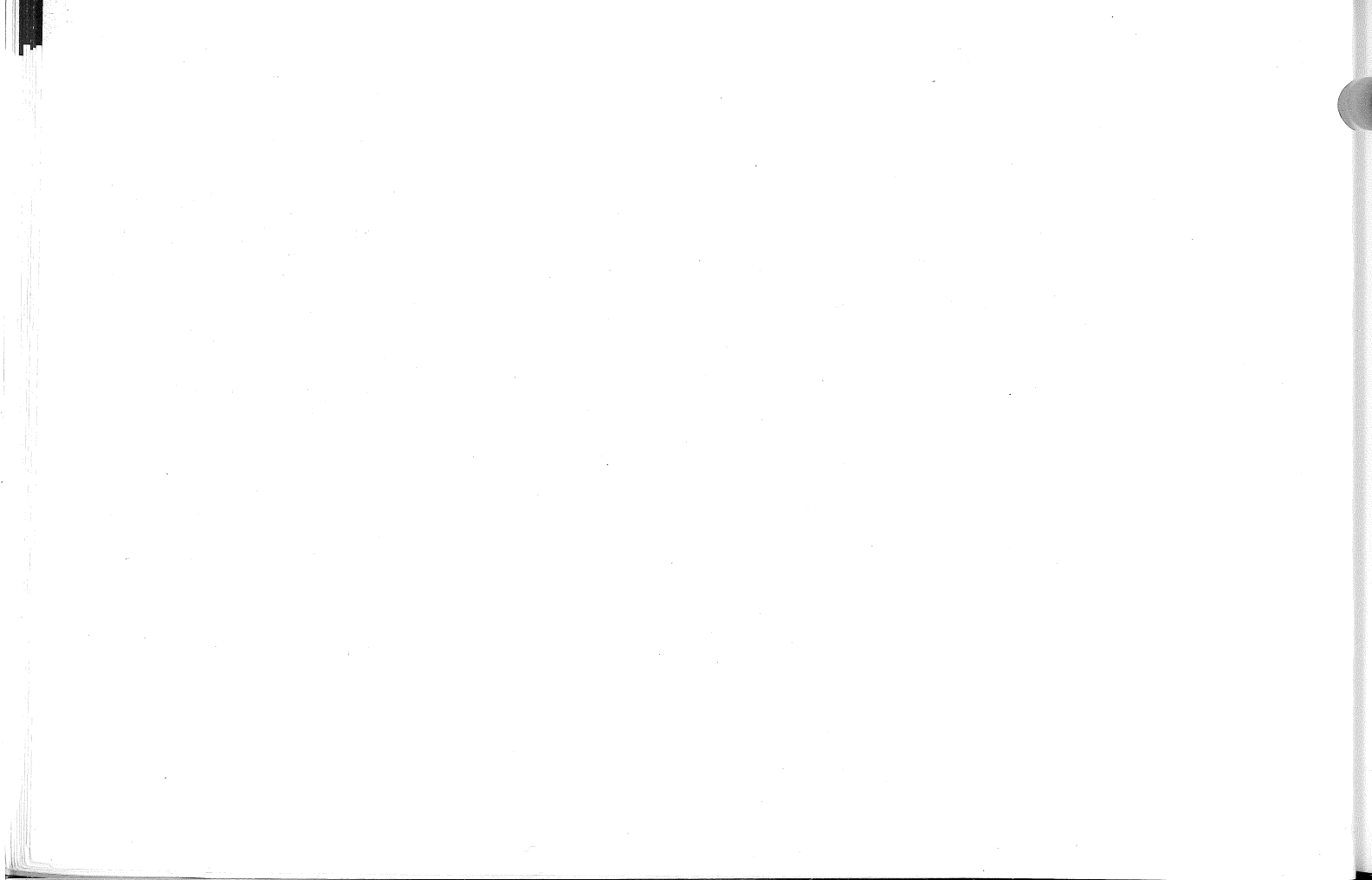
58616

## SAFETY INSTRUCTIONS

This vehicle is equipped with **DRUM BRAKES**. See Lubrication instructions for important service information.

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## **Safety Precautions**

Failure to follow the instructions or heed the hazard alerts, safety signs and precautions could result in injury, death or property damage.



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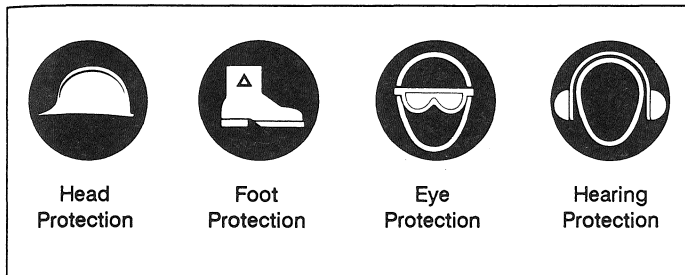
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## Personnel Precautions

- Avoid loose fitting clothing, loose or uncovered long hair, jewelry and loose personal articles. These can get caught in moving parts. Jewelry may also ground a live circuit.
- Know and use the protective equipment that is to be worn when operating or servicing the grader. Hard hats, protective glasses, protective shoes, gloves, reflector type vests, respirators and ear protection are types of equipment that may be required.



- Do not rush. Walk, do not run.
- Never drive or operate the grader while you are under the influence of alcohol or drugs.

## Operator - General Precautions



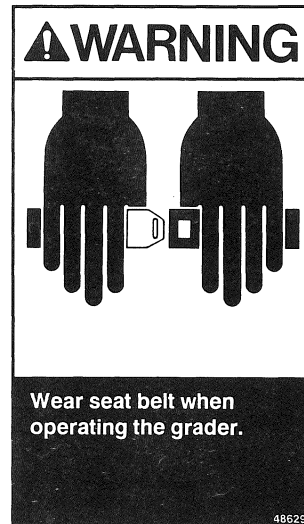
**Do not operate this machine unless you have read and understood the instructions and warnings in the Champion Operator's Manual and the CIMA Grader Safety Manual. Failure to follow the instructions or heed the warnings could result in injury or death. Proper care is your responsibility. Contact your distributor or Champion for replacement manuals and decals.**

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- Do not operate the grader unless you are a qualified operator.
- Read and understand the entire Operator's Manual. Before you operate the grader, understand its performance characteristics, capabilities and limitations, and become thoroughly familiar with all controls and instruments.
- Consult your supervisor if you do not understand the Operator's Manual.

### Operator - General Precautions continued

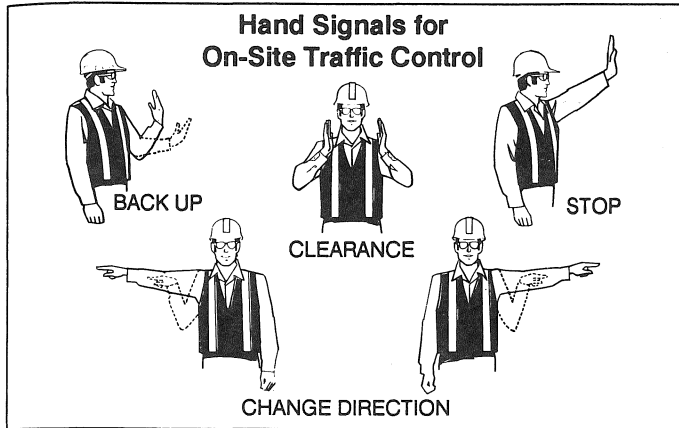
- Read and obey all safety signs on the grader. Ensure they are kept clean and in good condition. Replace the safety signs if they are damaged, missing or illegible. Refer to the section - **Safety Sign Locations** page 3-1.
- Know and follow your safety program rules.
- For specific safety requirements, potential work area hazards and the necessary precautions, consult your supervisor.
- Before operating the grader, ensure it is properly equipped. Consult your supervisor or your Champion Distributor for details.
- Do not permit riders in or on the grader.
- Ensure all doors, panels, inspection covers and the battery box cover(s) are in place and secure.
- Remove or secure loose objects in the cab such as lunch boxes, tools etc. Remove all objects which do not belong in or on the grader.
- Before backing up, use extra care to ensure all persons and vehicles are clear of the grader.



- Adjust the seat and fasten the seat belt. The seat belt must fit snug and low around your hips. The holding strap must be free of slack. Refer to the section - **Driving the Grader - Seat Belt** page 8-8.
- Keep the steps, handholds, operator's platform, seat, pedals and controls in good condition. Keep them clean and clear of debris, mud, ice and grease.
- Do not dismount from the grader with the engine running. Before leaving the operator's cab, place the transmission in neutral, lower the moldboard and all the attachments to the ground. Apply the hand brake. Shut down the engine. Remove and retain the ignition key.

## Operator - General Precautions continued

- Know and use the hand signals required for particular jobs. Know who has the responsibility for signaling.



- Ensure the lights are working properly at all times.
- Clean the grader regularly. Keep windows, mirrors and lights clean. Replace all broken windows and mirrors.
- If the grader is equipped with a back-up alarm and/or lights, ensure they are working properly. Never disconnect the back-up alarm or lights.

- Ensure that your grader is properly equipped for emergencies. Equipment such as a fire extinguisher, first aid kit, flares may be required. Locate and know how to use this equipment.

- Ensure the snow wing is fully raised when not in use and secured with the proper chains.

## Mounting and Dismounting Precautions

- Face the cab when climbing in or out of the grader. Use the handholds and steps provided. Maintain three points of support. For example, two hands and one foot or one hand and two feet.



## SAFETY INSTRUCTIONS

Use handholds and steps. Maintain 3 points of support.

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- Do not mount or operate the grader with wet or greasy hands, muddy shoes or boots.



## Mounting and Dismounting Precautions continued

- Do not jump from the grader at any time.
- Never try to mount or dismount the grader while it is moving.

## Starting Precautions

- Walk around the grader. Check for loose or missing parts, excess wear, trash build-up, fluid leaks and damaged tires. Visually inspect the condition of other items such as:

Hoses

Controls and Instruments

Circle and Moldboard Assembly

Engine Compartment

Hydraulic System

Cooling System

Windows and Mirrors

Brake Lines

Driveshafts

Cylinders

Lighting

Rim Lugs

Tire Inflation

Safety Equipment

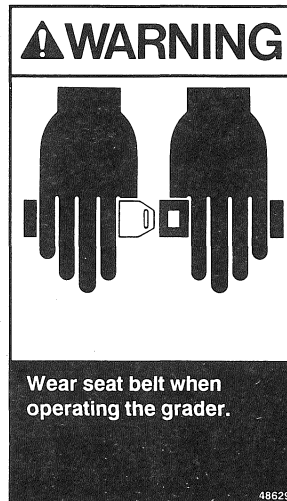
Front Axle

Attachments

Snow Wing Cables

Report any leaks, wear or damage. Fasten a 'DO NOT OPERATE' or similar warning tag to the steering wheel and/or isolation switch(es) . Remove and retain the ignition key.

- Walk around the grader and warn all personnel who may be servicing the grader or are in its path prior to starting. Do not start until all personnel are clearly away from the grader.
- Prior to starting the grader, check the grader for 'DO NOT OPERATE' or similar warning tags.
- Perform the 'Pre-start Checks' in this manual before starting the grader.



- Adjust the seat and fasten the seat belt. The seat belt must fit snug and low around your hips. The holding strap must be free of slack. Refer to the section - **Driving the Grader - Seat Belt** page 8-8.

- Start and operate the grader only from the operator's seat.

## Starting Precautions continued

- Know how to shut the engine down before attempting to start it.
- Check the transmission mode lever to ensure it is in NEUTRAL before starting the engine.
- Ensure the hand brake is applied.
- Sound the horn before starting the engine.
- Do not bypass the battery isolation switch(es). Have the switch(es) repaired if they are not working properly.



## **! WARNING**

**Never short across starter terminals. Grader could move unexpectedly. See Operator's Manual.**

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- Use jumper cables only in the recommended manner. Improper use can result in battery explosion or unexpected

movement of the grader. Refer to the section - **Pre-Start Checks - Batteries** page 7-24.

- Do not operate the engine in an enclosed area without adequate ventilation.
- After the engine has been started, check that all the gauges and instruments have the proper readings. Shut down the engine immediately if any improper readings are observed. Refer to the section - **Driving the Grader - Engine Start and Shut Down** page 8-10.
- Ensure the lights are working properly.
- Check that the hydraulic controls function properly.
- Check that the hand and service brakes function properly. Refer to the section - **Maintenance and Lubrication - Hand Brake Adjustment** page 14-14.
- Check that the engine hand throttle and accelerator function properly.
- Listen for unusual noises.
- Look around and behind the grader before moving it.
- Check that the left-hand and right-hand steering functions properly.

### Stopping Precautions

- Park the grader on level ground whenever possible and apply the hand brake. On grades, park the grader with the wheels securely blocked.
- Depressing the clutch pedal only may not stop the grader. You must depress the brake pedal also to stop the grader.
- Lower the moldboard and all attachments to the ground. Do not apply down pressure.
- Remove and retain the ignition key. Turn the battery isolation switch(es) to the OFF position, before leaving the grader.
- Always park the grader completely off highways and roads.
- Always set up safety cones, red flags, red lights or flares when parking the grader near traffic areas.

### Operating Precautions- General Operating Precautions

- Before operating your grader, test the brakes, steering, transmission, clutch and all controls and functions. Perform the test in an area where the safety of personnel and property will not be in jeopardy.

- If a malfunction is observed, park the grader and place a 'DO NOT OPERATE' or similar warning tag on the steering wheel and/or isolation switch(es). Be sure to remove the ignition key. Report the problem and have it repaired before operating the grader.
- If a failure occurs that causes loss of control such as steering, service brakes or engine, stop the grader as quickly as possible. Keep the grader securely parked until the malfunction is corrected or the grader can be safely towed. **See this page - Stopping Precautions.**
- Understand the graders limitations and keep the grader under control.
- Drive the grader with care and at speeds compatible with conditions. Use extra caution when operating over rough ground, on slopes, when ditching and when turning the grader.

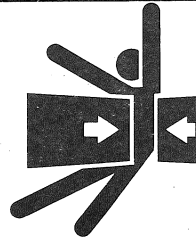
## General Operating Precautions continued

### **⚠ WARNING**

**Do not coast downhill. Excess speed could cause serious transmission damage and loss of control of grader. Severe personal injury or death could occur.**

- Select a gear that will prevent excessive speed when going downhill.
- Know your stopping distance at any speed. Regulate the speed of your grader accordingly.
- Note and avoid all hazards and obstructions such as overhangs, ledges, slide areas, electrical lines, underground cables, water mains, gas lines, etc.
- When operating close to electrical lines, underground cables, water mains or gas lines, contact the responsible authority and request assistance. Contact with buried pipeline or cable could result in serious injury or death due to fire or explosion.
- Know and understand the job site traffic flow patterns and obey flagmen, road signs and signals.

### **⚠ WARNING**



**Crush zone. Keep clear when engine is running.**

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- Watch for bystanders and never allow anyone to be under or to reach into the grader and its attachments while operating.
- Signal before turning.

### **⚠ WARNING**

**Do not use float control to lower moldboard. Loss of control of grader or damage to hydraulic system could result.**

## General Operating Precautions continued

### **WARNING**

**Sudden loss of any fluid indicates a serious malfunction. Stop grader. Consult a qualified service technician.**

- Do not operate the cold start switch when the engine is running. Serious engine damage could result.

## Roading the Grader Precautions

- Understand and obey traffic laws, road signs and signals.
- Keep both ends of the moldboard high and within the width of the grader.
- Use extra caution at all intersections.
- Be aware of traffic behind you. If necessary, pull over to the side of the road and allow the vehicles to pass safely.
- Stop and look both ways at railway crossings. Proceed when clear.
- Ensure your grader is properly equipped for roading. Such equipment as lights, flashing beacon, turn signals and

warning devices such as flags and a slow moving vehicle sign may be required. Check the local traffic laws for the correct traveling requirements.

- Ensure the articulation lock pins are installed when roading the grader.
- Drive cautiously when entering or leaving the shoulder of the road to avoid a rollover.
- If an electronic failure of the controller occurs while operating the grader, a 'Limp-home' feature allows you to move the grader away from certain situations or an emergency such as crossing railway tracks, operating in traffic areas or at your job location. Refer to the section - **Driving the Grader - 'Limp-home'** page 8-24.

- Do not use the hand throttle when roading the grader.

## Job Site Precautions

- Know and understand the job site traffic flow patterns and obey flagmen, road signs and signals.
- When moving the grader backwards, have a flagman direct you and the traffic around you. If a flagman is not available, look around and behind the grader to ensure the area is clear before moving.

## Job Site Precautions continued

- When scarifying or ripping across a slope, keep the moldboard parallel with the front axle, centered to the frame and lowered close to the ground to provide protection against rolling over.
- Do not dismount from the grader with the engine running. Before leaving the operator's cab, place the transmission in neutral, lower the moldboard and all the attachments to the ground. Apply the hand brake. Shut down the engine. Remove and retain the ignition key.
- Use the clutch pedal when you are starting, stopping, or when changing direction.

### **⚠ WARNING**

**Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.**

## Night Operation Precautions

- Ensure the grader is properly equipped for night operation. Equipment such as worklights, headlights, beacons and a slow moving vehicle sign may be required.

- Ensure the worklights are properly aimed. Dim the headlights for approaching traffic.
- When stopping at night near traffic areas, drive the grader off to the side of the road and set out flares or reflectors.

## Snow Removal Precautions

- Snow removal presents unique hazards due to weather conditions, poor visibility, slippery road surfaces, high operating speed, and other traffic. Be sure your grader is in good condition and that you have been properly trained before doing this work.
- Ensure your grader has the proper attachments before plowing snow. Equipment such as tire chains, warning lights, additional beacons and markings may be required.
- Keep your windshield and other window areas clean and clear for the best possible visibility. Use the windshield wipers and the window defrosters.
- Be alert for any obstructions covered by snow. Obstructions such as manhole covers, curbs, bridge abutments, embankments and fire hydrants etc. may be hazardous.
- Ensure the snow wing is fully raised when not in use and secured with the proper chains.

### Special Hazards Precautions

- Do not stop or turn the grader around on curves or at the crest of hills.
- Be alert when grading haul roads as normal rules of the road might not be observed.
- Use extra care when grading against oncoming traffic. Precautions such as flags, barricades, flashing lights, and flagmen may be needed to alert traffic.
- Do not operate the grader in areas where volatile gases may be present. Explosion could result. If you encounter an area where volatile gases may be present, shut down the grader and leave the area immediately.

### Fire Precautions

- Remove dust and combustible debris from the grader regularly.
- Inspect the grader daily for potential fire hazards such as damaged electrical wires. Have necessary repairs made immediately.
- Ensure that excess oil, grease or fuel is cleaned up immediately.

- Ensure the grader is properly equipped for grading in dry or forested areas. Equipment such as a spark arrestor may be required.

### Maintenance Precautions- General Maintenance Precautions



- Place the grader in the service position before performing any service, maintenance or inspection procedure. Refer to the section - **Maintenance and Lubrication - Service Position** page 14-5.

## General Maintenance Precautions continued

- Know and use the proper protective equipment. Equipment such as hard hats, protective glasses, protective shoes, gloves, reflector type vests, respirators and ear protection may be required.

- Avoid loose fitting clothing, loose or uncovered long hair, jewelry and loose personal articles. These can get caught in moving parts. Jewelry may also ground a live circuit when working on the electrical system.

- Wear gloves to protect hands when handling cable.

- Disconnect the battery cables before working on the electrical system. Remove the negative cable first and install it last.

- Avoid lubrication or mechanical adjustments with the grader in motion or the engine operating. If the engine must be in operation to make certain adjustments, place the transmission in neutral, apply the hand brake, place the grader in a safe position, lower the moldboard and attachments, securely block the wheels and use extreme caution.

## **⚠ WARNING**

**Do not work on graders supported only by moldboard or attachments. Hydraulic or mechanical failure could cause grader to fall resulting in severe personal injury or death.**

- Ensure that adequate stands or blocks are used to support the grader when servicing.

- Securely block the moldboard or any attachments that may fall before working on them.

- When servicing the grader, fasten a 'DO NOT OPERATE' or similar warning tag on the steering wheel. Be sure that the isolation switch(es) is in the OFF position and that you remove and retain the ignition key.

- Ensure the work area is clean, organized and safe.

- When servicing or replacing pins, etc; use a brass drift or other suitable material between the hammer and pin.

- Keep the brakes and the steering systems in good operating condition.



**General Maintenance Precautions** continued**⚠ WARNING**

**When using pressurized air for cleaning, wear a face shield and protective clothing. Do not direct the air hose nozzle at yourself or others. Severe personal injury could result.**

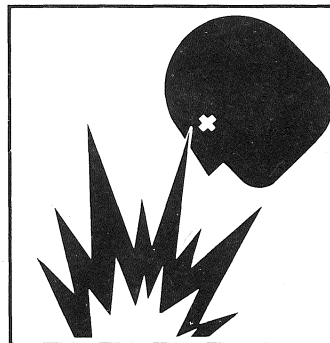
**⚠ WARNING**

**Handle all chemicals carefully and according to manufacturer's instructions. Improper handling can result in burns, poison from fumes, fire or explosion hazards. Severe personal injury or death could result.**

- Safety equipment such as goggles, respirators, and special clothing may be needed.
- Some parts or assemblies of the grader are very heavy. Use suitable lifting equipment.

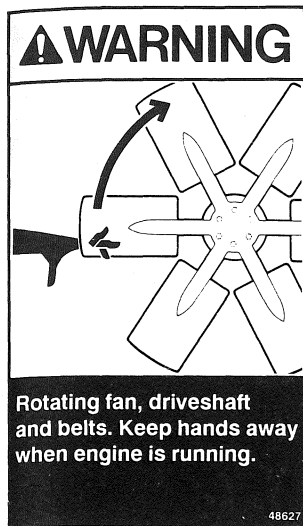
- Before welding, disconnect the following items:
  - a) The negative battery cable(s).
  - b) Positive battery cable(s).
  - c) Main power supply harness at the transmission controller.
  - d) Transmission wiring harness at the controller.
  - e) Alternator wiring harness.

Connect the arc-welder ground cable adjacent to the work area. Install the battery box cover(s). After completing your welding procedures, connect the electrical items a) through e) in the reverse order. Ensure to connect the negative battery cable(s) last.

**⚠ WARNING**

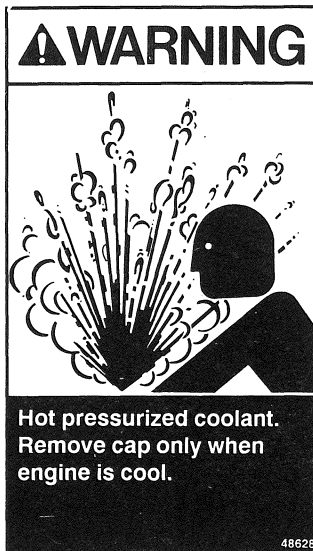
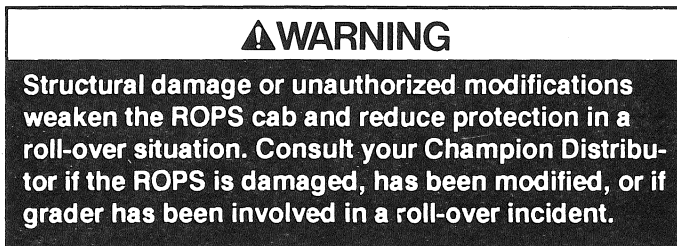
**Explosive gases.  
No smoking. Keep  
sparks and flames  
away from batteries.**

## General Maintenance Precautions continued



- Keep your head, body, limbs, feet and hands away from all moving parts. These include circle and moldboard assemblies, scarifier, ripper and engine fan belts and fan, shafts etc.

- Before the grader is placed back in service, ensure all doors, panels, inspection covers and the battery box cover(s) are in place and secure.
- After servicing the grader test it in a safe location.
- Do not allow unauthorized personnel on or around the grader.



- The spray from pressurized coolant can cause serious injury to your eyes and skin. Wait until the engine is cool enough to rest your hand on the radiator cap.

**General Maintenance Precautions** continued

- Avoid burns from direct contact with hot components or splashing hot oil.

**⚠ WARNING**

**Brake fluid can harm eyes. Wear eye protection. If contact occurs, flush your eyes with large amounts of water. Seek medical attention immediately.**

**Hydraulic System Maintenance Precautions**

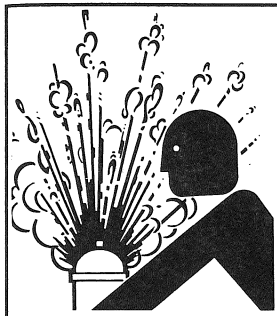
- Use extreme care when working with hydraulic systems incorporating accumulators. Relieve the hydraulic system pressure before performing any service.
- Residual pressure may remain in the hydraulic system. Relieve all pressure before disconnecting hoses. Tighten all connections before applying pressure.

**⚠ WARNING**

**Fluid escaping under pressure can penetrate the skin causing serious injury. Relieve all pressure before disconnecting hoses. Do not use your hand to check for hydraulic leaks.**

- If skin penetration occurs seek medical attention immediately
- Always wear eye protection when working on the hydraulic system.
- Use cardboard or a similar material to check for leaks.
- Do not bend or strike high pressure lines, tubes or hoses, or reinstall them in a bent or damaged condition. Leaks can cause a fire hazard.
- Replace fittings or hoses that are damaged, loose or leaking.
- Tighten all connections to the specified torque when you reinstall or replace high pressure lines, tubes or hoses.

## Accumulator Maintenance Precautions



### **⚠ WARNING**

Do not use oxygen or compressed air when precharging accumulators. An explosion can occur if oxygen comes in contact with a spark. Use dry nitrogen.



### **⚠ WARNING**

■ Ensure the accumulators have the proper precharge before putting the grader back into service. Improper precharge could result in severe personal injury or death. Consult your Champion Distributor.

■ Use extreme care when working with hydraulic systems incorporating accumulators. Relieve the hydraulic system pressure before performing any service.

Accumulator contents under pressure. Service by qualified personnel only.

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## Tire Maintenance Precautions

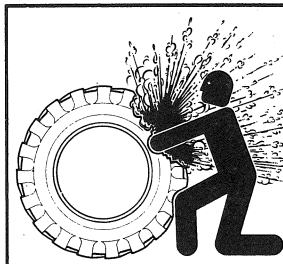
■ Tire repair or replacement must be performed by qualified personnel only.

■ Check the tires daily for wear and correct air pressure.

■ Do not stand near the tire while inflating. Use a self-attaching air chuck with a remote shutoff.

■ Do not overinflate the tires. Refer to the section - **Maintenance and Lubrication - Tire Inflation** page 14-12.

■ Ensure that all tires and rim parts are undamaged and correctly assembled before inflating the tires.



### **⚠ WARNING**

Failure to use a safety cage when inflating tires could result in severe personal injury or death.

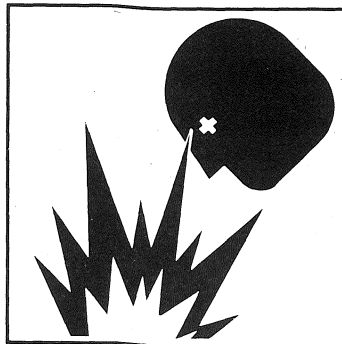
### Tire Maintenance Precautions continued

#### ⚠ WARNING

Do not weld on the rim. The flame and heat can cause an explosion. The weld can cause premature rim failure. Severe personal injury or death could result.

### Battery Maintenance Precautions

■ Batteries produce explosive gases. Keep sparks, flames, smoking materials, or other ignition sources away from batteries. Use a flashlight to check the electrolyte level.



#### ⚠ WARNING

**Explosive gases.  
No smoking. Keep  
sparks and flames  
away from batteries.**

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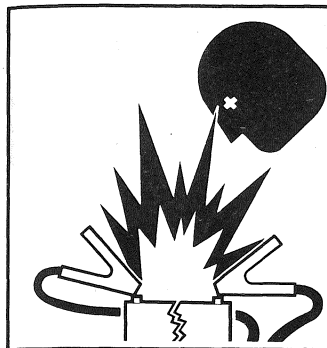
#### ⚠ WARNING

Handle batteries carefully. Battery acid is extremely corrosive and poisonous. Contact with the eyes, skin, or clothing can result in severe burns or other serious personal injury.

- If contact occurs seek medical attention immediately.
- Wear a face shield when working with batteries.
- Never lean over a battery during charging, testing or jump starting operations.
- Be familiar with procedures for charging and testing a battery. Read and follow the manufacturer's instructions for the battery charger.
- Place a wet cloth over the battery and its vents before charging or jump starting. Ensure that the cloth is not placed near any fan blades, belts or any other moving parts.
- Disconnect the negative cable first when removing a battery. Connect it last when installing a battery.
- Do not let metal objects come in contact with the battery terminals.

## Battery Maintenance Precautions continued

- Do not charge or jump start a frozen battery. It may explode due to gas trapped in the frozen battery. Allow the battery to warm to 16°C (60°F) before charging or jump starting it.
- Do not jump start a 12/24 volt start system. Improper connections may cause the batteries to explode resulting in severe personal injury or death. Remove the batteries and recharge them separately.

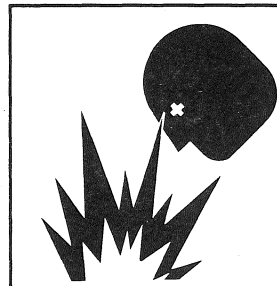


### **⚠ WARNING**

**Equipped with 12/24 volt start system. Do not jump start. See Operator's Manual.**

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## Ether - Cold Start Precautions



### **⚠ WARNING**

**Diesel cold start system contains ether which is explosive. Keep sparks and flames away. Severe personal injury or death could result.**

### **⚠ WARNING**

**Diesel cold start system contains ether which is a toxic chemical. Do not breathe the fumes, drink the fluid, or allow it to contact the skin. Severe personal injury or death could result.**

- If swallowed, breathed or contacted on skin or eyes seek medical attention immediately.
- Do not smoke when installing, maintaining, testing or troubleshooting the diesel cold start system.
- Wear protective goggles to avoid eye injury when testing the diesel cold start system.

**Ether - Cold Start Precautions** continued

- Point the openings of the valve, tube or atomizer away from yourself and others while testing the diesel cold start system.
  
- When replacing ether cylinders, ensure you are away from heat, open flames or sparks and that you are in a well ventilated area.
  
- Do not burn, puncture, or attempt to remove the core from an ether cylinder.
  
- Keep ether cylinders away from unauthorized personnel.
  
- Store replacement ether cylinders in a cool dry place away from direct sunlight. Do not keep them in a living area or in the operators compartment of the grader.

**Air Conditioning Unit Precautions**

- Do not attempt to repair or adjust the air conditioning system unless you are a qualified service technician.

**⚠ WARNING**

Do not smoke in an area where Freon® \* is used or stored. Do not allow Freon®\* to come in contact with an open flame or heated metal. A toxic gas results causing damage to lungs.

**⚠ WARNING**

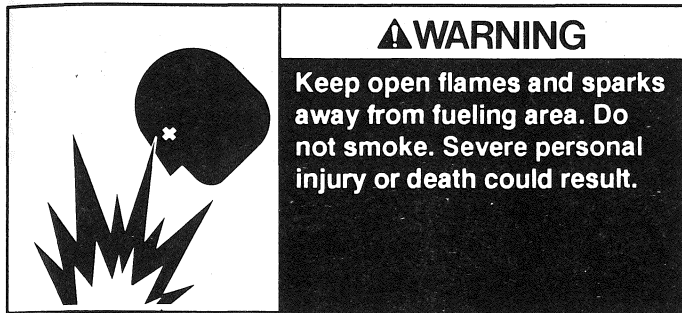
Exercise extreme care when handling Freon® : Direct contact with skin will cause frostbite.

- If contact with your skin or eyes occurs seek medical attention immediately.
  
- Wear protective clothing, gloves, goggles or glasses, while working on the air conditioning system.

\* Freon® is a registered trademark of DU PONT.

## Fuel Handling Precautions

- Allow the engine to cool before refueling.
- Do not refuel with the engine running.
- Ensure the fueling area is well ventilated.
- Turn off all electrical switches, cab heaters and the battery isolation switch(es).
- Do not smoke while refueling.



- To refuel, use the handholds and step provided to get to the fuel tank. Ensure the handholds, tires, tandems and the tandem steps are clean and dry to prevent you from slipping.

- Keep the fuel nozzle in constant contact with the filler tube of the tank being filled, and provide a ground to prevent static sparks from igniting the fuel.
- Do not fill the fuel tank to capacity. Leave room for fuel expansion.
- Clean up any spilled fuel immediately.
- Do not mix gasoline or any other non-specified material with diesel fuel. Highly combustible vapors may result.
- Tighten the fuel tank cap securely. Should the fuel cap be lost, replace it only with the original manufacturer's approved cap. Use of a non-approved cap without proper venting may result in pressurization of the tank.
- Use the correct fuel grade for the operating season.



### Towing Precautions

- When necessary to tow the grader, do not exceed 5 mph (8 kmh).
- Be sure the towing machine has sufficient braking capacity to stop the towed load.
- If the towed grader cannot be braked, a tow bar or two towing machines must be used - one in front pulling and one at the rear to provide braking. Do not tow over long distances.
- Use the tow hitch when using the grader for towing. If a cable or chain is used keep people away from the towline.
- Shielding of the operator(s) against towline breakage must be provided. Refer to the section - **Towing and Transporting** page 11-1.

#### **⚠ WARNING**

**Improper towing methods or equipment could result in severe personal injury or death. Read and understand the towing instructions and precautions in this manual.**

### Transporting Precautions

- Exercise safety and follow all local laws when loading, unloading or transporting the grader. Refer to the section - **Towing and Transporting** page 11-1.

### All Wheel Drive Precautions

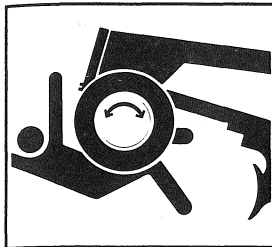
- Do not attempt to repair or adjust the All Wheel Drive System unless you are a qualified service technician.

#### **⚠ WARNING**

**Do not bypass or alter any switch or other component in the All Wheel Drive System. Modifications can cause premature engagement or prevent disengagement of the system. Property damage and personal injury can result.**

## All Wheel Drive Precautions continued

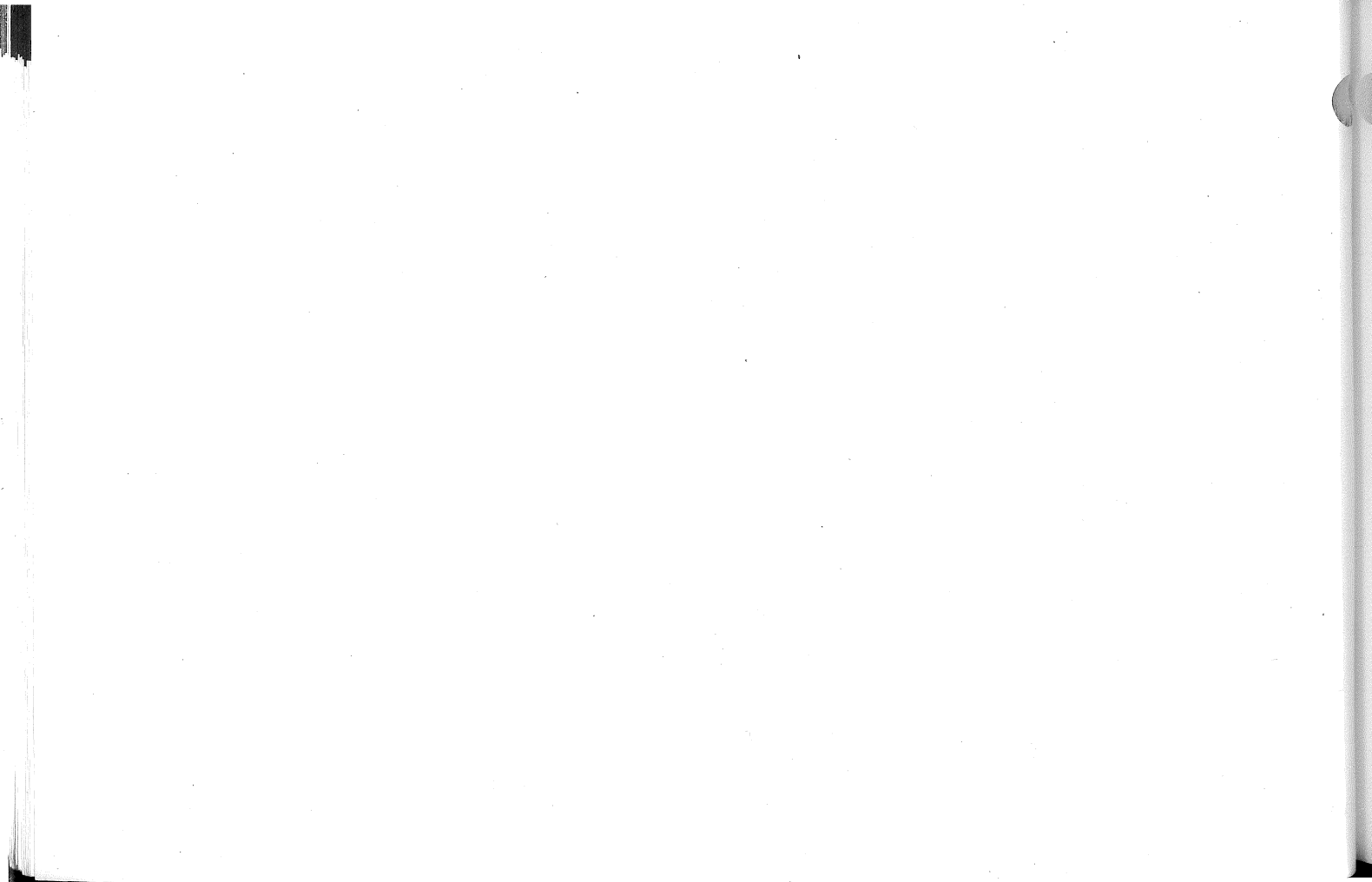
- Use extra care when working on All Wheel Drive System components and hoses. A high pressure leak could result in personal injury.



### **⚠ WARNING**

**Wheels may rotate unexpectedly when raised off the ground. Keep clear when engine is running.**

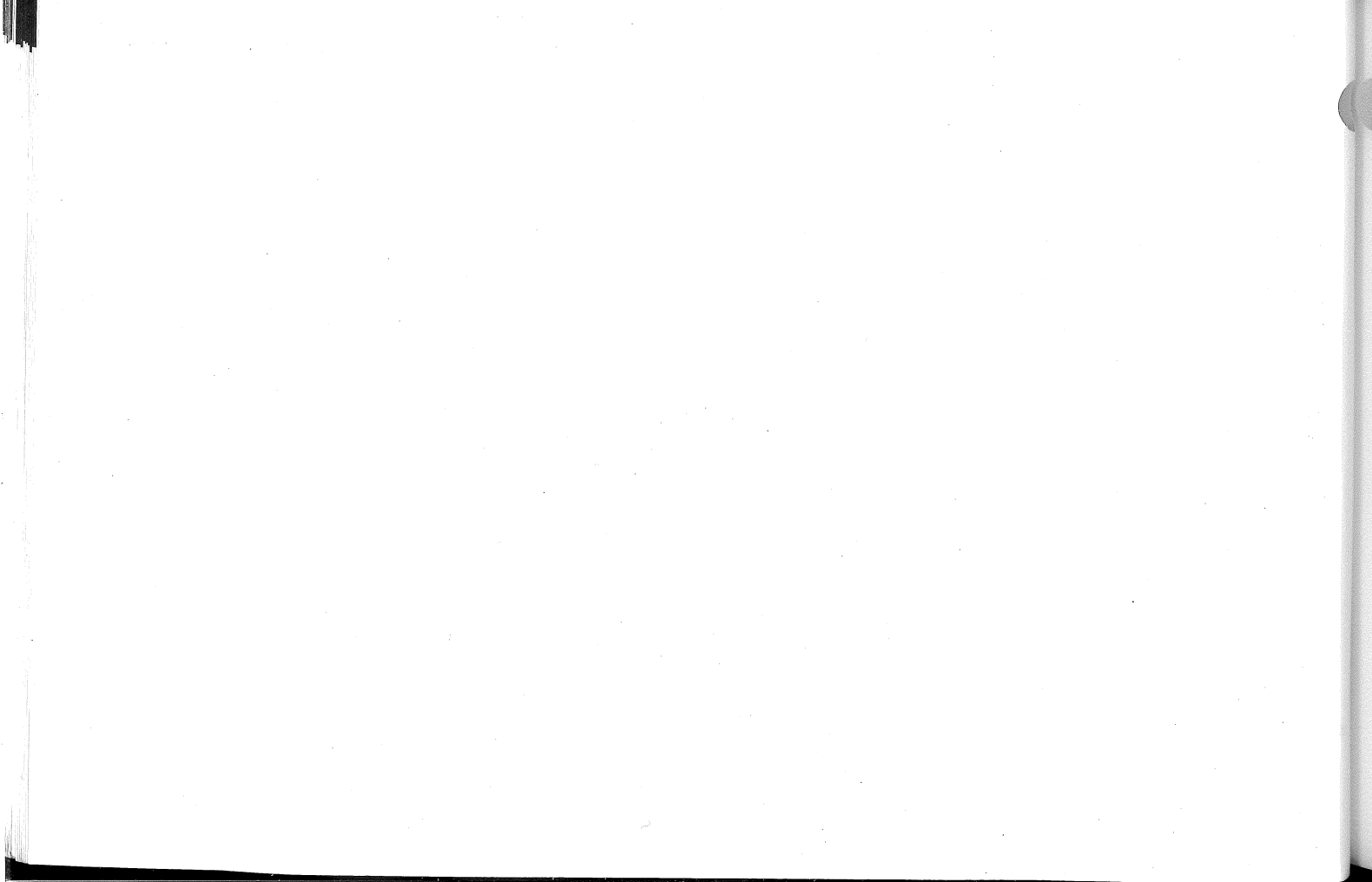
- Do not operate the All Wheel Drive System with the front wheels off the ground except when testing the system.
- Only qualified service personnel should test the system.
- Read and understand the section - **All Wheel Drive** page 12-1, before operating your grader.



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## Serial Number Locations

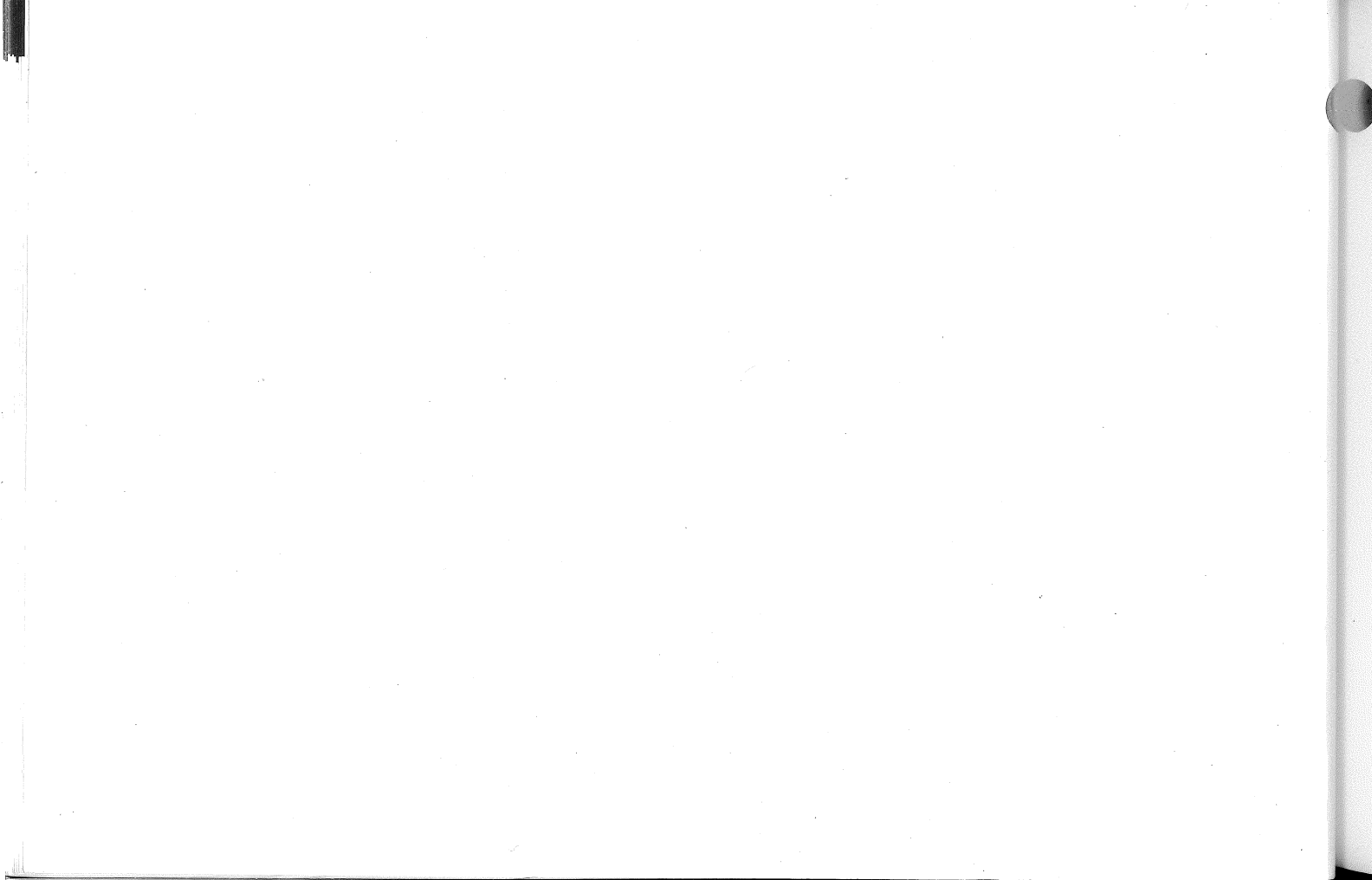
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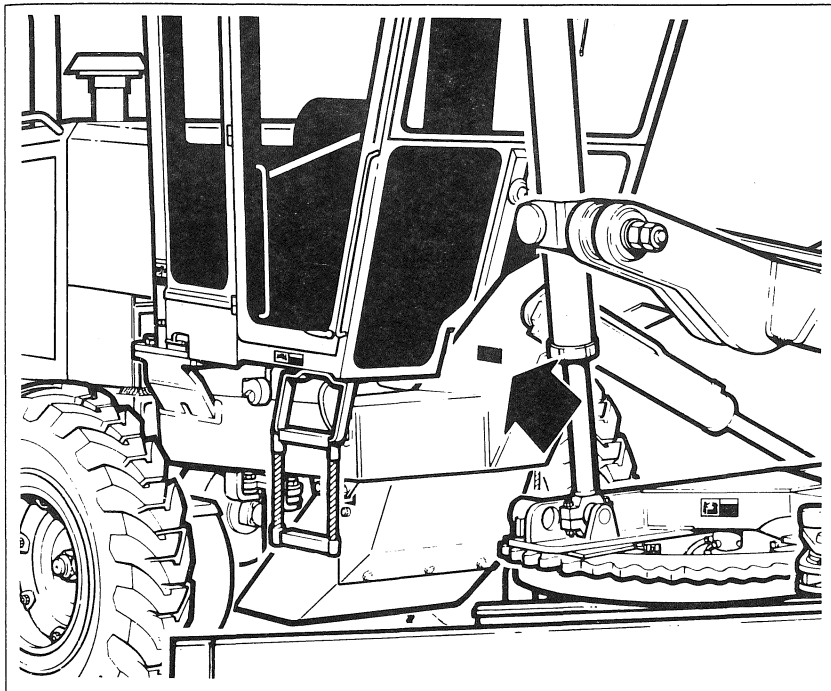
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## Grader Serial Number Location

The grader is issued a specific serial number when it is manufactured. This serial number must be used in conjunction with the Parts Manual to order correct replacement parts.

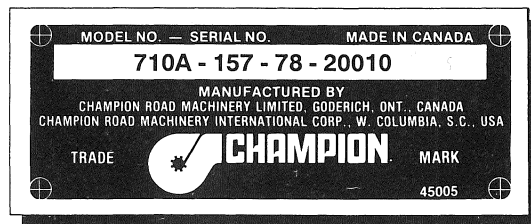
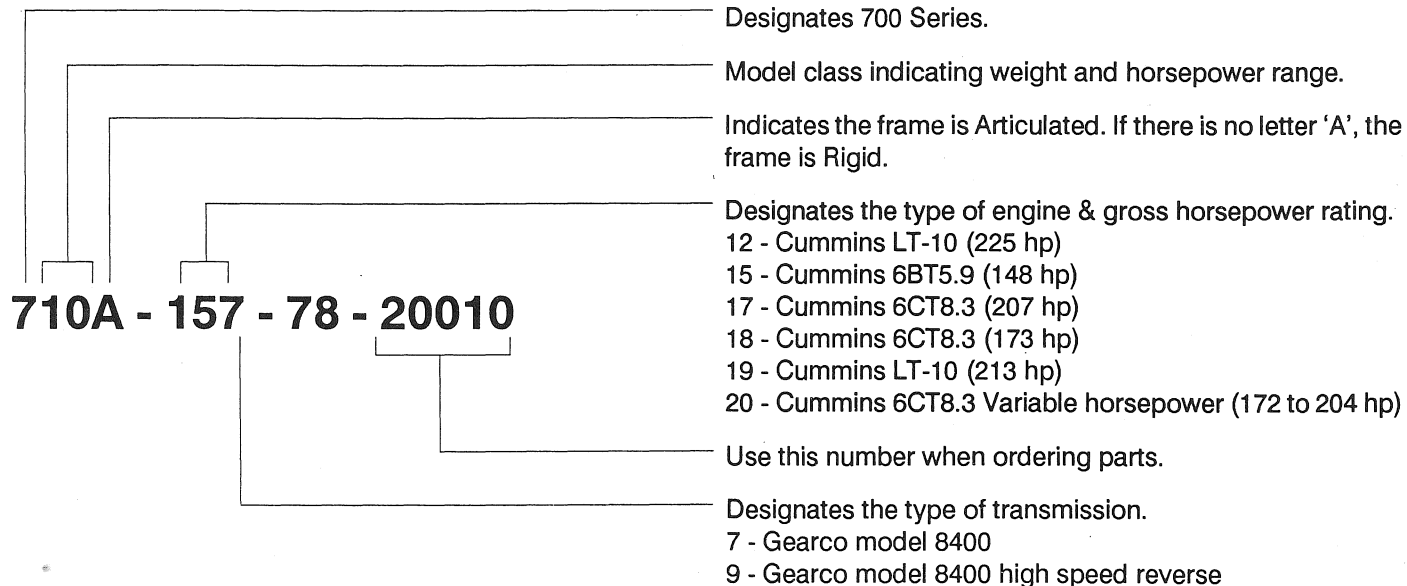
The serial number is stamped on a metal plate attached to the right-hand side of the frame in front of the cab.



Record Grader Serial Number



## Grader Serial Number Identification

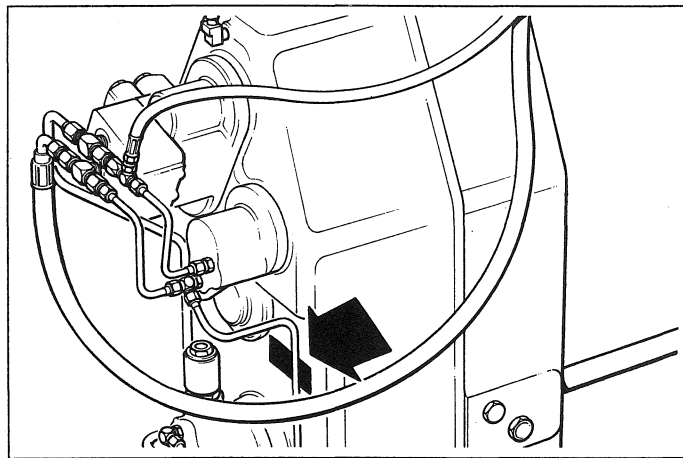


# SERIAL NUMBER LOCATIONS

## Transmission Serial Number Location

Located on lower front of transmission.

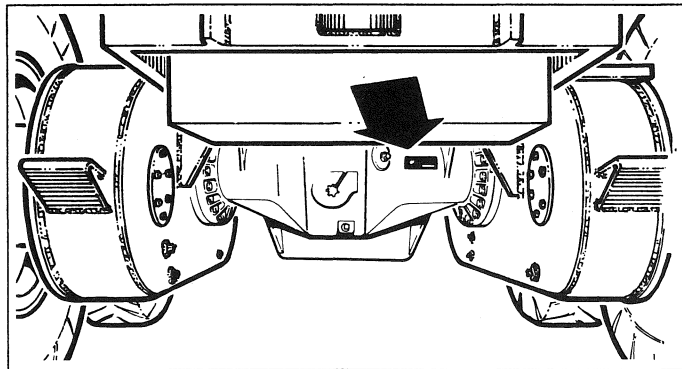
Record Transmission Serial Number

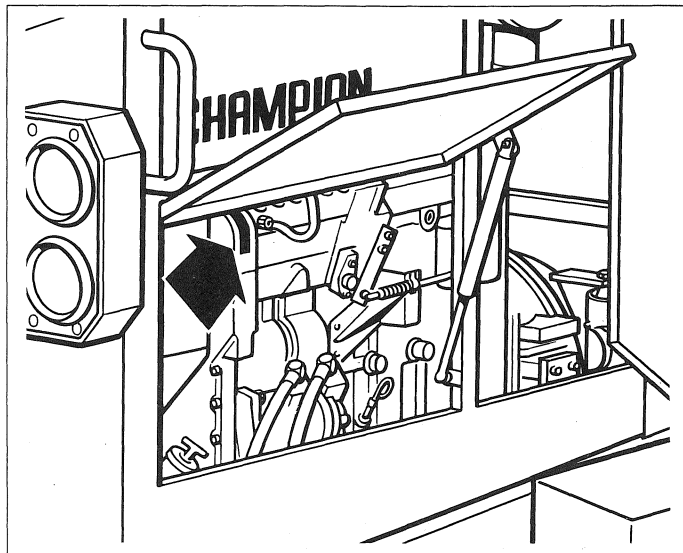


## Final Drive Serial Number Location

Located on rear or top of final drive.

Record Final Drive Serial Number



**Engine Serial Number Location**

Cummins 6BT and 6CT engines - located on fan end of engine, right-hand side of grader. See Engine Manual.

Cummins LT-10 engine - located on top, front, right-hand side of engine.

**Record Engine Serial Number**

# Controls and Instruments



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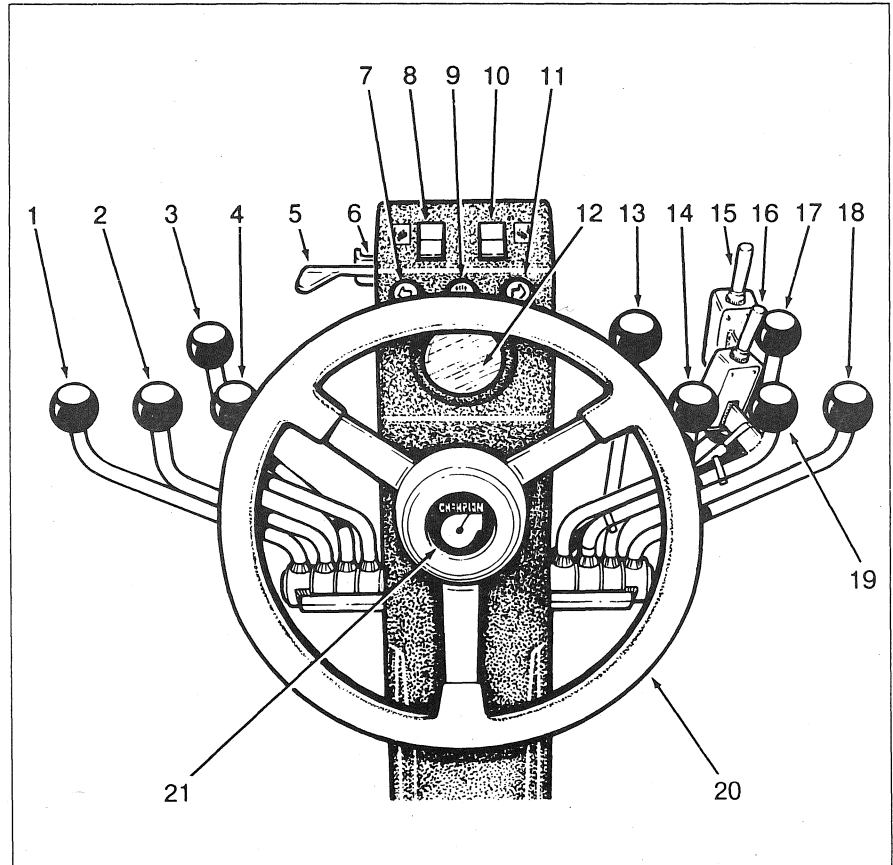
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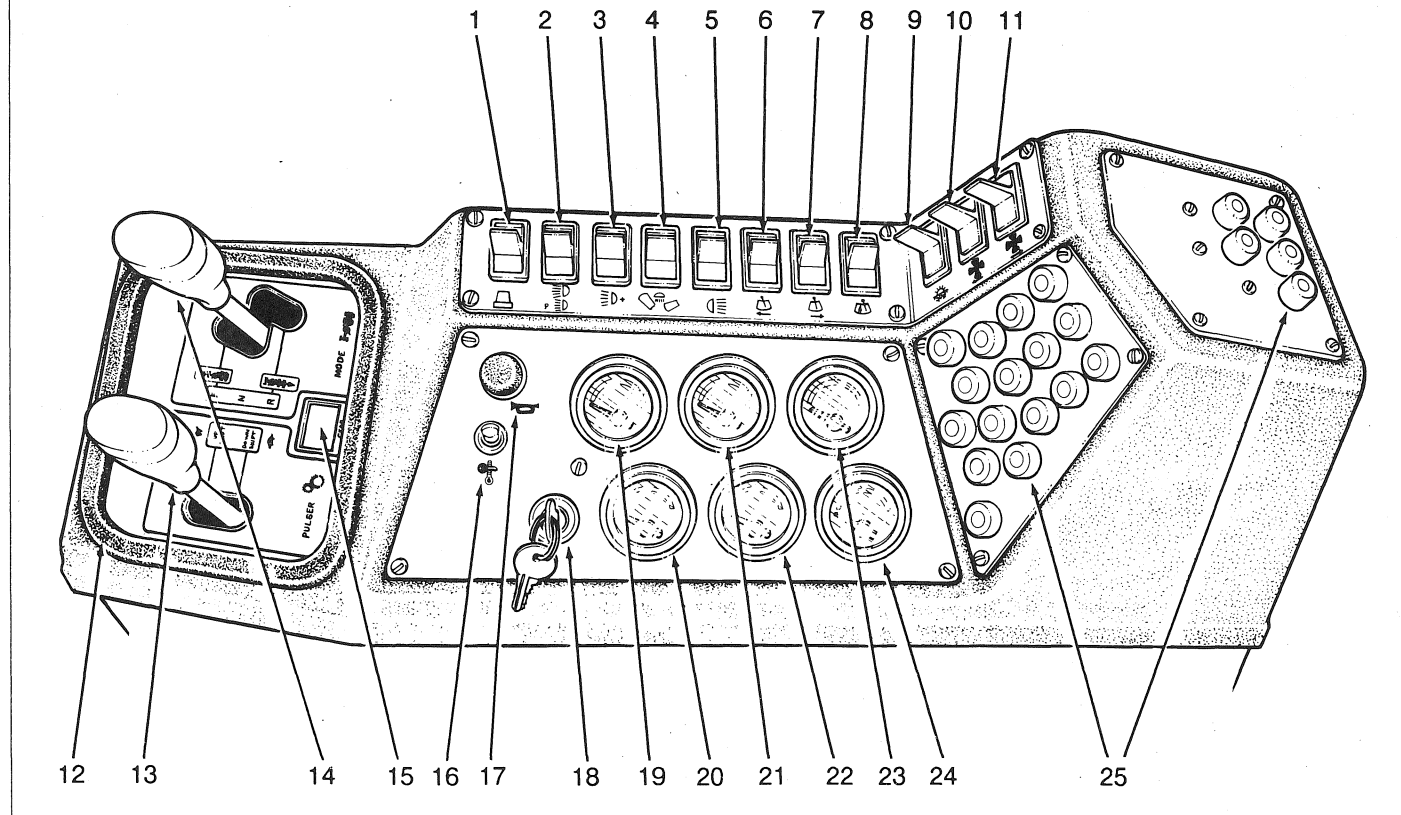
## Pedestal

1. Left-hand Blade Lift Lever
2. Moldboard Slide Shift Lever
3. Moldboard Tilt Lever
4. Circle Turn Lever
5. Directional Indicator Switch
6. Hazard Lights (4-Way Flasher) Switch
7. Left-hand Directional Indicator Light
8. Left-hand Float Valve Switch
9. High Beam Indicator Light
10. Right-hand Float Valve Switch
11. Right-hand Directional Indicator Light
12. Tachometer
13. Hi-Lift Arm Lock Cylinder Lever
14. Circle Shift Lever
15. Scarifier/A-Frame Selector Valve Switch
16. Articulation Switch
17. Control Lever for Scarifier, Front-Mounted Blade or Plow
18. Right-hand Blade Lift Lever
19. Front Wheel Lean Lever
20. Steering Wheel
21. Pedestal Tilt Knob





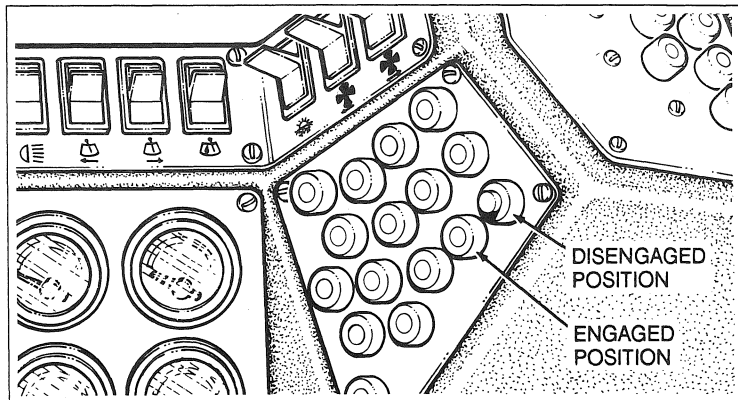
## Console



## Key to Console Items

1. Rotating Beacon Switch
2. Headlights and Parking Lights Switch
3. Extra Headlights Switch
4. Work Lights Switch
5. Rear Floodlights Switch
6. Front Windshield Wiper Switch
7. Rear Windshield Wiper Switch
8. Windshield Washer Switch
9. Heater Blower Switch
10. Front Defroster Fan Switch
11. Rear Defroster Fan Switch
12. Transmission Controller
13. Pulser Lever - Gear Selector
14. Mode Lever - Forward, Neutral or Reverse Selector
15. Digital Display
16. Cold Start Switch
17. Horn Button
18. Ignition Switch
19. Engine Temperature Gauge
20. Voltmeter
21. Engine Oil Pressure Gauge
22. Fuel Level
23. Transmission Oil Pressure Gauge
24. Transmission Oil Temperature Gauge
25. Circuit Breaker Panels

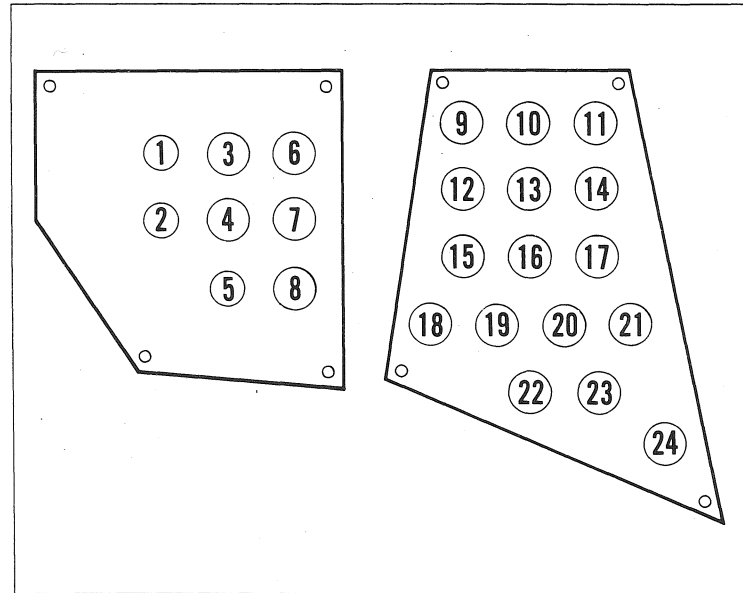
**Circuit Breakers:** If an electrical overload occurs, the circuit breaker is tripped and the button extends to the disengaged position. Press the button to reconnect the circuit. If the problem persists, have it repaired by a qualified service technician.


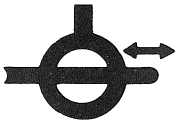





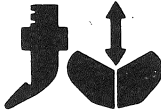

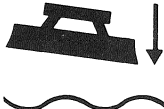



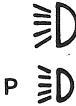








## Circuit Breakers


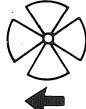
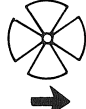






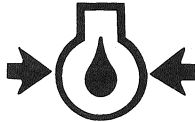






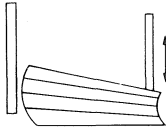
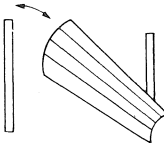
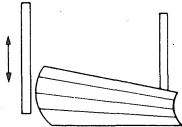
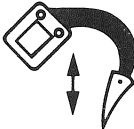
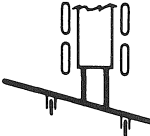
1. Headlights (Automatic Reset)
2. Air Conditioner (Automatic Reset)
3. Supplemental Steering
4. Tire Pump
5. Heater (Automatic Reset)
6. Back-up Lights and Alarm
7. Transmission Solenoid
8. Transmission Microprocessor
9. Cold Start
10. Wing or Rear-mounted Attachment Controls
11. Rotating Beacon
12. Rear Windshield Wiper
13. Front Windshield Wiper
14. Wing Lights
15. Windshield Washer
16. Extra Headlights
17. Rear Floodlights
18. Ignition Switch
19. Horn
20. Float Valves

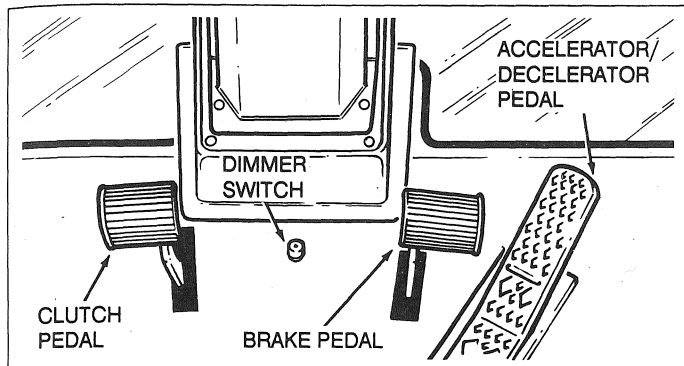
21. Defroster Fans
22. Pedestal Feed
23. Directional Indicators
24. Brake Lights and Dome Light



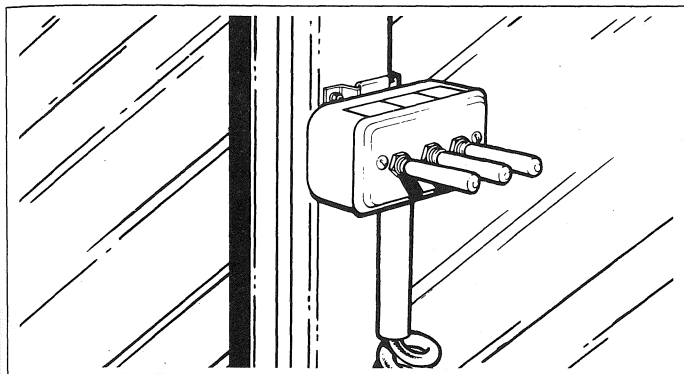
 <p>MOLDBOARD LIFT</p>	 <p>MOLDBOARD SLIDE SHIFT</p>	 <p>MOLDBOARD TILT</p>	 <p>CIRCLE TURN</p>	 <p>HI-LIFT ARM LOCK</p>
 <p>CIRCLE SHIFT</p>	 <p>FRONT WHEEL LEAN</p>	 <p>SCARIFIER, PLOW OR DOZER OPERATION</p>	 <p>LEFT-HAND MOLDBOARD FLOAT VALVE</p>	 <p>RIGHT-HAND MOLDBOARD FLOAT VALVE</p>
 <p>DIRECTIONAL INDICATORS</p>	 <p>HEADLIGHT HIGH BEAM</p>	 <p>ROTATING BEACON</p>	 <p>HEADLIGHTS/ PARKING LIGHTS</p>	 <p>EXTRA HEADLIGHTS</p>
 <p>WORK LIGHTS</p>	 <p>REAR FLOODLIGHTS</p>	 <p>FRONT WINDSHIELD WIPER</p>	 <p>REAR WINDSHIELD WIPER</p>	 <p>WINDSHIELD WASHER</p>

**Symbols for Controls and Instruments**









 <p>HEATER</p>	 <p>FRONT DEFROSTER FAN</p>  <p>REAR DEFROSTER FAN</p>	 <p>BRAKE FAILURE</p>	 <p>HORN</p>	 <p>ENGINE WARNING</p>
 <p>TRANSMISSION OIL PRESSURE</p>	 <p>ETHER COLD START</p>	 <p>ENGINE COOLANT TEMPERATURE</p>	 <p>ENGINE OIL PRESSURE</p>	 <p>VOLTS</p>
 <p>FUEL LEVEL</p>	 <p>SUPPLEMENTAL STEERING</p>	 <p>HAND BRAKE</p>	 <p>TRANSMISSION OIL TEMPERATURE</p>	 <p>LOCK/UNLOCK DIFFERENTIAL</p>
 <p>FRONT MAST OPERATION</p>	 <p>WING TILT</p>	 <p>REAR MAST OPERATION</p>	 <p>RIPPER OPERATION</p>	 <p>WINDROW ELIMINATOR</p>



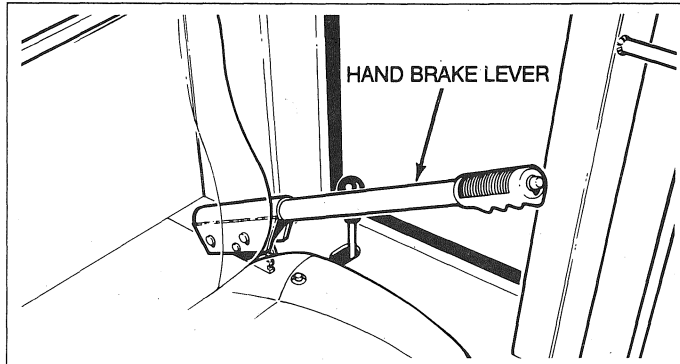
**Pedals and Dimmer Switch**



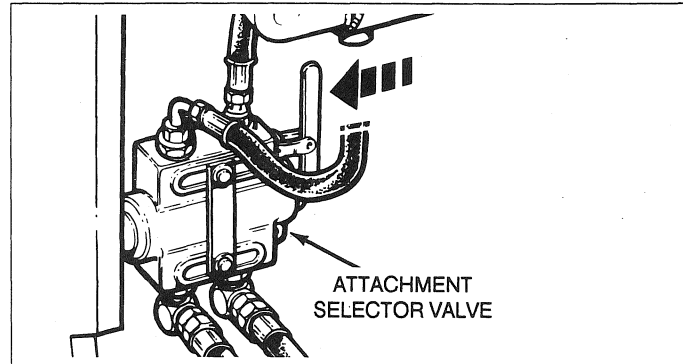
**Attachment Controls Switch Box for Snow Wing, Ripper or Windrow Eliminator**

-  ENGINE WARNING LIGHT
-  SUPPLEMENTAL STEERING WARNING LIGHT
-  BRAKE WARNING LIGHT
-  HAND BRAKE WARNING LIGHT
-  LOCK/UNLOCK DIFFERENTIAL LIGHT
-  LOCK/UNLOCK DIFFERENTIAL SWITCH
-  ACCESSORY SWITCH
-  ACCESSORY SWITCH

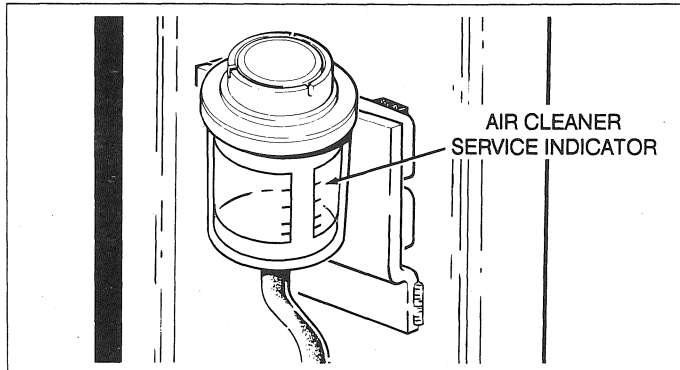
The Switches and Warning Lights are located on the right-hand door post. Positions of switches and warning lights are optional.



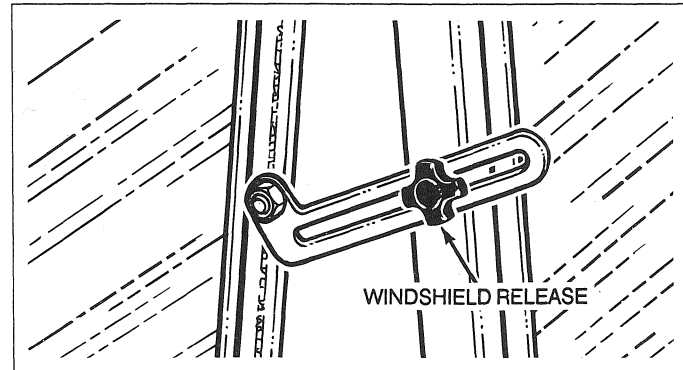
The Hand Brake Lever is located on the left-hand side of the cab.



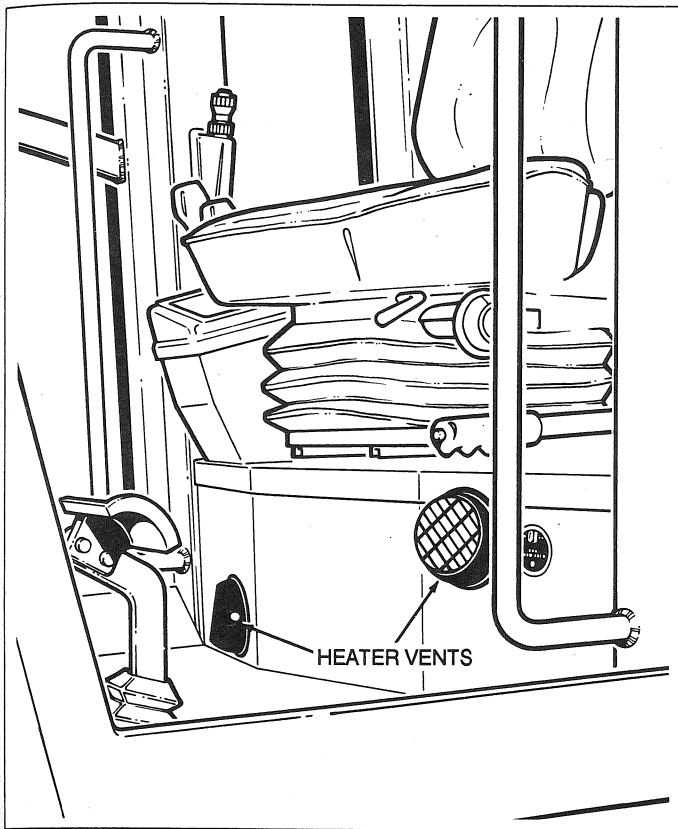
The Attachment Selector Valve is located on the left-hand side of the frame, behind the nose plate.



Air Cleaner Service Indicator - Left-hand Door Post



Windshield Release

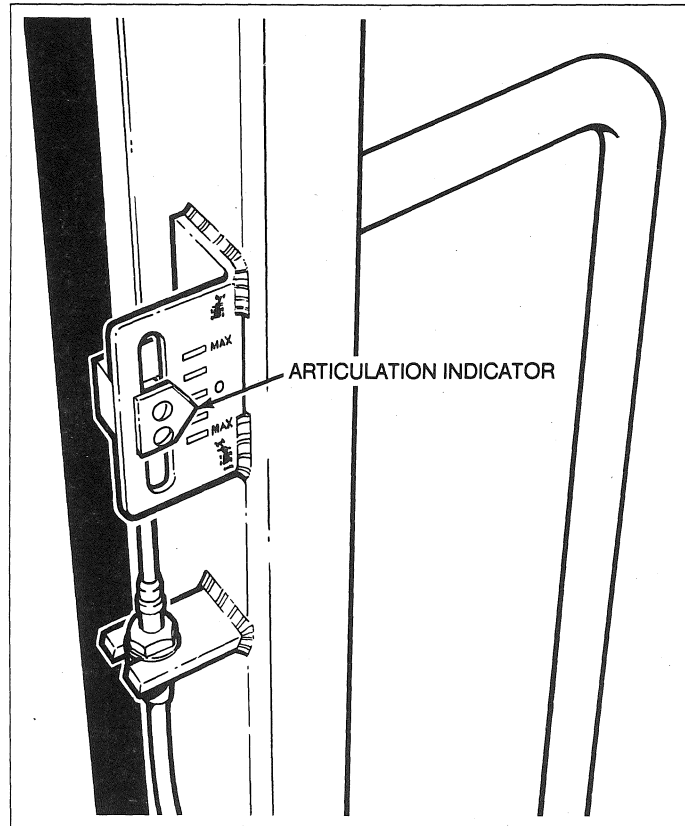


Heater Vents

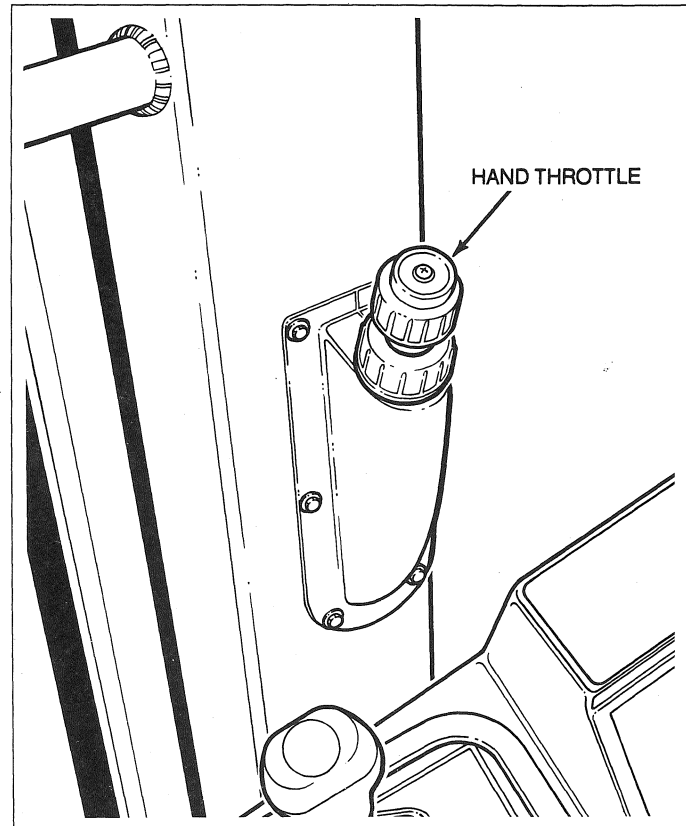


The Heater Control Lever is located on the right-hand side of the cab. Move the lever to increase or decrease the temperature.

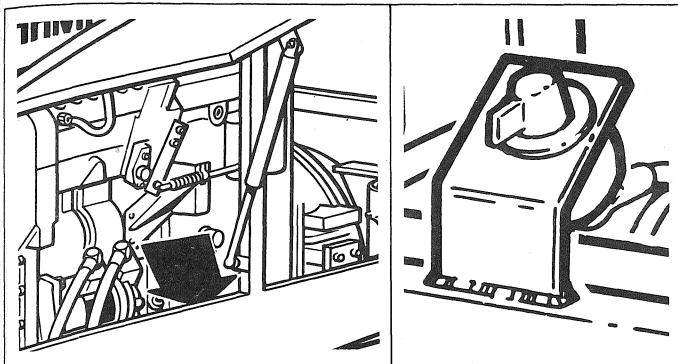




Articulation Indicator (Left-hand side of cab)

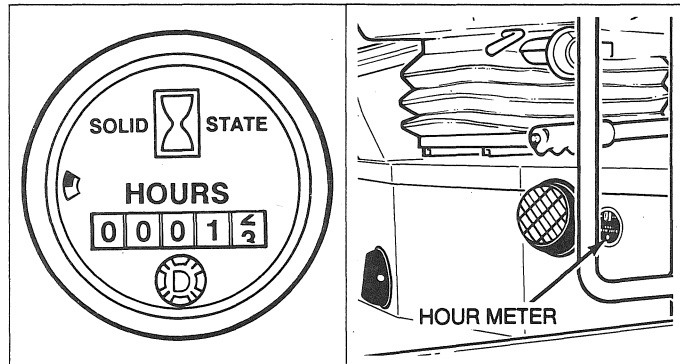


Hand Throttle (Right-hand door post)



## Battery Isolation Switch(es)

The battery isolation switch(es) is located inside of the engine compartment. Turn the switch(es) to the ON position before starting the grader. At the end of the day, turn the switch(es) to the OFF position for added security.



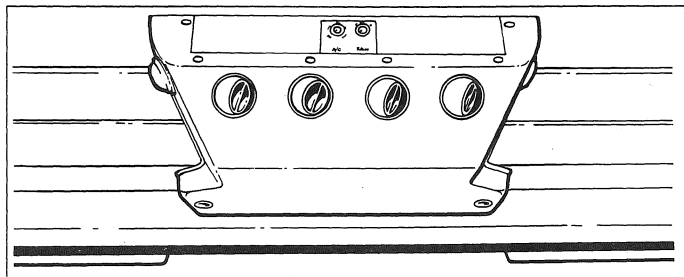
The Hour Meter is located on the left-hand side of the cab, beside the heater vent.



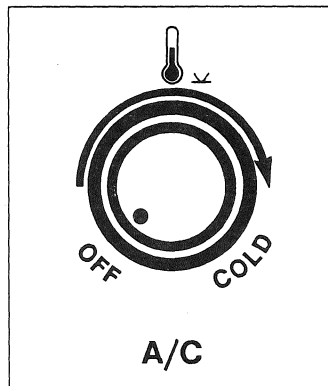
## **⚠ WARNING**

Never short across starter terminals. Grader could move unexpectedly. See Operator's Manual.

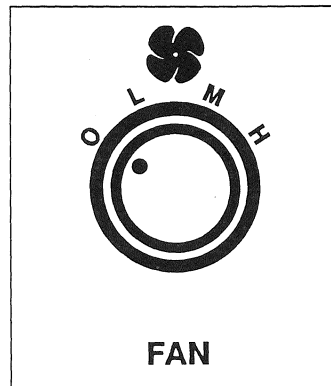
Do not bypass the battery isolation switch(es). Have the switch(es) repaired if it is not working properly.



The Air Conditioner is located on the ceiling of the cab. Air vents and controls are located at the front of the air conditioner.



The Thermostat Control adjusts the temperature of the air from a minimum to maximum setting.



The Fan Speed Control adjusts the air flow speed from off to low, medium, and high.

**NOTE:** The Fan Speed Control and Thermostat Control should be adjusted together. When reducing the air flow, you must reduce the thermostat setting to avoid freezing the evaporator coil.

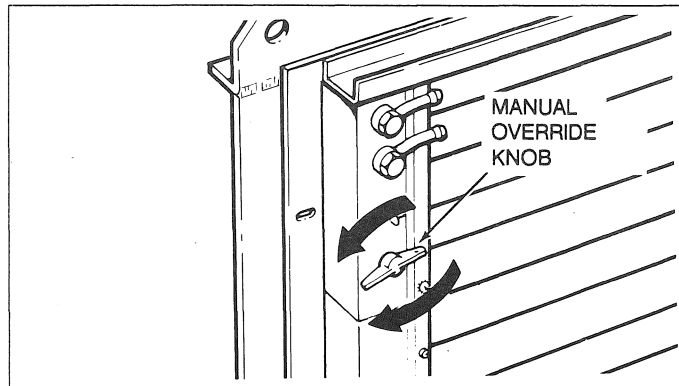
**Air Conditioner Operation and Radiator Shutters.** When using the air conditioner on graders equipped with a radiator shutter, you must keep the shutter louvers open. This avoids excessive compressor cycling due to a reduced air flow.

### **Radiator Shutter Operation (Manual Override) - Air Conditioner in Use (Summer Operation).**

- Ensure the air conditioner is turned off.
- Allow the engine to reach operating temperature.
- Turn the manual override knob clockwise to keep the shutter open. The shutter louvers remain open after the engine cools.

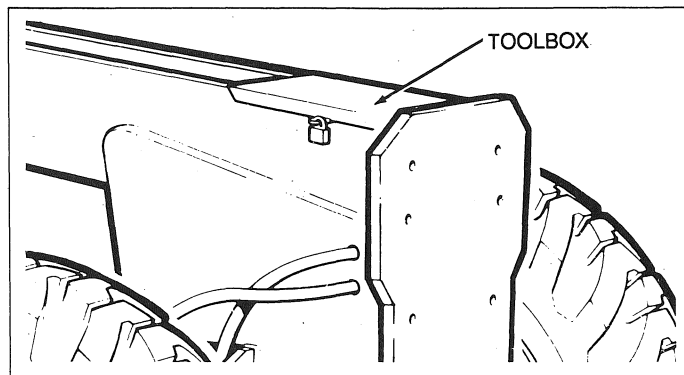
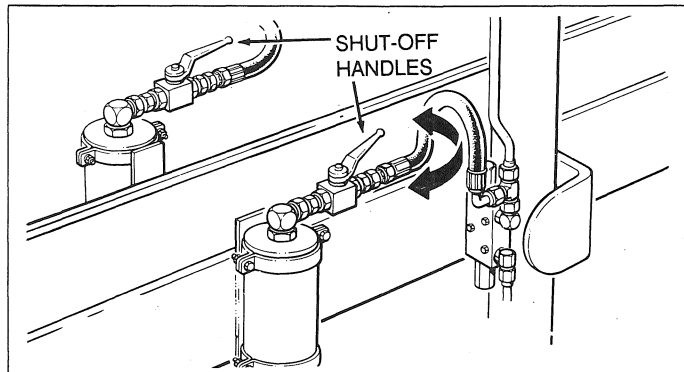
### **Radiator Shutter Operation (Automatic Control) - Air Conditioner not in Use (Winter).**

- Allow the engine to reach operating temperature.
- Turn the manual override knob counter-clockwise to return the shutter to automatic control. The shutter louvers close automatically when the engine cools.



### **⚠ CAUTION**

Do not turn the manual override knob on or off when the engine is cold. Damage to the shutter thermostat will result. Turn the manual override knob only after the engine reaches operating temperature.



### Circle System Accumulators

Some graders are equipped with blade lift and circle shift accumulators. The accumulators absorb shock loads and protect the circle system from impact damage when the grader is working in arduous applications.

In fine grading operations, where a high degree of blading tolerance is needed, the accumulators can be isolated from the hydraulic system. This is done using shut-off valves. Shut-off valve handles, found in the toolbox located in the front of the grader frame, are supplied for this purpose. Turn the handle clockwise to connect the accumulator with the hydraulic system. Turn the handle counter-clockwise to isolate the accumulator from the hydraulic system.

# Pre-start Checks



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Conduct a daily inspection of your grader every 4 to 24 hours of operation or at the beginning of each work shift. Before making any checks ensure the grader is in the Shut-down Position.

*Max oil change  
250 hr.  
15W40*

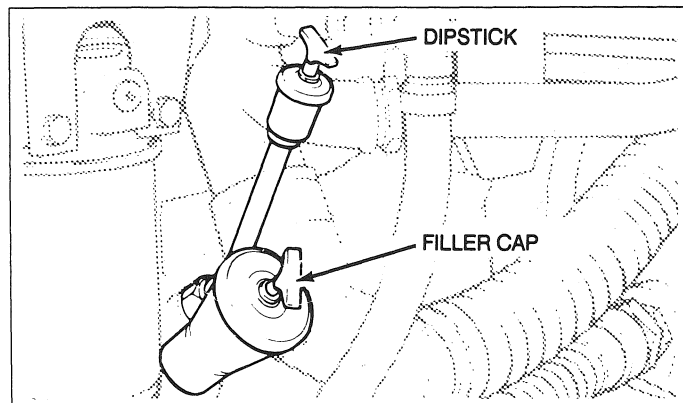
## Shut-down Position

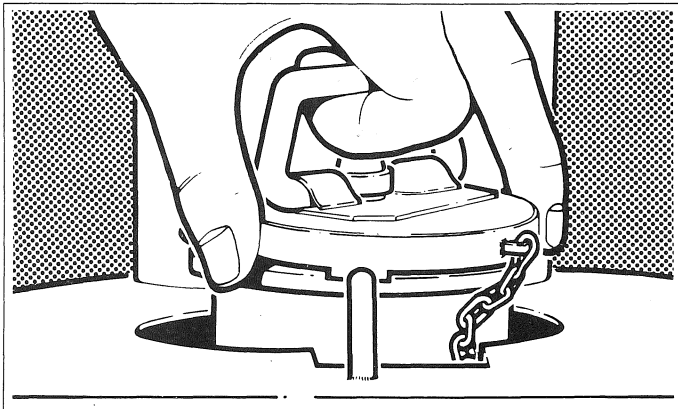
- Park the grader on a level surface.
- Place the transmission in NEUTRAL and apply the hand brake.
- Lower the moldboard and all attachments to the ground.  
Do not apply down-pressure.
- Shut down the engine.
- Remove and retain the ignition key.
- Turn the battery isolation switch(es) to the OFF position.

## Engine Oil

Refer to the Engine Manual to locate the dipstick and the oil filler cap.

- Withdraw the dipstick and check the oil level.
- Add engine oil as required. Consult your engine manual for the correct oil type.
- Check the oil for contaminants or water. Consult your Engine Manual if the oil is contaminated.

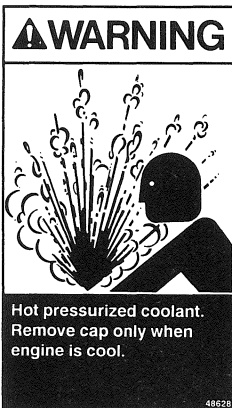




### Engine Coolant

The radiator cap is located on top of the engine hood at the rear of the grader.

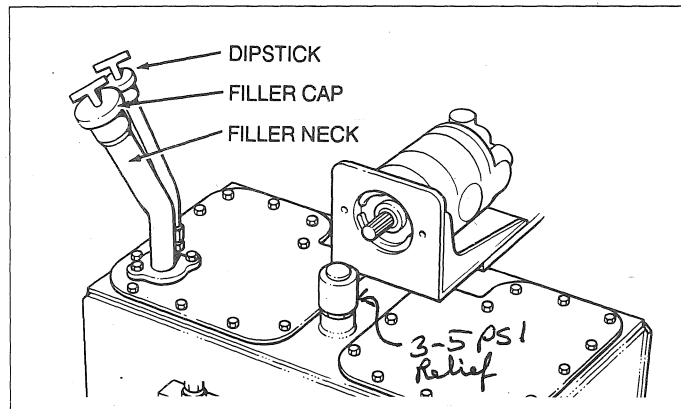
- Carefully remove the cap. The coolant level should be approximately 2 in. (5 cm.) from the top of the filler neck.
- Add coolant as required. Refer to the Engine Manual for correct coolant type.
- Install the cap. Refer to the section - **Maintenance and Lubrication - Engine Cooling System** page 14-18. Extreme loss of coolant indicates a leak in the cooling system or a serious engine malfunction. Consult a qualified service technician.

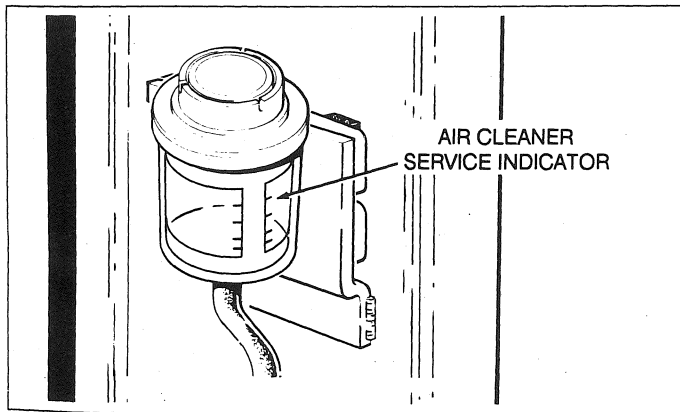
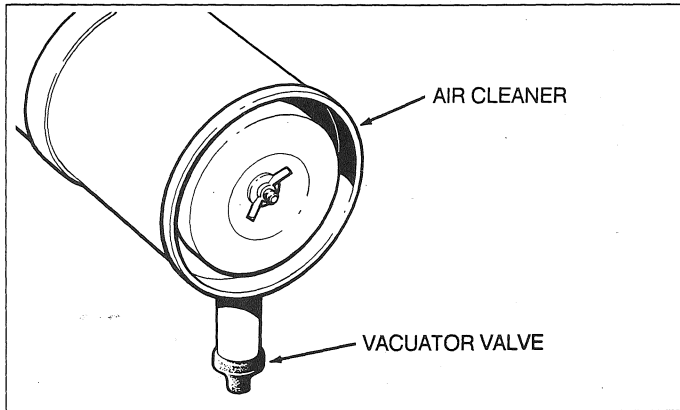


## Hydraulic Oil Level

The hydraulic tank filler cap and dipstick is located at the rear of the grader, on the right-hand side below the radiator and hydraulic pumps.

- To check the hydraulic oil level, start the engine, centralize the circle and moldboard under the grader and fully lower the blade and all attachments.
- Put the grader in the shut down position. Refer to the beginning of this section.
- Clean all dirt from around the filler cap and dipstick.
- Remove the dipstick from the hydraulic tank and wipe clean.
- Replace the dipstick and seat it firmly. Remove the dipstick and check the oil level.
- Add fresh hydraulic oil as necessary through the filler neck. Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-26, for the correct oil type.





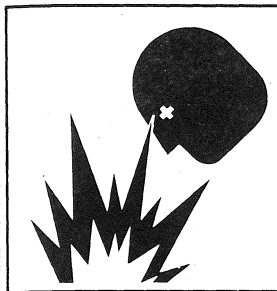
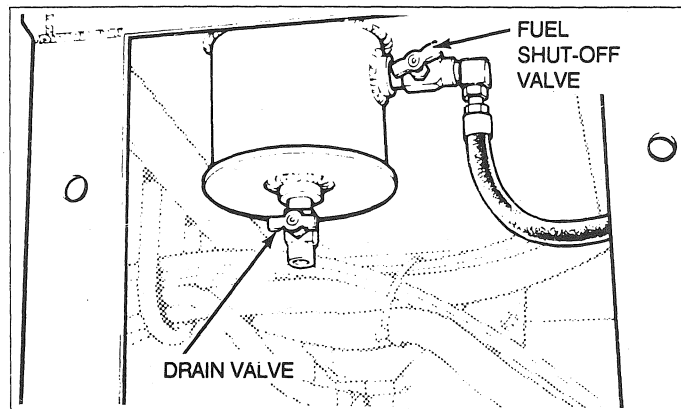
### Air Cleaner

- Tap the air cleaner end cover with your hand and empty the vacuator valve. Make sure that the vacuator valve is securely fastened.
- Check the air cleaner service indicator located in the cab on the rear left hand side. If the indicator has reached the red 25 in. (635 mm) line on the transparent indicator body, you must service the air cleaner. Refer to the section - **Maintenance and Lubrication - Engine Air Filter Elements** page 14-6. Do not service the air cleaner unless the indicator has reached the red line. Unnecessary service may contaminate the engine.
- Check the tubes and connections leading from the air cleaner to the engine. Look for loose clamps, cracks, or accumulation of dust which may indicate a leak.

*Reset daily*

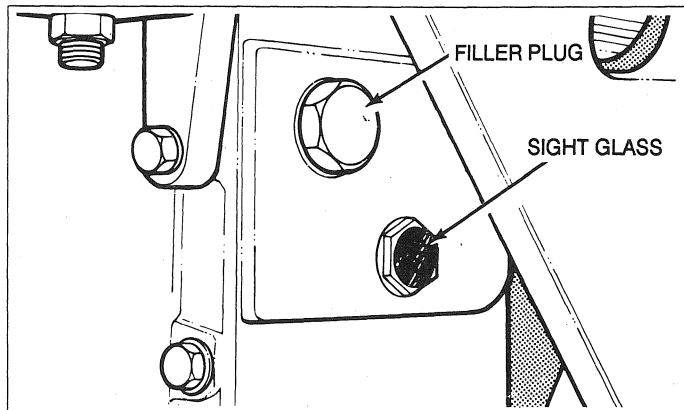
## Fuel Tank

- Keep the fuel tank full to reduce the chance of condensation and corrosion. Do not fill the fuel tank to capacity. Leave room for fuel expansion.
- Before starting the engine, open the fuel shut-off valve located on the rear of the fuel tank sump.
- Open the drain valve on the bottom of the sump to remove water or other accumulated contaminants.
- Clean up any spilled fuel immediately. Refer to the section - **Safety Precautions - Fuel Handling Precautions** page 4-23.



### **⚠ WARNING**

Keep open flames and sparks away from fueling area. Do not smoke. Severe personal injury or death could result.



### Transmission Oil Level

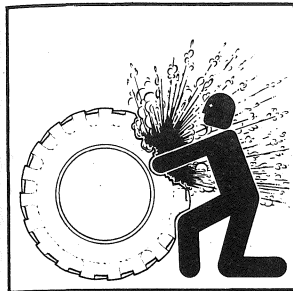
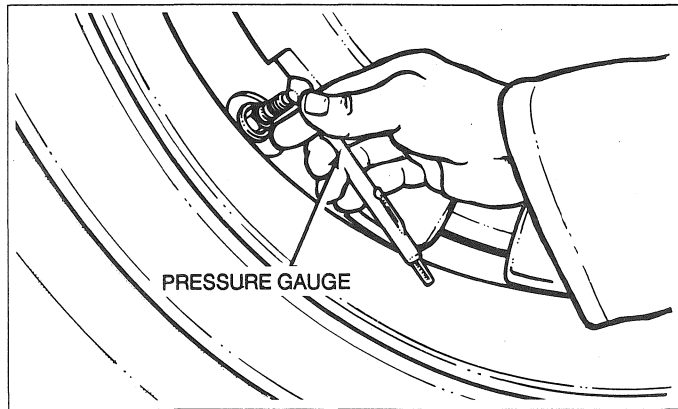
Check the transmission oil level at operating temperature. The best time is at the end of each shift. However, the transmission oil sight glass should be full when the engine is shut down.

- Park the grader on level ground and place the transmission in NEUTRAL.
- Apply the hand brake and lower the moldboard and all attachments to the ground.
- The transmission oil level sight glass is located on the left-hand side of the transmission case. When the engine speed is at idle, the fluid level should be at the middle of the sight glass. If additional fluid is required, shut down the engine.
- Remove the filler plug located above and to the left of the sight glass. Add transmission oil as required. Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-26, for the correct oil type.
- Recheck this level with the engine idling in NEUTRAL.
- Shut down the engine when the check is complete.

## Tire Inflation

Premature tire wear is caused by improper tire inflation. The grader's ride and handling are also affected.

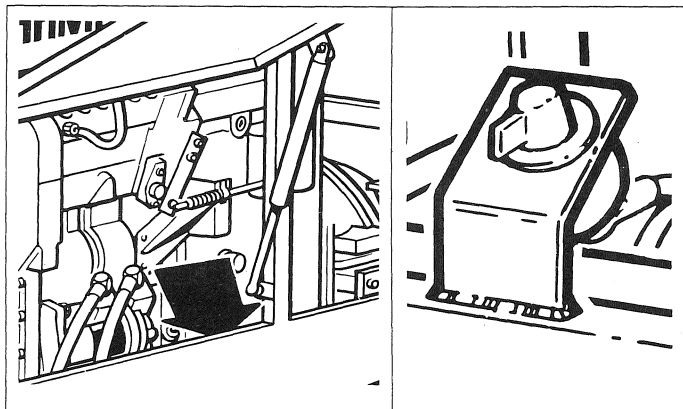
- Check the tire pressure with an accurate pressure gauge when the tires are cold. Refer to the section - **Maintenance and Lubrication - Tire Inflation** page 14-12, for the correct tire pressure. Also refer to the section - **Safety Precautions - Tire Maintenance Precautions** page 4-19.
- Check for cuts, abrasions and uneven or excessive tread wear. Tire repair or replacement must be performed by qualified personnel only.



### **⚠ WARNING**

Failure to use a safety cage when inflating tires could result in severe personal injury or death.





### Battery Isolation Switch(es)

The battery isolation switch(es) is located inside the engine compartment. The switch(es) cuts off electricity between the batteries and the grader's electrical system.

- Ensure the connections are clean and tight.
- Ensure the switch(es) functions correctly. All electrical devices should be inoperative with the switch in the OFF position.

Do not bypass the battery isolation switch(es). Have the switch(es) repaired if it is not working properly.

## Lights, Warning Lights and Safety Signs

- Ensure the lights, back-up alarms and other warning and safety devices are clean and working properly.
- Ensure the safety signs are clean and in good condition. Replace them if damaged, missing or illegible.

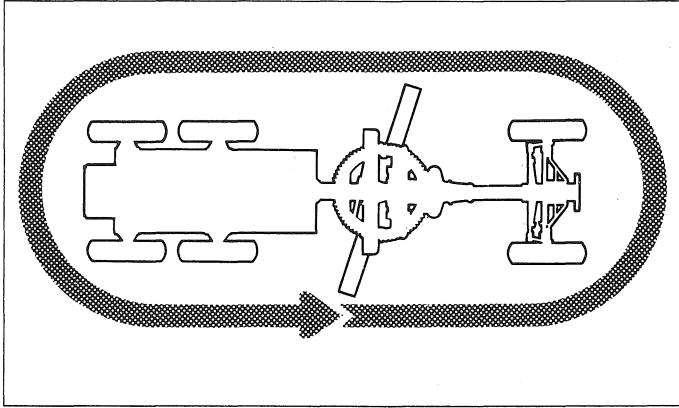


## Radiator and Oil Cooler

- Remove any debris from the radiator and cooler fins.
- Check the drive belts and fan blades.
- Clean the radiator with compressed air in the opposite direction to the normal air flow.

### **▲ WARNING**

When using pressurized air for cleaning, wear a face shield and protective clothing. Do not direct the air hose nozzle at yourself or others. Severe personal injury could result.



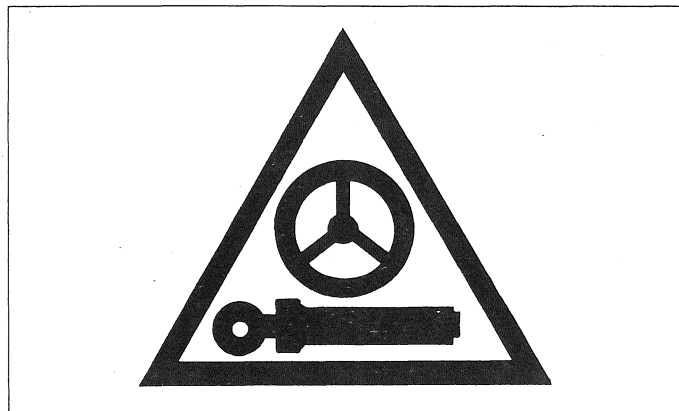
### Walk-around Inspection

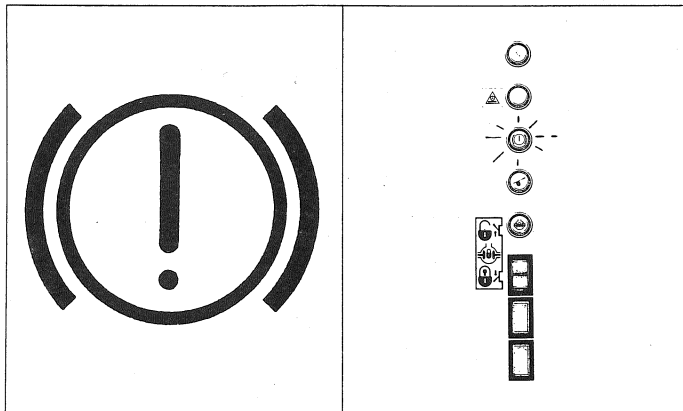
Perform a walk-around inspection before climbing into the cab.

1. Look for oil and coolant leaks, tire damage, pinched hoses, loose bolts or worn cutting edges. Have them repaired or replaced.
2. Visually check the brake fluid level through the semi-transparent reservoir on graders equipped with drum brakes. Refer to this section, page 7-21.
3. Ensure tools and any other objects are removed from the grader, before starting it.
4. Clean the cab glass.
5. Clear away any debris from the moldboard or circle turn area.
6. See that the circle and moldboard slide rails are clean and lubricated. Refer to the section - **Maintenance and Lubrication - Circle Lubrication** page 14-11.
7. Check the grader for 'DO NOT OPERATE' or similar warning tags.
8. Adjust rearview mirrors.

### **Supplemental Steering System**

If your grader is equipped with the supplemental steering system, check it before you start the engine. Refer to the section - **Driving the Grader - Supplemental Steering System** page 8-29.





### Service Brakes Warning System Check

Check the service brakes warning system daily.

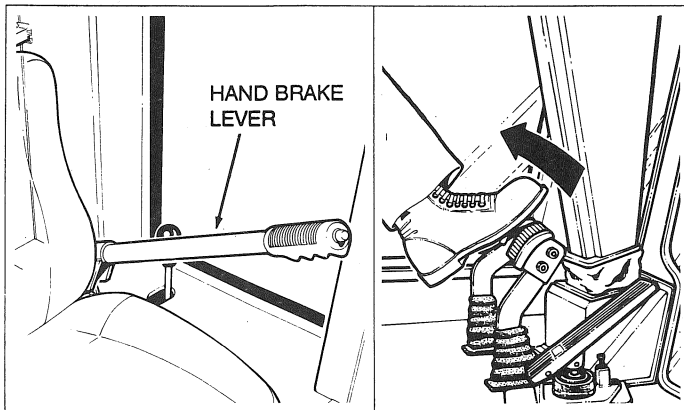
- Turn the battery isolation switch(es) to the ON position.
- Insert the ignition key and turn to the ON position.
- The brake warning light and alarm should energize. This indicates the master cylinder booster electric motor pump is working.
- If the warning light and alarm do not energize, the brake system is faulty and must be repaired by a qualified service technician. Do not drive the grader.

### Hand Brake

Check the hand brake operation daily.

- Apply the hand brake until the pawl engages the sixth ratchet tooth (this should require approximately 60 lb [27 kg] of effort).
- Start the engine only when it is safe to do so.
- Adjust the engine speed to low idle.
- Depress the clutch pedal and select third speed forward.
- Slowly release the clutch pedal - take approximately two seconds to do so. The engine must stall. If the engine does not stall, the caliper assembly needs adjustment.

Refer to the section **Maintenance and Lubrication - Hand Brake Adjustment Frequency - All Models** page 14-14 and subsequent paragraphs for detailed adjustment instructions. Have the hand brake adjusted by qualified service personnel only.



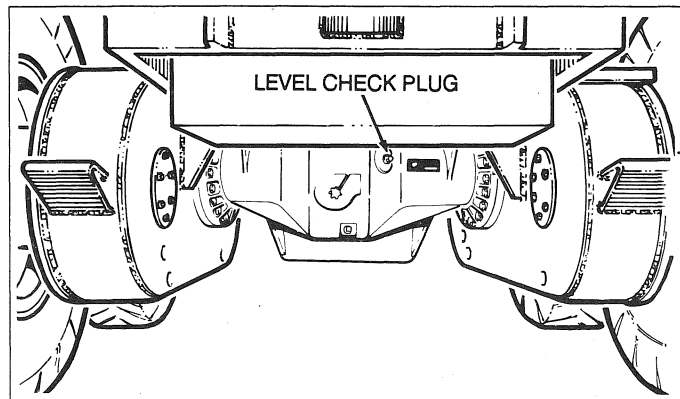
Conduct this inspection once a week or every 50 hours of operation, whichever comes first. As with the daily checks, put the grader in the Shut-down Position.

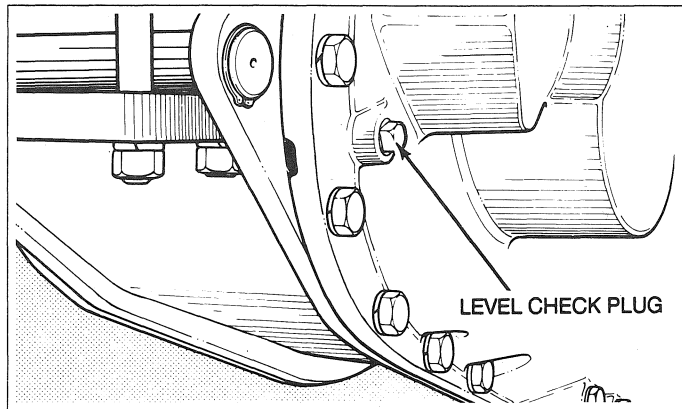
## Shut-down Position

- Park the grader on a level surface.
- Place the transmission in NEUTRAL and apply the hand brake.
- Lower the moldboard and all attachments to the ground. Do not apply down-pressure.
- Shut down the engine.
- Remove and retain the ignition key.
- Turn the battery isolation switch(es) to the OFF position.

## Final Drive Oil Level - SR30 and SR40

- Chock the tires properly.
- The level check/fill plug for the final drive is the top plug on the rear of the final drive case. Clean all dirt from around the plug.
- The oil should be at the level of the hole.
- Add final drive oil as required. Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct oil type.





750 + 7A0

### Final Drive Oil Level - Gearco Twin Bull Gear

- Chock the tires properly.
- The level check plug for the final drive is located in the right side housing behind the cross shaft cap. Clean all dirt from around the plug.
- Remove the plug. The oil should be at the level of the hole.
- To add more oil, remove the breather cap from the filler tube located on the left side of the engine compartment.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct oil type.

80W90 or AW140

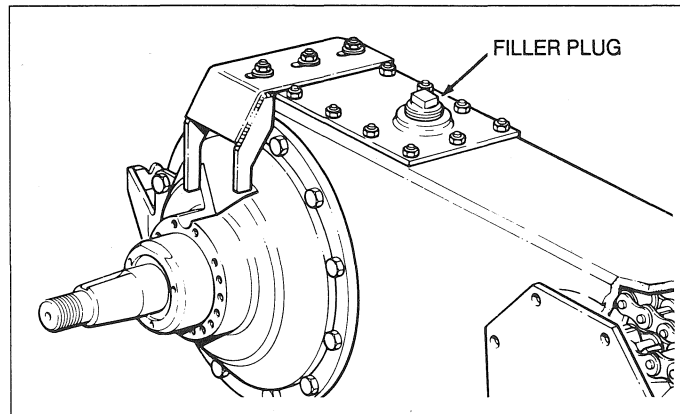
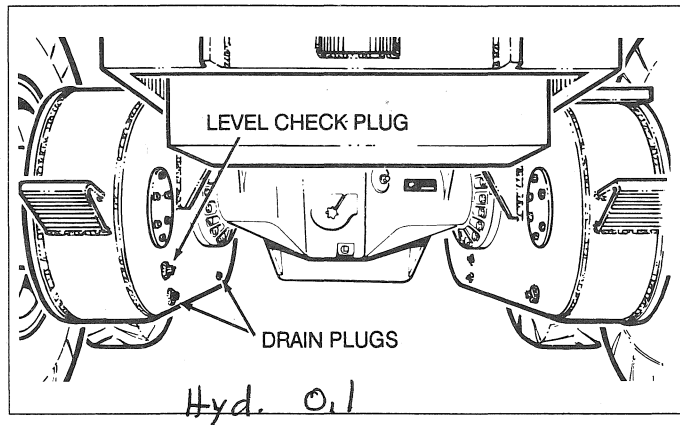
## Tandem Oil Level

- Ensure the tandems are level for an accurate oil level check.
- Slight oil pressure inside the tandem may give a false oil level indication when the level check plug is removed. Relieve the pressure by removing the plug slowly.

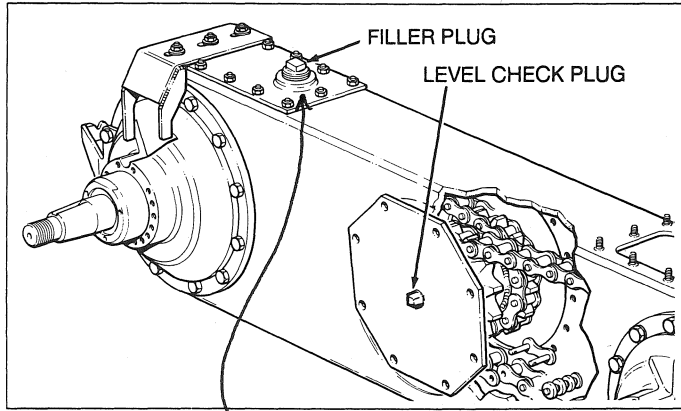
## Tandem Oil Level - Drum Brakes

- The level check plug for the right-hand tandem is located above the drain plug on the inside face at the front end of the tandem case. The level check plug for the left-hand tandem is located above the drain plug on the inside face at the rear end of the tandem case.
- Clean all dirt from around the plug.
- Remove the plug. The oil level should be at the bottom of the hole. Add more oil if the level is below the bottom of the hole.
- To add more oil, remove the filler plug located on the top of the tandem case.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-26, for the correct oil type.







*Dip stick on newer machines on fill plug.*

### **Tandem Oil Level - Oil Disc Brakes**

- The level check plug is located in the center of the tandem cover plate.
- Clean all dirt from around the plug.
- Remove the plug. A small amount of oil should flow from the hole.
- To add more oil, remove the filler plug located on the top of the tandem case.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-26, for the correct oil type.

*Hyd. Oil*

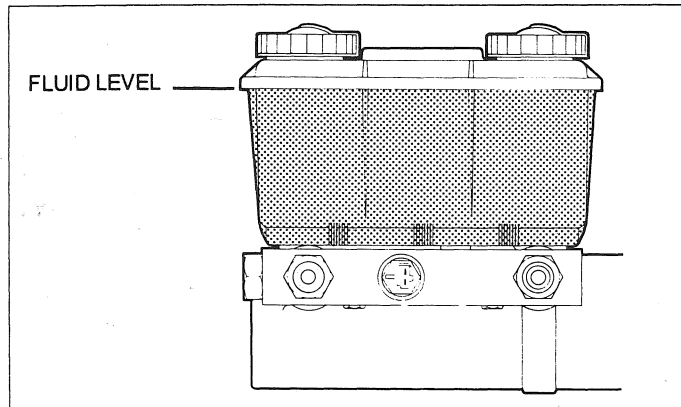
## Service Brakes Master Cylinder Fluid Level

### **⚠ WARNING**

Sudden loss of any fluid indicates a serious malfunction. Stop grader. Consult a qualified service technician.

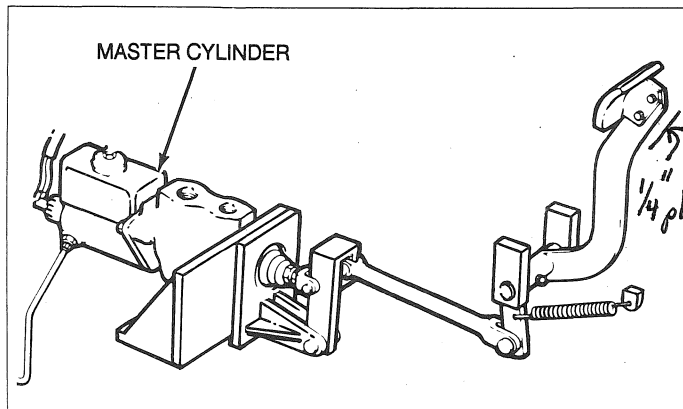
- The service brakes master cylinder is located under the right-hand side of the cab.
- Clean the outside of the reservoir.
- The fluid level should be at the reservoir flange.
- Add the correct fluid type as required.
- Clean up spilled fluid immediately.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct fluid type.



### **⚠ WARNING**

Brake fluid can harm eyes. Wear eye protection. If contact occurs, flush your eyes with large amounts of water. Seek medical attention immediately.



### ⚠ WARNING

Brake fluid can harm eyes. Wear eye protection. If contact occurs, flush your eyes with large amounts of water. Seek medical attention immediately.

### Clutch Fluid Level

#### ⚠ WARNING

Sudden loss of any fluid indicates a serious malfunction. Stop grader. Consult a qualified service technician.

- The clutch master cylinder is located under the left-hand side of the cab.
- Clean the top of the reservoir.
- Remove the cap. The fluid level should be approximately 1/2 in. (13 mm) from the top.
- Add the correct brake fluid type as required.
- Clean up spilled fluid immediately.

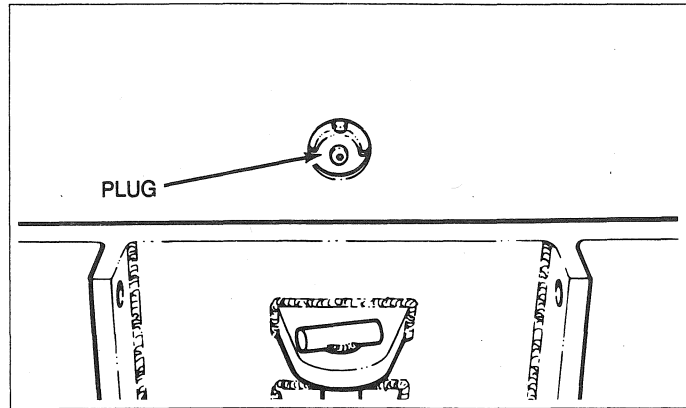
Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct fluid type.

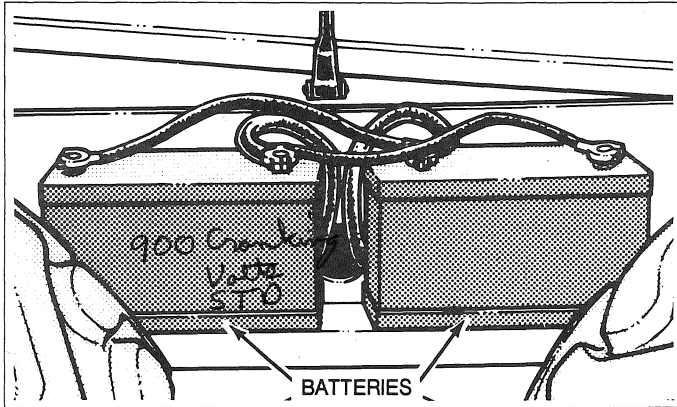
*Brake fluid*

## Pump Drive Gearbox Oil Level - All Wheel Drive

- To check the pump drive gear box oil level, remove the plastic plug from the access hole in the gearbox cover plate.
- Remove the socket head plug from the gearbox housing. A small amount of oil should flow from the hole.
- Add more oil through the same hole as required.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct oil type.





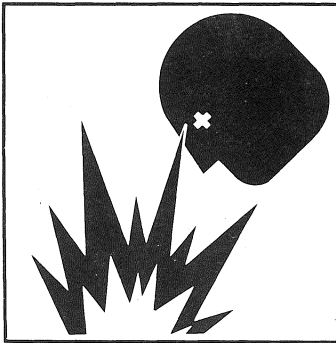
### Batteries *12 volt system*

Batteries are located inside battery boxes on one or both of the tandems.

- Remove the battery box cover(s).
- Check the terminals for corrosion and tighten the cable connectors.
- If the batteries have filler caps, remove the caps and check the level of the electrolyte.
- Add distilled water only. Install the caps.
- Check and tighten the battery hold down clamps and do not let your tools or metal objects come in contact with the battery terminals.
- Replace the battery box cover(s).

Batteries produce explosive gases. Keep sparks, flames, smoking materials, or other ignition sources away from batteries. Use a flashlight to check the electrolyte level.

Refer to the section - **Maintenance and Lubrication** - pages 14-20 and 14-21, and the section **Safety Precautions - Battery Maintenance Precautions** page 4-20, for further information on batteries.



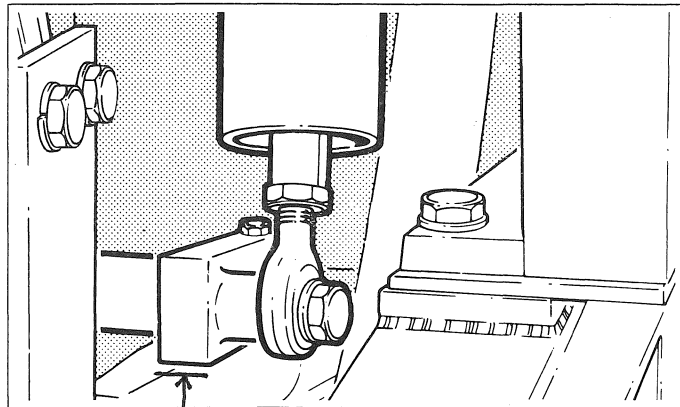
## ⚠ WARNING

**Explosive gases.  
No smoking. Keep  
sparks and flames  
away from batteries.**

### Clutch Free Play

The slave cylinder is located on the right-hand side of the clutch housing.

- Press the cross shaft arm downwards. This will rotate the cross shaft.
- Press until a firm resistance is felt. This means that the release bearing is engaging the lever arms of the clutch.
- The slave cylinder should extend to the measurement specified in the **700 Series Shop Manual P/N L-2005**.

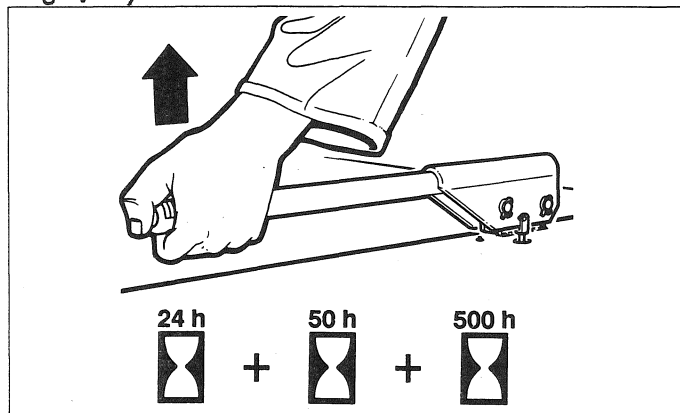


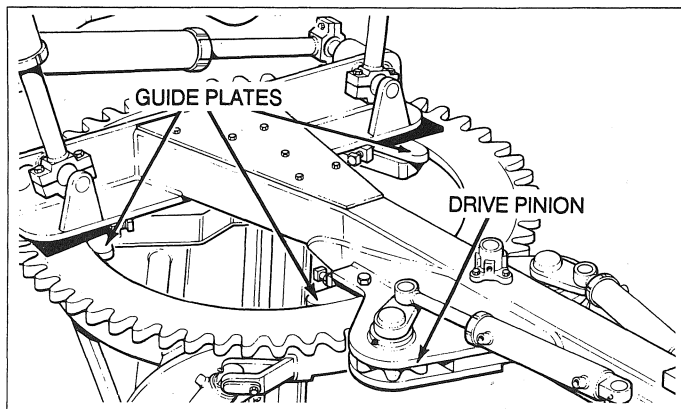
$\frac{1}{8}$ " play

### Hand Brake

After 50 hours and at every 500 hours check for cable stretch.

Refer to this section, page 7-16. Refer to the **700 Series Shop Manual P/N L-2005**.





### Circle Adjustment

- Adjust the front guide plate(s) to contact the inner face of the circle. Contact should be across the complete width of the guide plate(s).
- Check the backlash of both drive pinions. It should be 0.080 in. (2,0 mm).
- Check the backlash of the circle turn valve pinion. It should be 0.080 in. (2,0 mm).
- Adjust the clearance of the rear guide plates to 0.040 in. to 0.080 in. (1,0 mm to 2,0 mm) evenly between the guide plates and the circle.

Refer to the **700 Series Shop Manual P/N L 2005**, for detailed adjustment instructions. Have the circle adjusted by qualified service personnel.

# Driving the Grader





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## Operator's Cab Entry and Exit

- Use the handholds and steps provided with at least three points of support. Use two hands and one foot or two feet and one hand.
- Do not climb the steps or operate the grader with wet or greasy hands, muddy shoes or boots.
- Keep the steps, operator's platform, seat, pedals and controls clean and clear of debris, mud, ice, grease, tools and other objects.



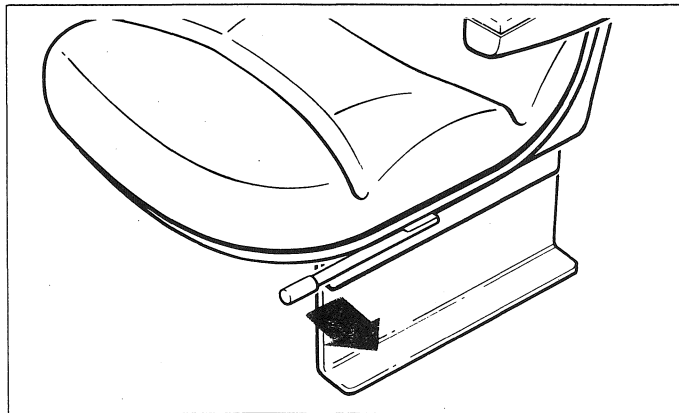
## Seat Adjustments

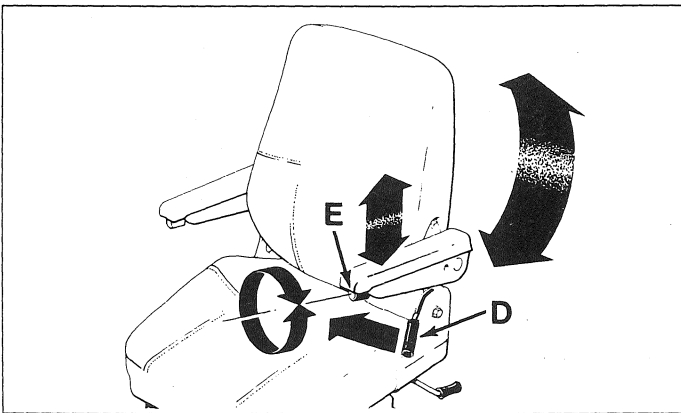
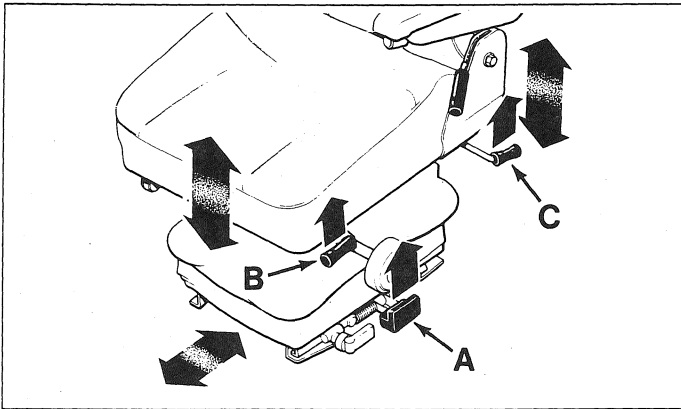
Adjust the seat before starting the grader. Ensure the hand brake is applied.

### Standard Seat

The standard seat incorporates two adjustments.

- To move the seat forward or back, pull on the lever located on the lower left-hand side of the seat.
- Ensure that it latches securely.





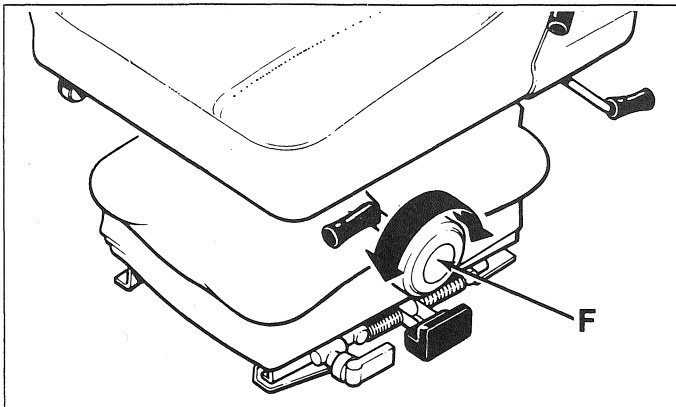
## Suspension Seat

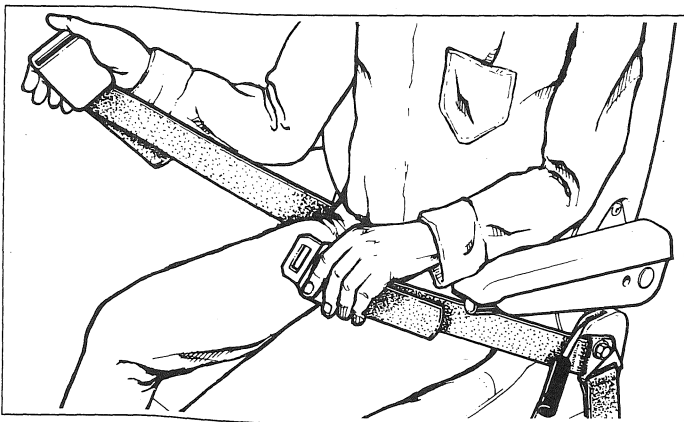
The optional suspension seat has six adjustments. All adjustment levers are on the left side.

- To move the seat forward or backward, pull on the lever mounted on the seat track (A).
  - Ensure that it latches securely.
  - To raise or lower the front of the seat, pull up on lever (B) located near the front left corner of the seat cushion.
  - To raise or lower the rear of the seat, pull up on the lever (C) located near the rear left corner of the seat cushion.
  - Use levers (B and C) to adjust the seat height.
  - Ensure the seat latches securely.
- 
- To change the angle of the seat back, pull up on lever (D) located near the lower left corner of the seat back.
  - To adjust the height of either arm rest, lift the arm and rotate the knurled knob (E).

## Suspension Seat continued

- To adjust the suspension for your weight, rotate the outer ring of the numbered dial (F) until the portion of the dial corresponding to your weight shows in the orange window.

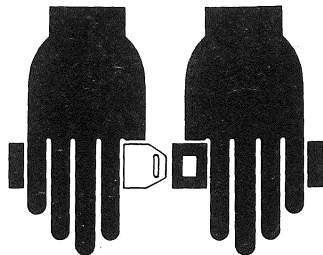




### Seat Belt

- Pull both ends of the seat belt away from the seat.
- Ensure that the belt is fully extended and not tangled or caught in the seat.
- Fasten the clasp.
- Pull the belt to fit snug and low around your hips.
- The holding strap must be free of slack.

### WARNING

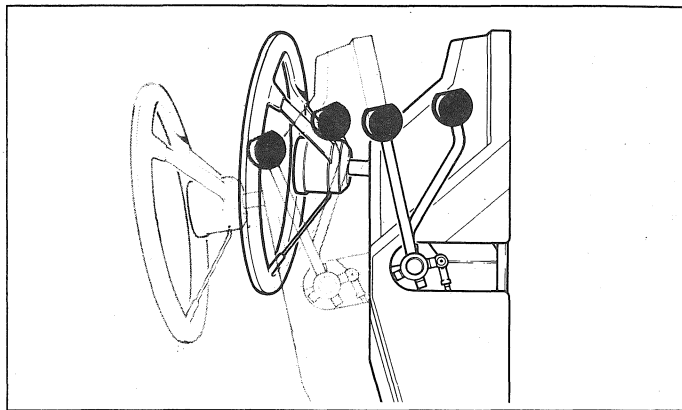


**Wear seat belt when  
operating the grader.**

## Pedestal

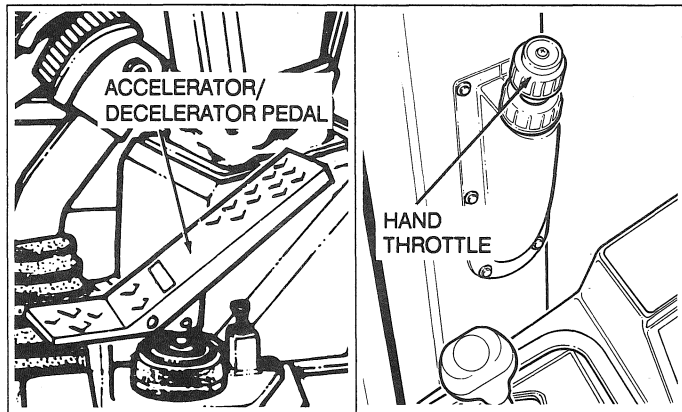
The Champion control pedestal allows fast, simple adjustment of the steering wheel and levers.

- To change the pedestal position, grasp the steering wheel.
- Turn the center knob counter-clockwise. This releases the locking mechanism.
- Move the pedestal to the desired position.
- Turn the center knob clockwise. This locks the pedestal.



## Accelerator/Decelerator Pedal

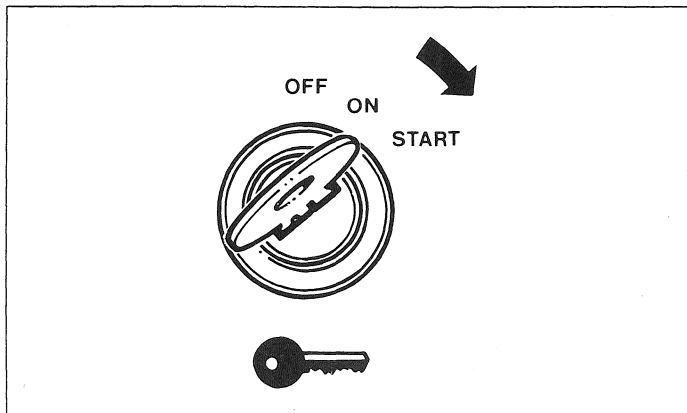
- Depress the pedal toe to increase rpm.
- Release the pedal to decrease engine rpm.
- Use the pedal to override the hand throttle setting.
- Depress the heel of the pedal to decrease engine rpm when the hand throttle is set.
- When you remove your foot from the pedal, the engine speed will return to the preset hand throttle position. Refer to section - **Operating the Controls - Hand Throttle** page 9-11.





## Engine Start and Shut Down

- Prior to starting the grader, check the grader for 'DO NOT OPERATE' or similar warning tags. Turn the battery isolation switch(es) to the ON position.
- Start and operate the grader only from the operator's seat.
- Know how to shut the engine down before attempting to start it.
- Check the transmission mode lever to ensure it is in NEUTRAL before starting the engine.
- Ensure the hand brake is applied.
- Sound the horn before starting the engine.
- Do not operate the engine in an enclosed area without adequate ventilation.

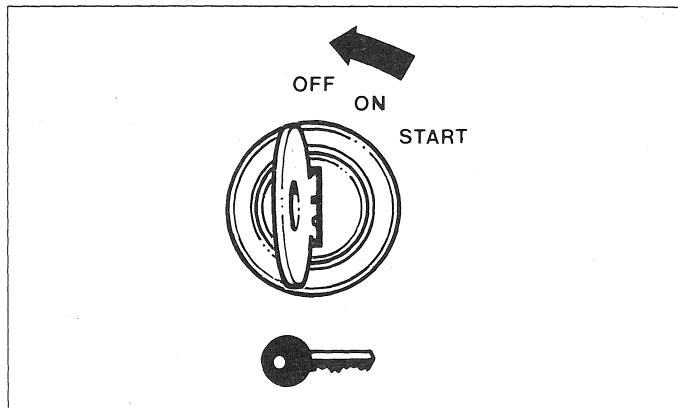


## Starting the Grader

- Insert the ignition key in the switch.
- Rotate the key clockwise to the START position.
- Do not crank engine for more than 30 seconds.
- Release the key and wait two minutes before trying again.
- Release key when engine starts.

## Engine Shut Down

Turn the ignition key counterclockwise to the OFF position to shut down the engine. Refer to the section - **Pre-Start Checks - Shut Down Position** page 7-5.

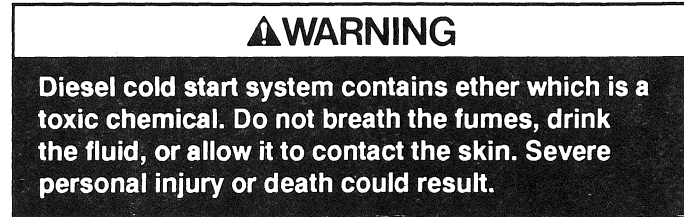
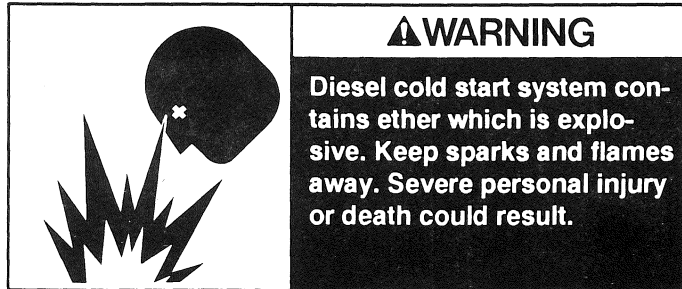


## Cold Weather Start Up Procedure

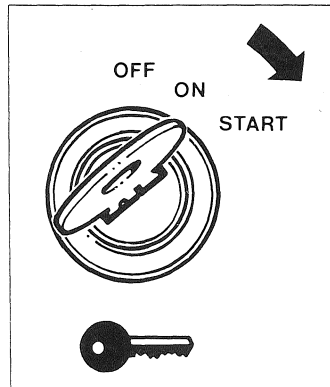
If oil in the hydraulic circuit is cold, hydraulic functions may move slowly. Do not attempt grader operations until the hydraulic oil is warmed up. If you do not follow the proper warm up procedure, hydraulic pump damage may result.

- Run the engine at approximately 1000 rpm for five minutes. Do not put load on the hydraulic system.
  
- Cycle all hydraulic cylinders through their working range several times until the hydraulic functions operate normally.
  
- The grader is now ready to operate under load.

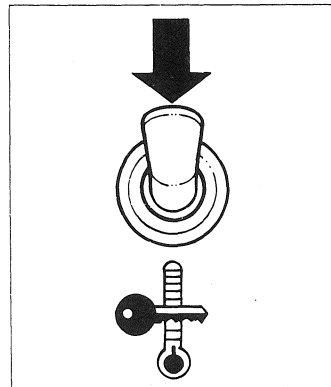
## Cold Start



- If swallowed, breathed or contact with skin or eyes seek medical attention immediately.



Ignition Switch



Cold Start Switch

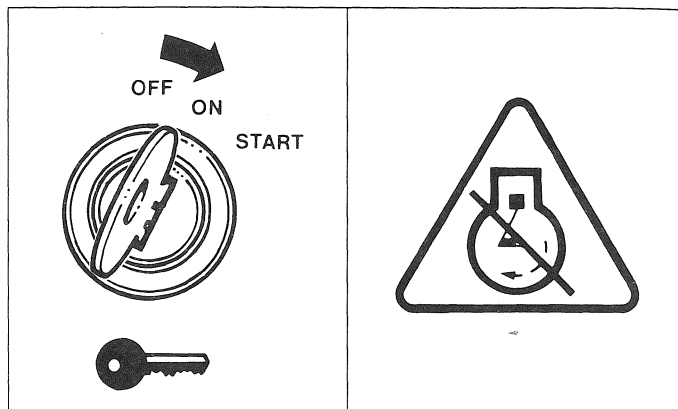
Your grader may be equipped with a Cold Start kit to make starting easier in cold weather.

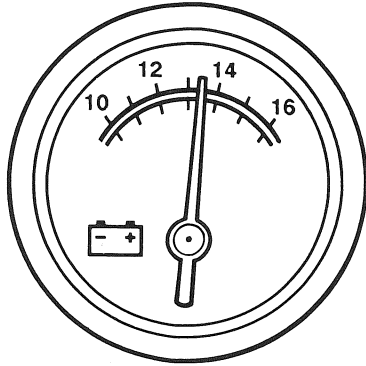
- To use Cold Start, turn the ignition switch to the START position and depress the Cold Start switch for two seconds.
- Do not crank engine more than 30 seconds.
- Release the key and wait two minutes before trying again.
- Release key when engine starts.

## Engine Warning System

This combination warning light and alarm is activated by either high coolant temperature or low engine oil pressure or both.

- Before starting the engine, turn the ignition switch to the ON position. The warning light and alarm should energize.
- Start the engine. The warning light and alarm should de-energize within ten seconds. If they do not de-energize, shut down the engine. Report the problem and have it repaired by a qualified service technician.
- If the warning light and alarm energizes while operating the grader, stop the grader as quickly as possible.
- With the engine still running, check the engine coolant temperature and oil pressure gauges and note the readings.
- Place the grader in the Shut Down Position by doing the following. Park the grader on a level surface. Place the transmission in NEUTRAL and apply the hand brake. Lower the moldboard and all attachments to the ground. Do not apply down-pressure. Shut down the engine. Remove and retain the ignition key. Turn the battery isolation switch(es) to the OFF position.
- Fasten a 'DO NOT OPERATE' or similar warning tag on the steering wheel.
- Report the problem and have it repaired by a qualified service technician.



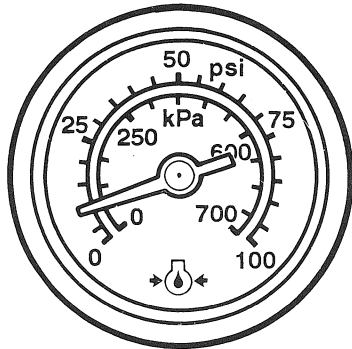


### Gauges

Check the engine oil pressure gauge and voltmeter immediately after starting the engine. Check the gauges often during operation. Refer to the Engine Manual.

### Voltmeter

The voltmeter should show 13 to 14 volts with the engine running. Any other readings indicate an electrical problem. Report the problem and have it repaired by a qualified service technician.

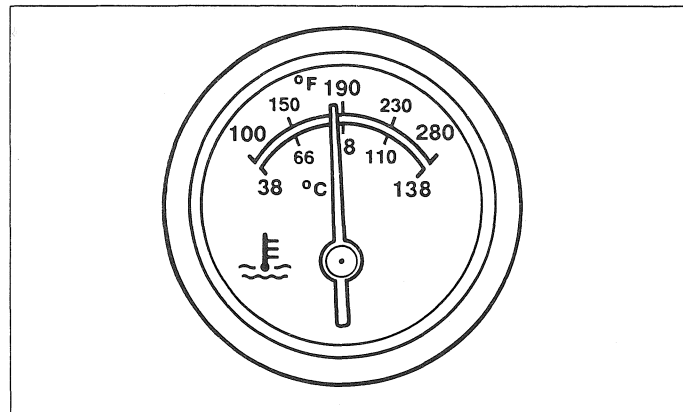


### Engine Oil Pressure Gauge

- This gauge should show 10 psi (69 kPa) with the engine idling.
- If the engine oil pressure does not reach this figure within fifteen seconds, shut down the engine.
- Do not operate the grader.
- Report the malfunction to a qualified service technician.
- If the oil pressure is significantly higher, allow the engine to reach full operating temperature and recheck the oil pressure gauge.

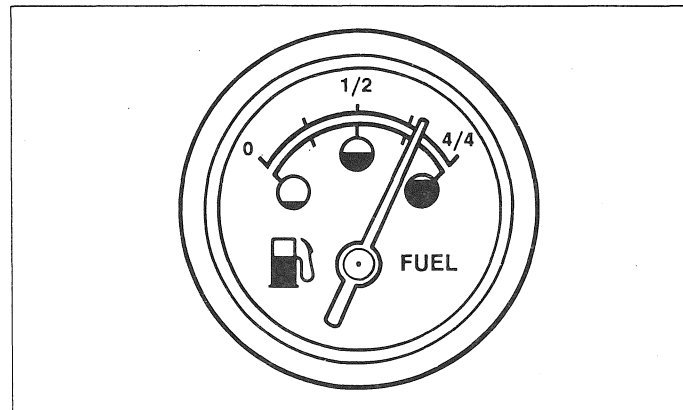
## Engine Temperature Gauge

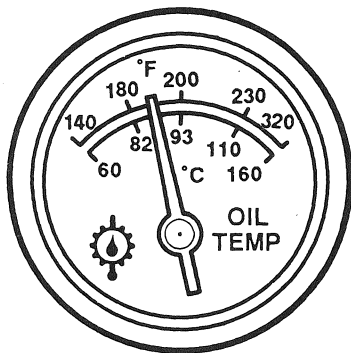
This gauge monitors the temperature of the engine cooling system. The gauge should show between 160°F to 212°F (71°C to 100°C). A constant lower or higher reading indicates an engine cooling problem. Report the problem and have it repaired by a qualified service technician.



## Fuel Level Gauge

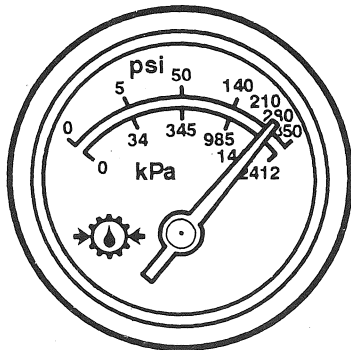
This gauge monitors the amount of fuel in the fuel tank. The gauge shows 1/4 increments. Check your fuel supply when the grader is on level ground. At the end of each working shift, it is recommended the fuel tank be filled. This reduces the chance of condensation forming in the fuel tank. Do not fill the fuel tank to capacity. Leave room for fuel expansion.





### Transmission Temperature Gauge (Optional)

This gauge monitors the temperature of the transmission hydraulic oil. The gauge should show between 170°F to 225°F (77°C to 107°C). A constant lower or higher reading indicates a cooling problem. Report the problem and have it repaired by a qualified service technician.

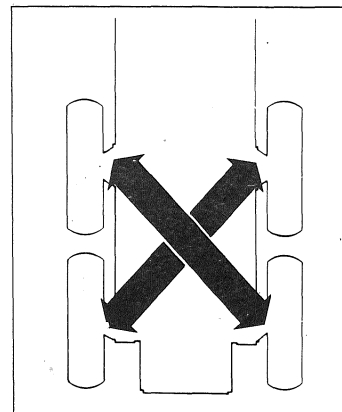
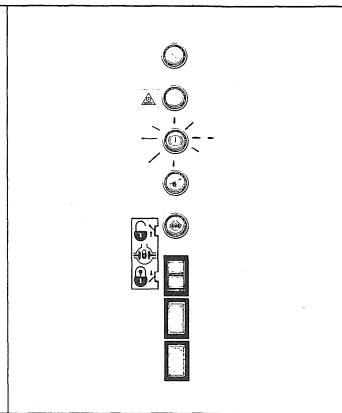


### Transmission Oil Pressure Gauge (Optional)

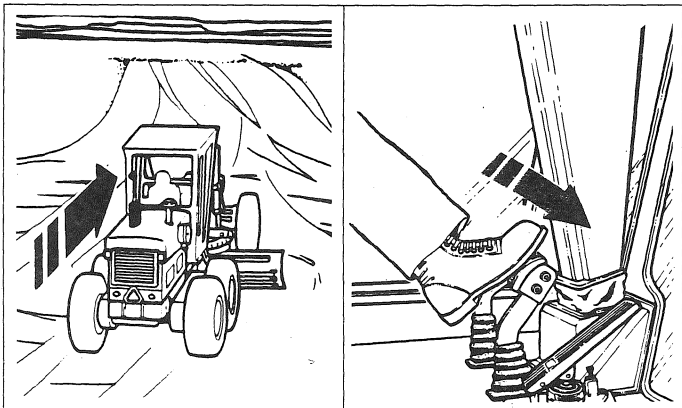
- This gauge should show 210 psi (1447 kPa) to 235psi (1622 kPa) at maximum engine rpm.
- If the transmission oil pressure does not reach or exceed this range, shut down the engine.
- Do not operate the grader.
- Report the malfunction to a qualified service technician and have it repaired.

## Service Brakes

- Push down on the brake pedal to apply the service brakes.
- The brake warning light is mounted on the right-hand door post. If the brake warning light and alarm energize during grader operation, the brake system is faulty and must be repaired by a qualified service technician. Do not drive the grader.
- A supplementary power source automatically supplies hydraulic power assist in the event of an engine failure or any situation where hydraulic oil flow is interrupted to the service brake system.
- This reserve system provides power assisted braking capability at a reduced level and automatically resets when hydraulic oil flow is restored.
- The service brake system has two brake circuits. The system provides reduced braking capability in the event of a brake line rupture or other failure in one circuit.
- Each of the two circuits function on one front and opposite rear tandem wheel. Should one circuit fail, braking remains effective on all tandem wheels through the tandem chains.
- If the brake warning light and alarm energize, the brake system is faulty and must be repaired by a qualified service technician. Do not drive the grader.
- If the system is functioning on only one of the brake circuits, the brake warning light and alarm energize when the brake pedal is depressed.
- The brake warning light and alarm actuate when there is a loss of hydraulic oil flow.







## **⚠ WARNING**

Unless you need braking action, do not depress brake pedal when ignition key is in OFF position. Service brakes electric motor pump will energize using battery power only. Subsequent loss of braking effectiveness could result in personal injury or death. Apply hand brake before shutting down engine.

## **Brake Function Check**

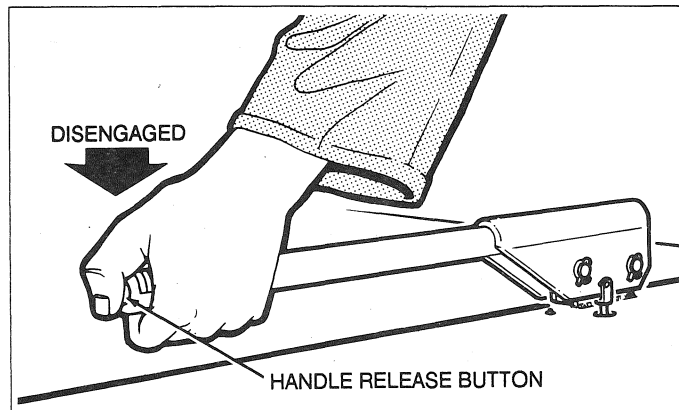
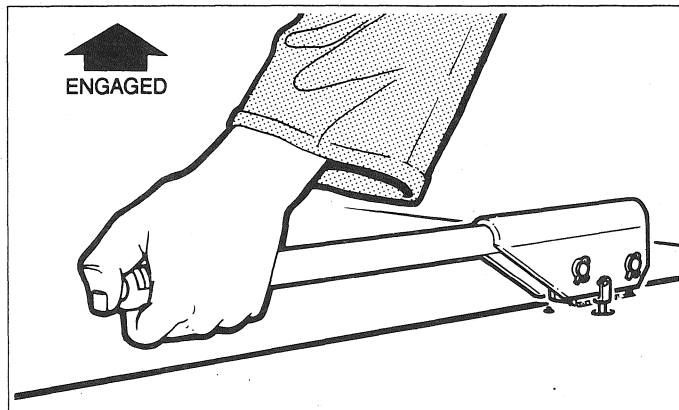
- Perform this brake function check once every week.
- Check the hand brake operation. Refer to the section **Pre-Start Checks - Hand Brake** page 7-16.
- Make a visual check around the machine. Ensure all personnel are clearly away from the area. Signal your intention to start the engine. Start the engine when it is safe to do so.
- Back the grader up a slight incline where it is safe to allow the machine to roll forward without power.
- Stop the grader, place the transmission in NEUTRAL and apply the hand brake (this should require approximately 60 lb [27 kg] of effort). Shut down the engine and keep the ignition key in the OFF position.
- Release the hand brake when it is safe to do so. Allow the grader to roll ahead at about 2 to 3 mph (3 to 5 km/h). Apply the service brakes. The grader must stop abruptly.
- If the grader does not stop, use the hand brake to stop the machine. Immediately have the brake system repaired by a qualified service technician.

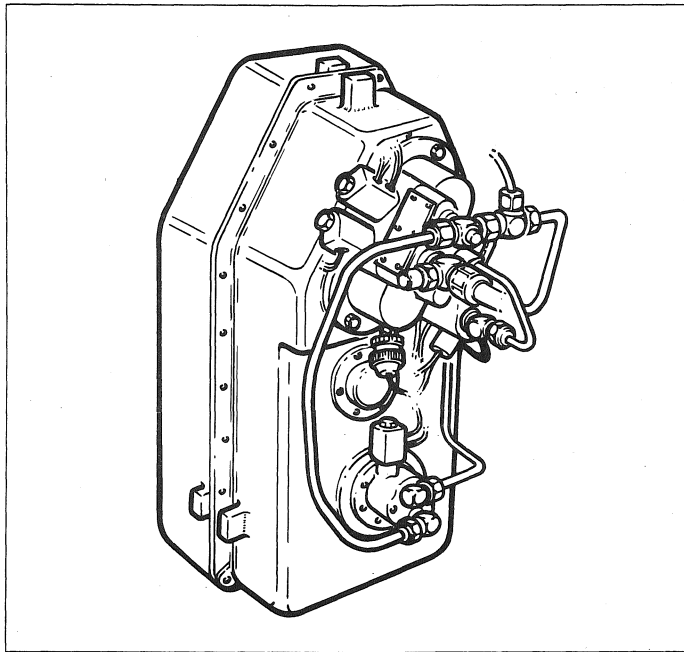
## Hand Brake Operation

- Always apply the hand brake when parking the grader.
- Pull the hand brake lever up to apply the hand brake (this should require approximately 60 lb [27 kg] of effort).
- Apply the hand brake only when the grader is stopped and the transmission is in the NEUTRAL mode.
- Release the hand brake before moving the grader.
- The hand brake warning light and alarm will energize when the hand brake is engaged and the transmission FORWARD or REVERSE mode is selected.
- Select NEUTRAL or disengage the hand brake to de-energize the warning light and alarm.
- The hand brake can also be applied to stop the grader in an emergency. After using the handbrake for an emergency stop, it must be inspected and adjusted by qualified service personnel. Refer to the Section - **Pre-Start Checks - Hand Brake** page 7-16.
- To release the hand brake, press the handle release button and push the handle down.

### **⚠ WARNING**

Hand brake may not provide same braking capability after use for an emergency stop. Severe personal injury, death or machine damage could result. Have hand brake caliper assembly inspected and adjusted by qualified service personnel before moving grader.





### Transmission

- Champion motor graders are equipped with Gearco model 8400 transmissions.
- The transmission is a direct drive, full powershift transmission with eight forward and four reverse gears.
- An electric shift control and a full engine master clutch disconnect the engine from the drivetrain. In the event of engine stalling, stop the grader.
- Leaving the transmission in gear will not hold grader. Place transmission in NEUTRAL and apply hand brake.

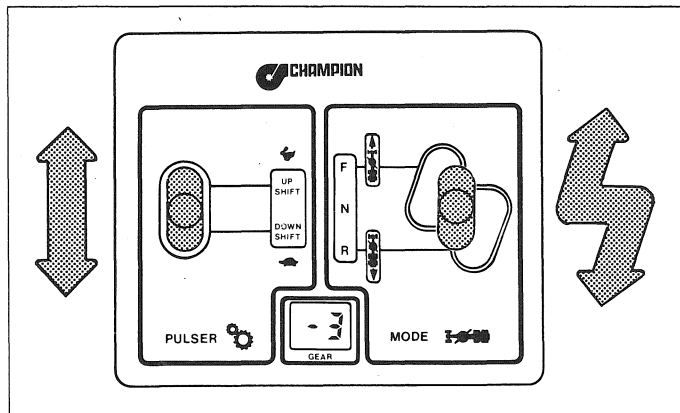
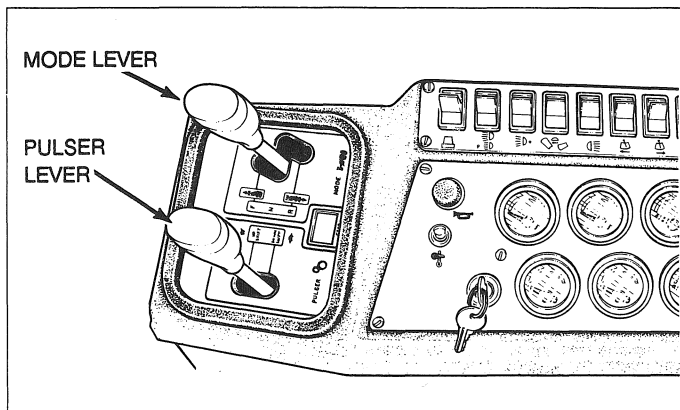
### **⚠ WARNING**

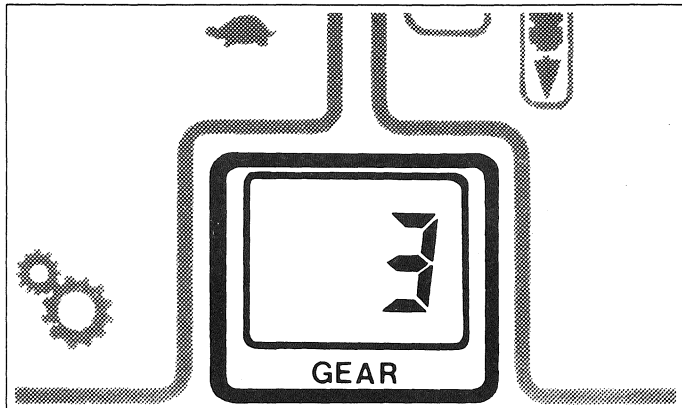
**Do not coast downhill. Excess speed could cause serious transmission damage and loss of control of grader. Severe personal injury or death could occur.**

- Always select a gear that will prevent excessive speed when going downhill.

## Controller

- The transmission controller is mounted in the console on the operator's right-hand side. It has two red handled levers.
- The Pulser lever controls gear changes.
- The Mode lever controls the direction of travel.
- The controller also incorporates a digital display to show you which gear the transmission is in. Move the pulser lever straight forward to change to a higher gear or straight back to change to a lower gear. It returns to the center position when you release it.
- The mode or direction lever has three positions, FORWARD, NEUTRAL and REVERSE. The mode lever will remain in any of the three positions until moved.





### Display

- With the mode lever in the FORWARD position, the LCD (Liquid Crystal Display) shows the number of the forward gear; for example '3'.
- With the mode lever in the REVERSE position, the display shows a negative number; for example '-2'.
- The display also communicates other useful information in the form of simple, two digit codes.

CODE	MEANING
CH	'Champion'
6.0	Controller identification (example)
.8.8	Display test
1	Last gear memorized (example)
-1	Opposite gear (example)

### Start Code Sequence

When you start the engine the display will show a series of codes called the start sequence.

*Controller I.D. Codes*

*1.7 → First one*

*1.8*

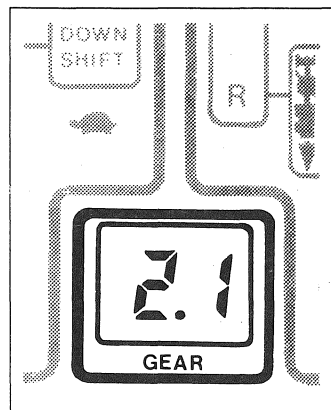
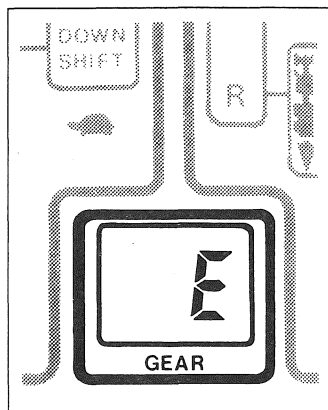
*2.7*

*6.0 → Mach. s/w 21134 + up*

## Error Codes

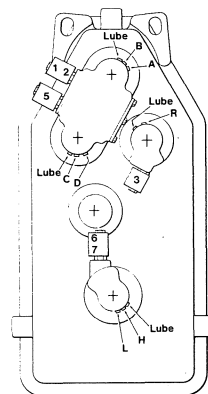
The controller continuously monitors the transmission electrical system. If a failure occurs:

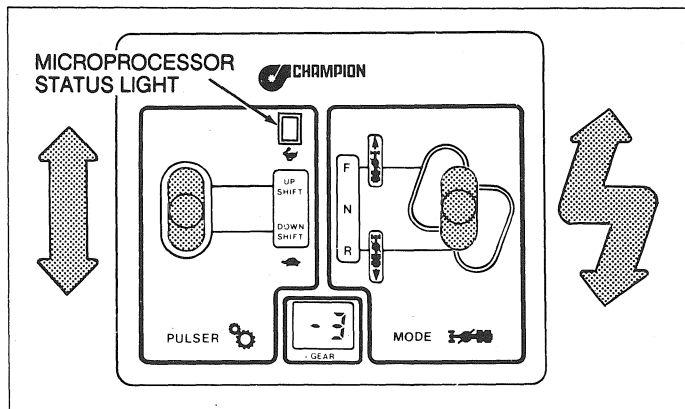
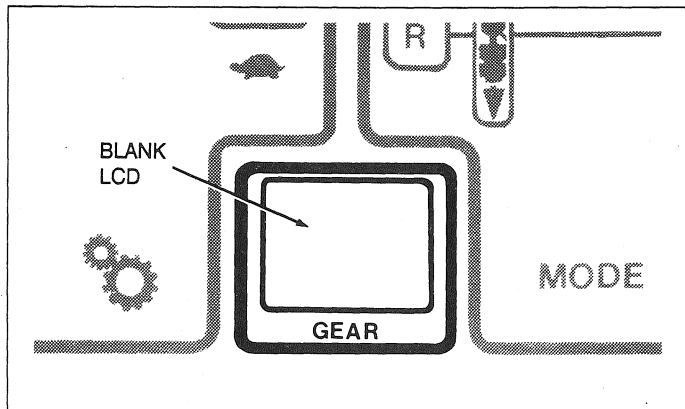
- The display shows the letter 'E' followed by a two-digit numeric code.
- The controller disables both levers and places the transmission in NEUTRAL.
- The display alternates between 'E' and the code until the operator returns the mode lever to the NEUTRAL position.
- Have the transmission electrical system repaired by a qualified service technician.



Code	Malfunction	Code	Malfunction
1.0	Electric power is below 9.5 vdc	3.1	Short circuit, solenoid 3
2.0	Open circuit, solenoid 2	3.3	Short circuit, solenoid 6
2.1	Open circuit, solenoid 3	3.4	Short circuit, solenoid 7
2.3	Open circuit, solenoid 6	3.5	Short circuit, solenoid 5
2.4	Open circuit, solenoid 7	3.6	Short circuit, solenoid 1
2.5	Open circuit, solenoid 5	4.0	Forward/Neutral input error
2.6	Open circuit, solenoid 1	4.1	Reverse/Neutral input error
2.7	No power to solenoid circuits	4.2	Neutral restart error
3.0	Short circuit, solenoid 2	4.4	Forward/Reverse input error

## Solenoid Identification





### 'Limp-home'

An electronic fault within the controller will cause the transmission to shift to NEUTRAL. If this happens, while operating the grader, stop the grader as quickly as possible. The LCD (liquid crystal display) will also be blank. The 'Limp-home' feature provides 4th gear FORWARD or 1st gear REVERSE.

#### To activate 'Limp-home':

- Depress the clutch and brake pedals.
- Move the MODE lever to the NEUTRAL position.
- Then move it to either FORWARD or REVERSE position. The PULSER lever does not function with the 'Limp-home' feature activated.
- Slowly release the brake and clutch pedals. The grader is now in motion.

The 'Limp-home' feature can only be activated when there is an electronic fault in the controller's microprocessor.

### Microprocessor Status Light

- A GREEN light indicates the controller's microprocessor is functioning properly.
- A RED light indicates an electronic fault in the controller's microprocessor. Have the controller repaired by a qualified technician.

## Driving the Grader - Starting Out

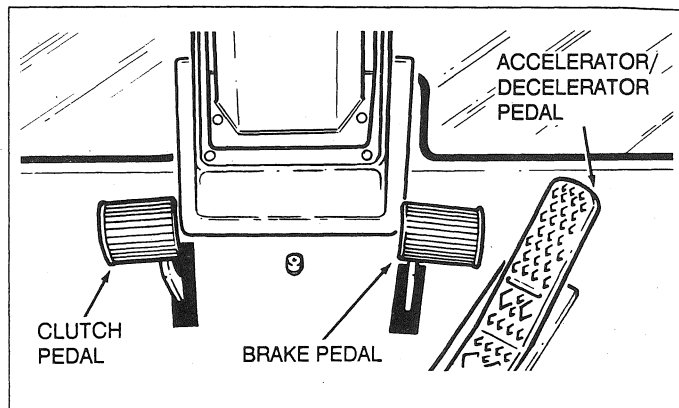
- Raise the moldboard and all attachments off the ground. Refer to the section - **Operating The Controls** page 9-1.
- Position the moldboard inside the tires; steer the front wheels to make sure they do not strike the moldboard.

## Clutch Pedal

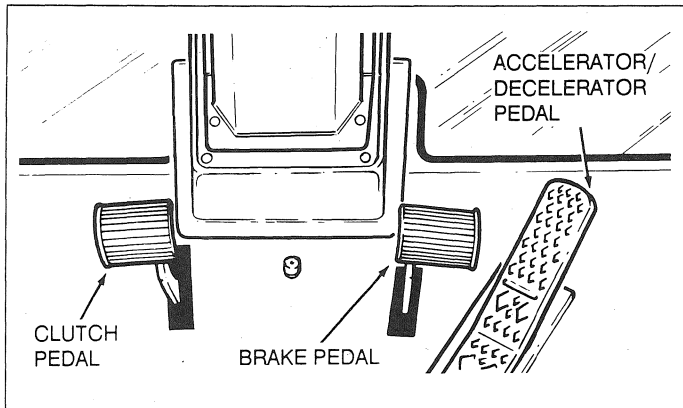
Use the clutch pedal when you are starting from a complete stop or changing directions. Do not start to move the grader in any forward gear higher than 4th or any reverse gear higher than -2nd.

### To put the grader in motion:

- Depress the clutch and brake pedals.
- Move the MODE lever into the FORWARD or REVERSE position.
- Select the starting gear using the PULSER lever.
- Release the hand brake.
- Slowly release the clutch and brake pedals.
- Depress the accelerator as required. The grader is now in motion.
- Do not rest your feet on the clutch or brake pedals when driving the grader. This can cause unnecessary wear.







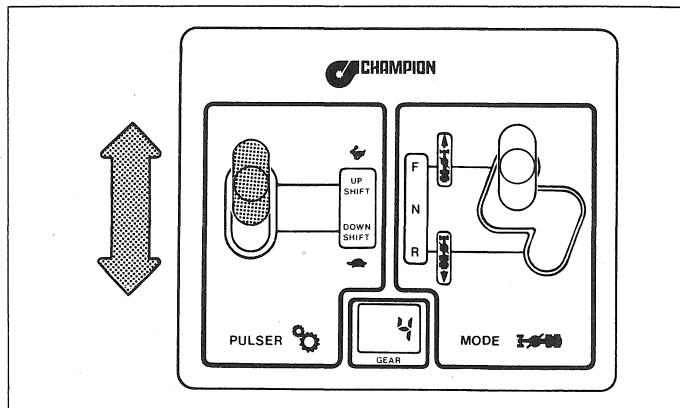
### Stopping the Grader

- Reduce engine speed.
- With the transmission in the proper gear, slowly depress and hold down the clutch and brake pedals. Depressing the clutch pedal only, may not stop the grader. You must depress the brake pedal also to stop the grader.
- Stop the grader.
- Use brake pedal to hold grader when transmission is in gear and engine is running.
- Move the mode lever into the NEUTRAL position.
- Apply the hand brake.
- Release the clutch and brake pedals.
- Lower the moldboard and all attachments to the ground.
- Shut down the engine.

## Changing Gears

You do not have to use the clutch pedal to change gears.

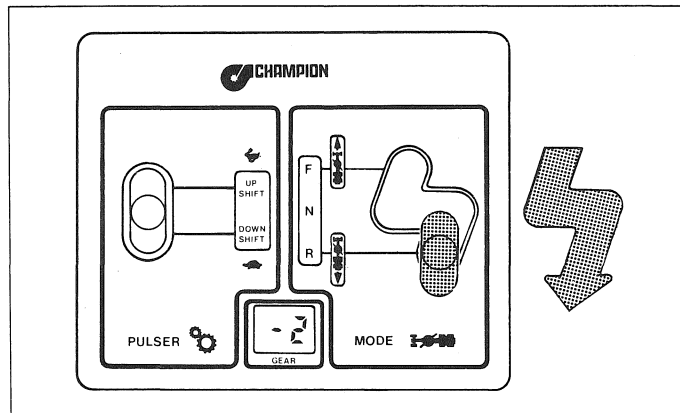
- To shift to a higher gear, push forward on the PULSER lever and release it.
- To shift to a lower gear, pull backward on the lever and release it.
- When not using the moldboard or attachments, lower the engine's rpm as you change gears.
- Do not shift to a lower gear at maximum engine rpm. Damage to the transmission could result.

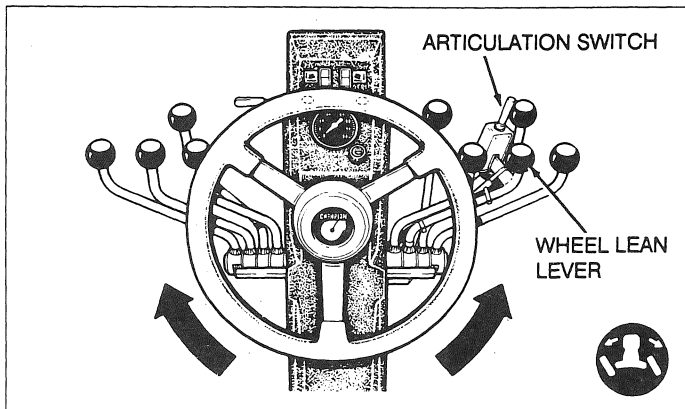


## Changing Directions

Stop the grader to change directions.

1. Downshift to 4th FORWARD, -2nd REVERSE or lower.
2. Depress the clutch pedal and bring the grader to a complete stop using the service brakes.
3. Move the MODE lever to change direction.
4. Release the brake and clutch pedals.
5. The grader is now in motion.



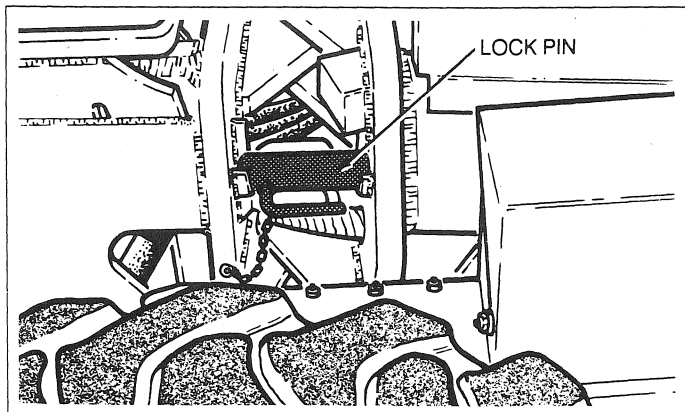


## Steering

- Turn the steering wheel to steer the grader to the left or right.
- Use the front wheel lean lever to reduce the grader's turning circle. Do not use at high speeds. Reaction is quick.
- Use the articulation switch to further reduce the grader's turning circle. Ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. Do not use at high speeds. Reaction is quick.

## ⚠ WARNING

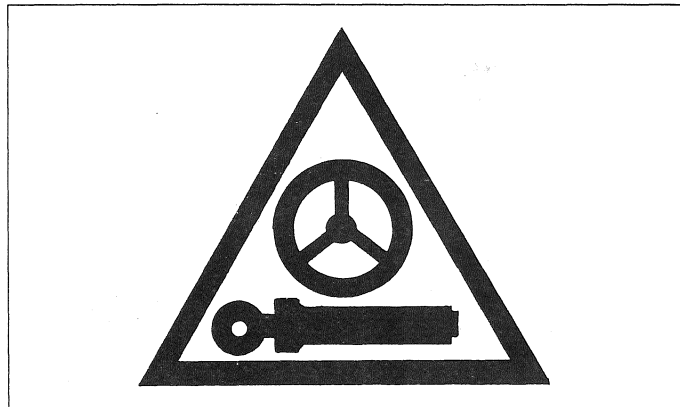
Power assist for steering only operates when engine is running. If engine stalls, stop the grader.



- If the engine stalls, the steering system will revert to 'manual' and requires more effort to turn the steering wheel. Stop the grader. Place transmission in NEUTRAL and apply hand brake. Start the engine, if possible. If the engine cannot be started refer to the section - **Safety Precautions - Stopping Precautions** page 4-10. Have the engine repaired.

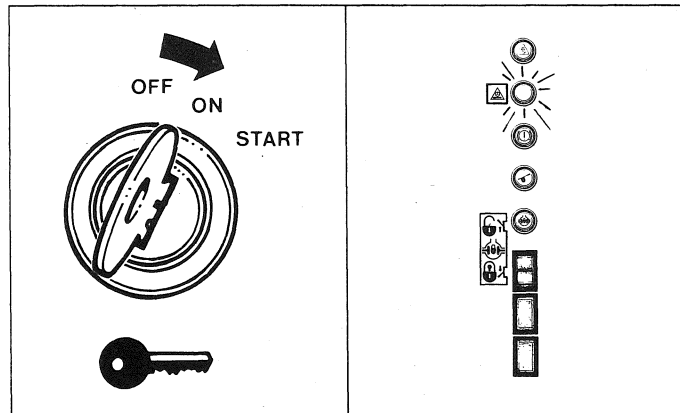
## Supplemental Steering System

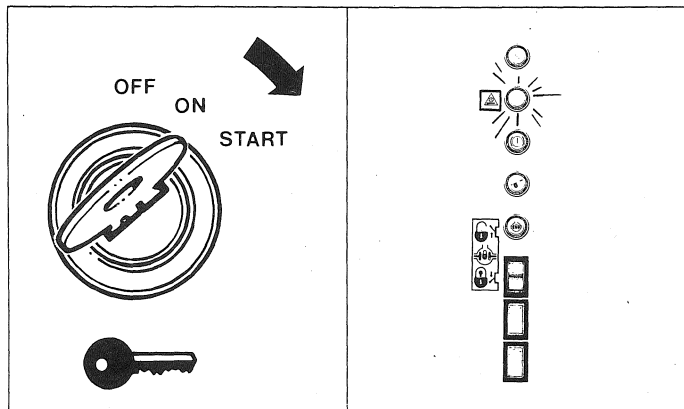
- This auxiliary hydraulic system allows the operator to make steering corrections more easily in the event of engine failure.
- Turn the ignition switch to the ON position to operate the system.
- Operate the system only long enough to make a steering correction.



## Supplemental Steering System Check

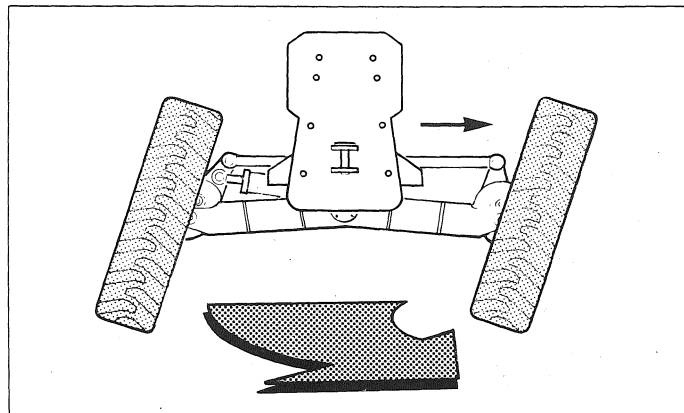
- Insert and turn the ignition key to the ON position.
- The supplemental steering warning light and alarm should energize.
- Check the system by turning the steering wheel. If it does not turn easily, there is a fault in the system. Have the system repaired by a qualified service technician.





### Supplemental Steering System Check continued

- Leave the ignition key in the ON position only long enough to check the system.
- Start the engine. The warning light and alarm will de-energize, but the system is ready if the engine stalls.
- If the warning light and alarm stay on with the engine running, do not drive the grader. The system is faulty and must be repaired by a qualified service technician.



### Front Wheel Lean

You can reduce the turning circle of your grader by using the front wheel lean lever. Lean the wheels in the direction you will turn. Position the front wheels vertically again after completing the turn. Refer to the section - **Operating the Controls - Front Wheel Lean** page 9-8, and the section **Operating Techniques** page 10-1.

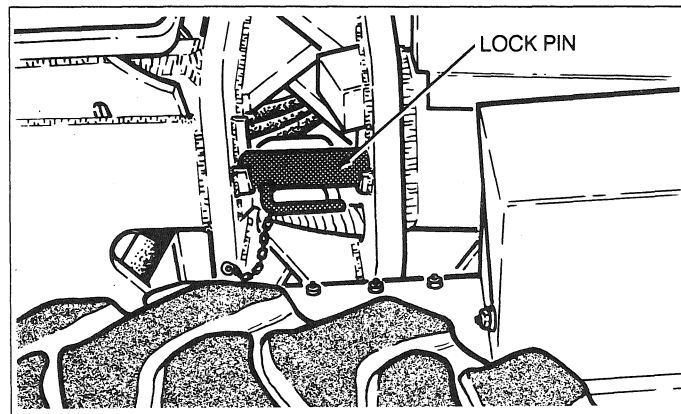
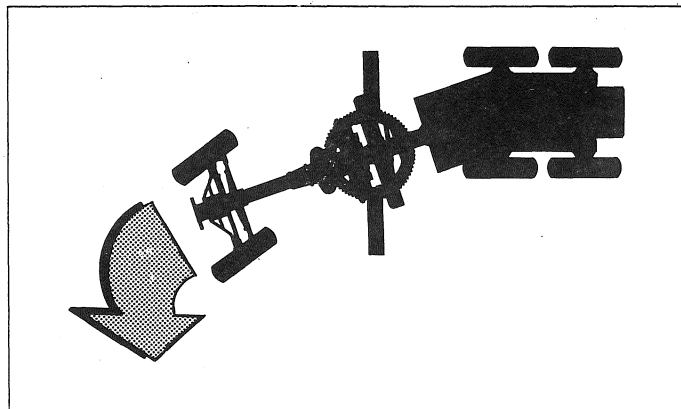
## Articulation

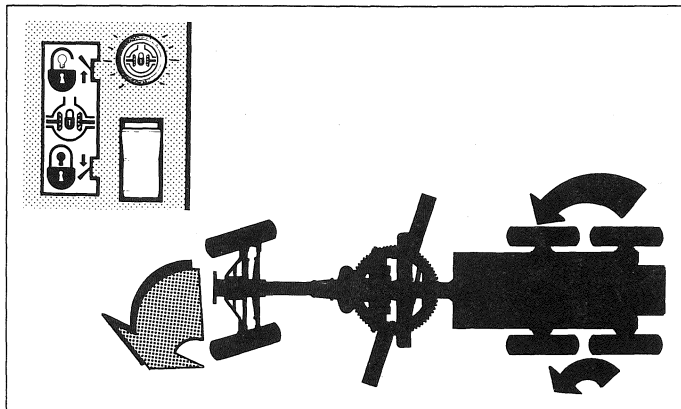
### **▲WARNING**

Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.

If your grader has an articulated frame, you can reduce the turning circle. Before articulating, remove the locking pins. Reinstall them when not using the articulating function. Articulation can also be used to make some grading operations easier. Use the articulation switch to articulate the grader in the direction you will turn. Refer to the section - **Operating the Controls - Articulation Switch** page 9-10.

- Ensure the articulation lock pins are installed when roading the grader.



**⚠ CAUTION**

Do not lock the differential while the tandem wheels are spinning. Damage to the differential could result.

**Final Drives**

The lock/unlock differential control switch is mounted in the electrical panel on the right-hand door post.

- Put the control switch in the 'UNLOCK' position when differential action is required; for example, to reduce the turning radius of the grader. The warning light above the switch will energize.
- Put the control switch in the 'LOCK' position for normal grading operations. The warning light will de-energize. It is advisable only to use the lock mode when operating the grader on off-road situations.
- Unlock the differential on paved surfaces. This will avoid tire scuffing when steering the grader around corners.
- Lock or unlock the differential ONLY when the grader is stopped or driving in a straight line.

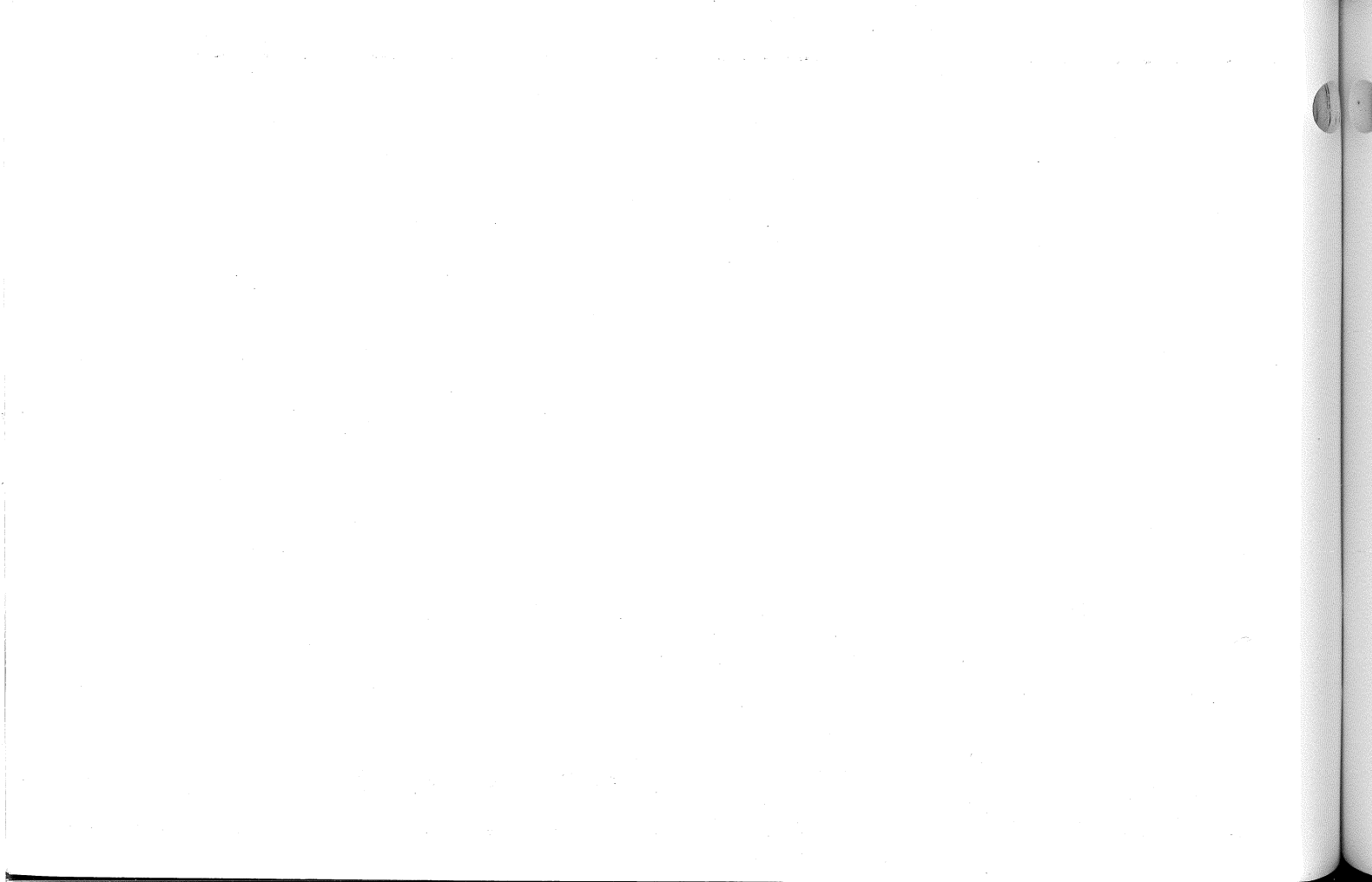
**⚠ CAUTION**

Do not lock or unlock the differential while making a turn. Damage to the differential could result.

# Operating the Controls

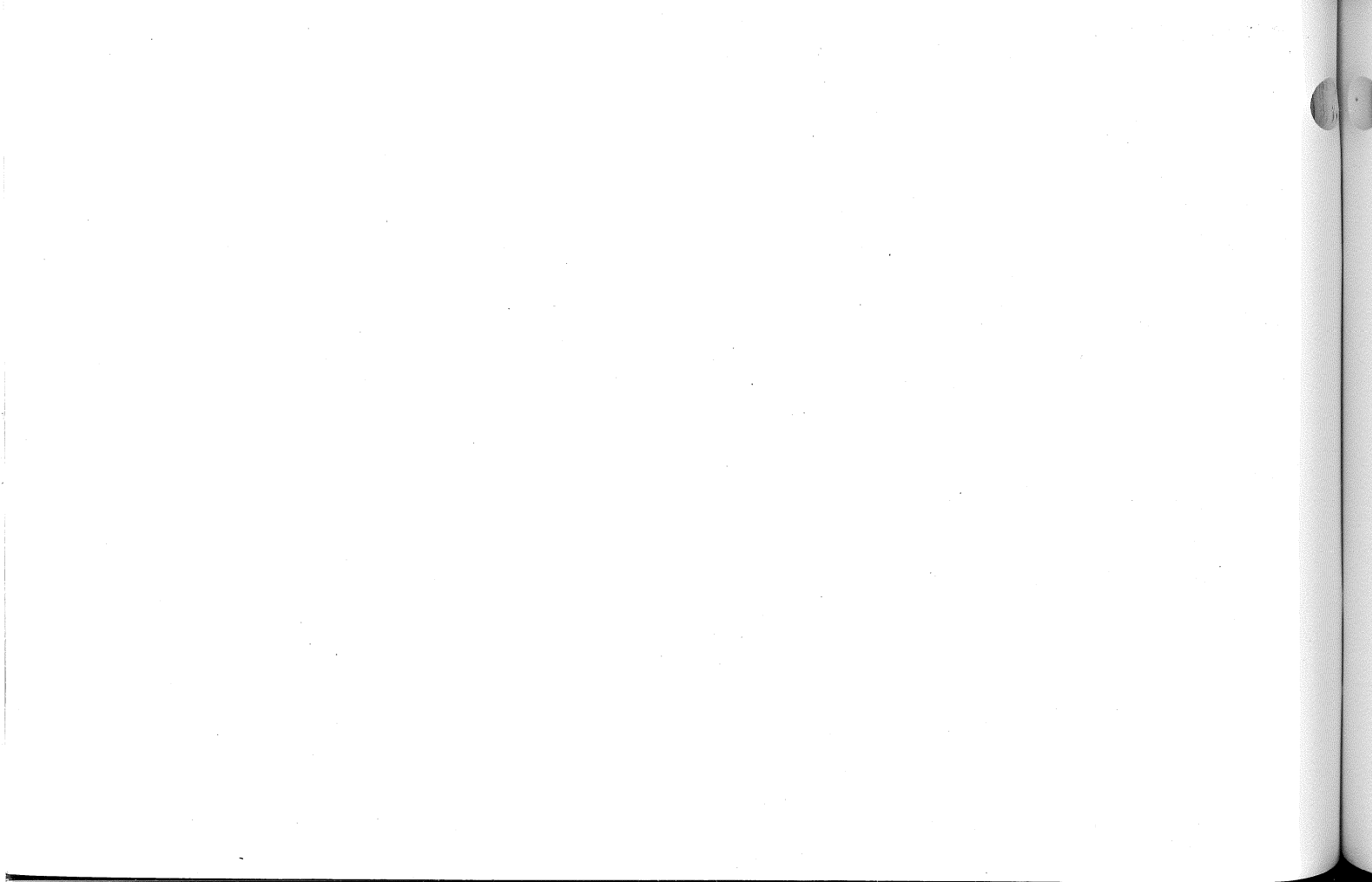
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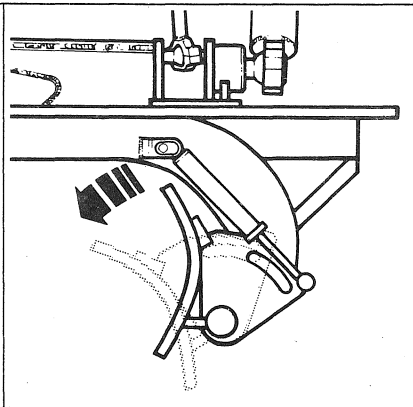
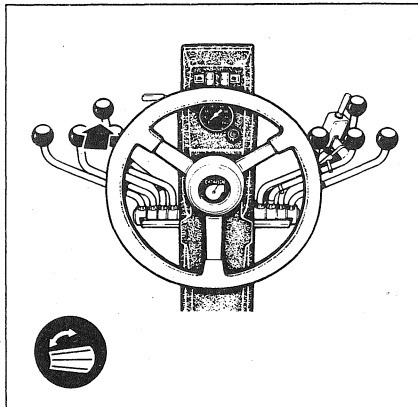
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## Moldboard Tilt Lever

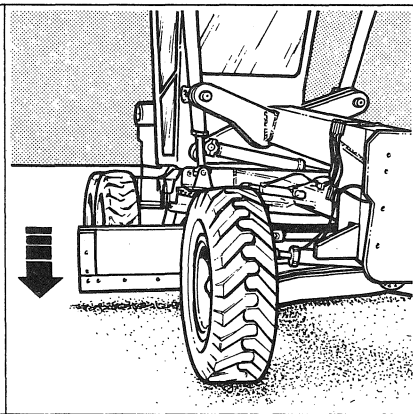
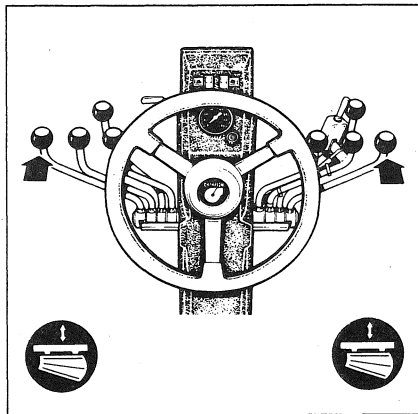
Use the moldboard tilt feature to ensure that the grading material rolls freely off the blade.

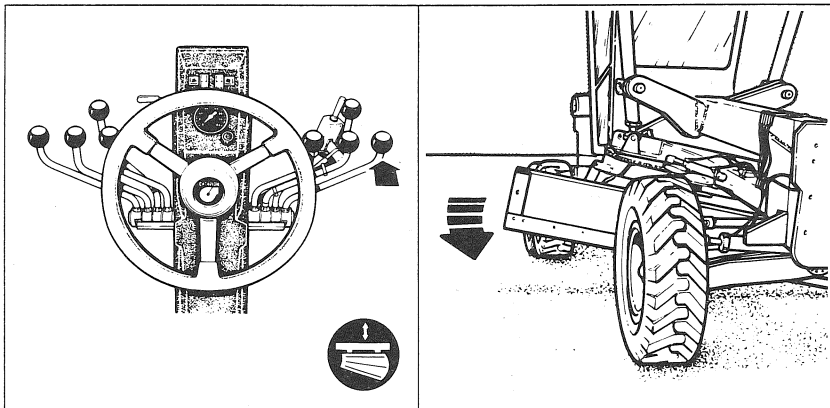
- Push forward on this lever to tilt the moldboard forward.
- Pull back on this lever to tilt the moldboard rearward.



## Blade Lift Levers

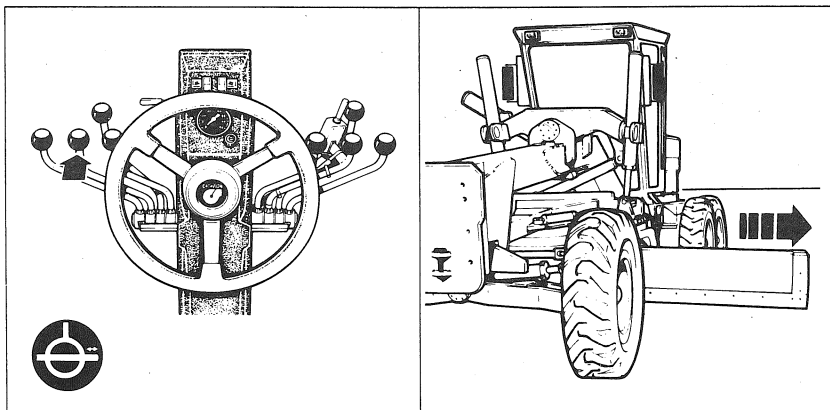
- Push forward on both levers at the same time to lower the moldboard.
- Pull back on both blade lift levers at the same time to raise the moldboard.





### Blade Lift Lever *continued*

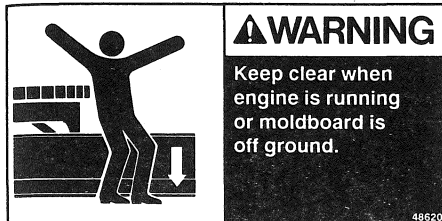
- Push forward on the lever for the side you wish to lower.
- Pull back on the lever for the side you wish to raise.



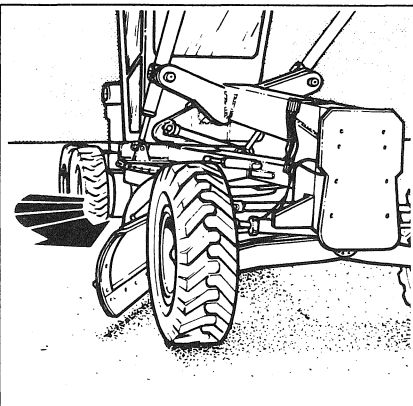
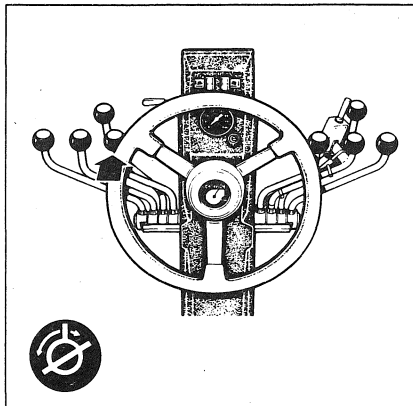
### Moldboard Slide Shift Lever

- Push forward on the moldboard slide shift lever to slide the blade out to the left-hand side of the grader.
- Pull back on the lever to slide the blade to the right-hand side of the grader.

## Circle Turn Lever

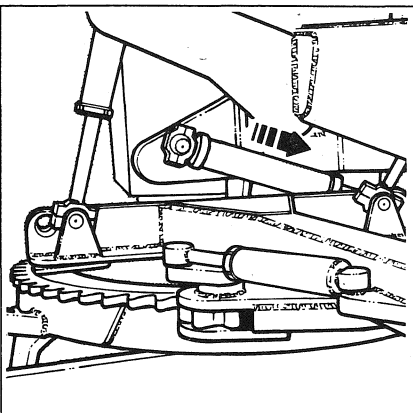
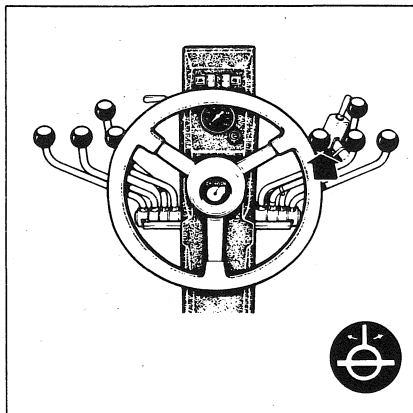


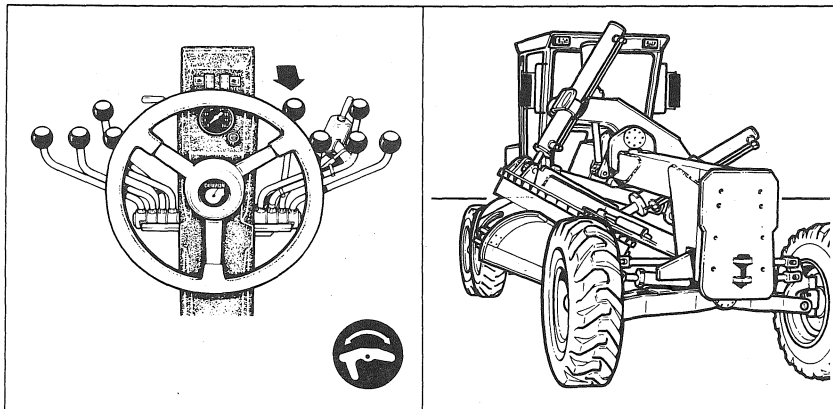
- Push forward on the circle turn lever to rotate the circle counterclockwise.
- Pull back on the lever to rotate the circle clockwise.



## Circle Shift Lever

- Push forward on the circle shift lever to move the circle and moldboard assembly out to the left-hand side of the grader.
- Pull back on the lever to move the assembly out to the right-hand side of the grader.

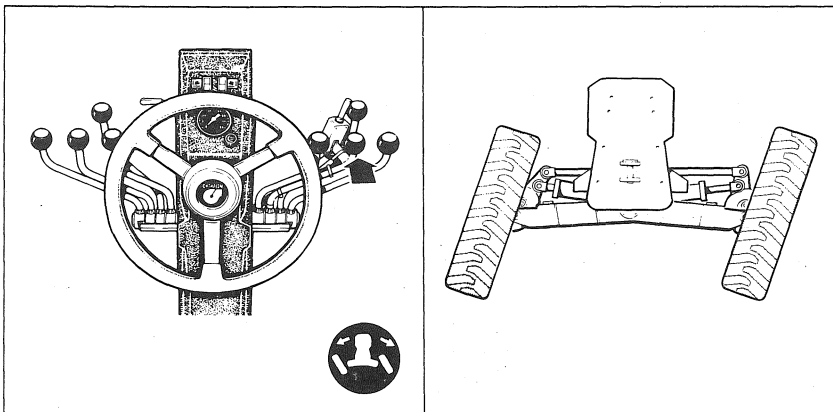


**Hi-Lift Arm Lock Cylinder Lever**

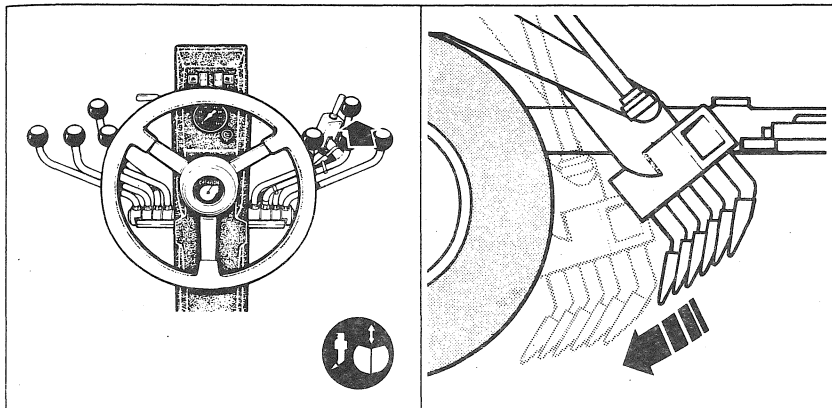
Use this control lever to Hi-Lift the moldboard.

**See this section** page 9-18.

- Pull back on the lever to extend the cylinder.
- Push forward on this lever to retract the rotary lock cylinder.

**Front Wheel Lean Lever**

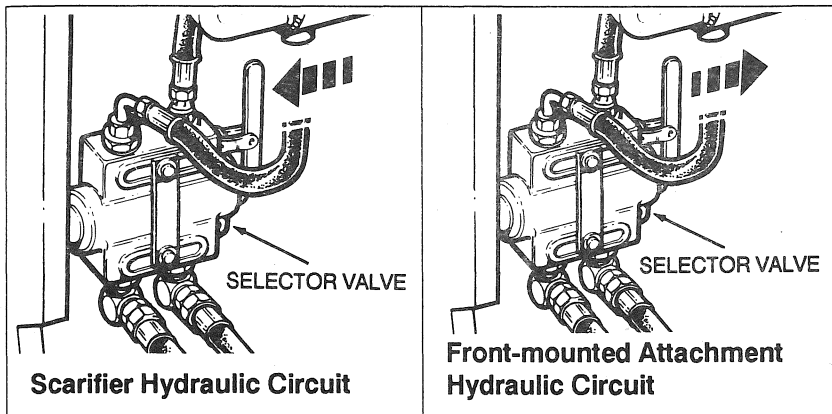
- Push forward on the wheel lean lever to lean the front wheels to the left.
- Pull back on the lever to lean the wheels to the right. See the section - **Driving the Grader - Front Wheel Lean** page 8-30.



## Control Lever for Scarifier, Dozer Blade or Snowplow

The accessory lever controls a scarifier, snowplow or dozer blade if they are fitted to the grader.

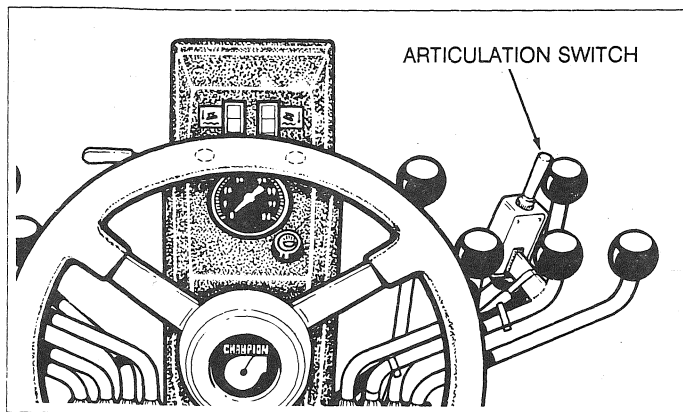
- Push forward on the control lever to lower the attachment.
- Pull back on the lever to raise the attachment.



When the grader is equipped with a scarifier and/or a front-mounted attachment such as a dozer blade or snowplow, they share the same control lever. The sharing function is controlled by a selector valve. This valve is behind the frame on the left-hand side, behind the nose plate.

- Push the selector lever forward to choose the scarifier hydraulic circuit.
- Pull the selector lever rearward to choose the front-mounted attachment hydraulic circuit.

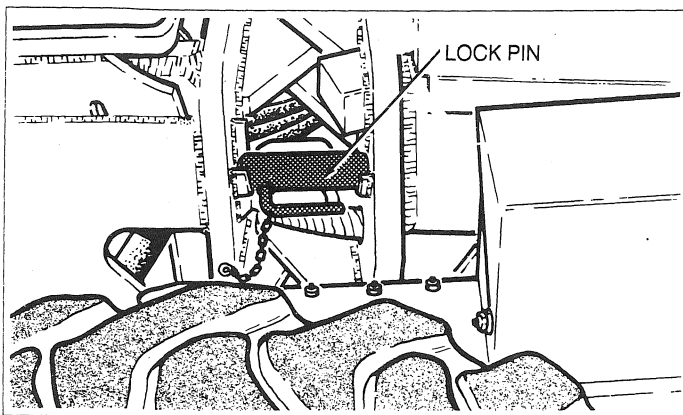




### Articulation Switch

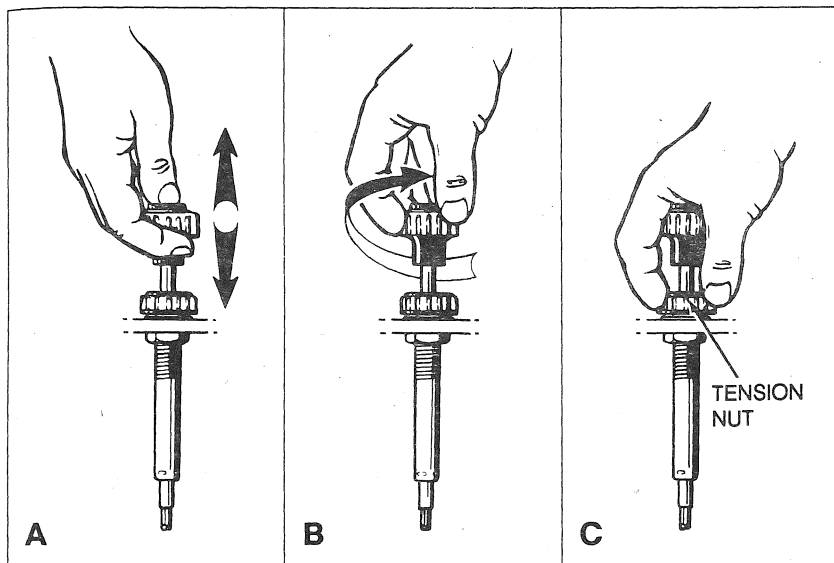
If your grader has an articulated frame the articulation control switch is mounted on the front wheel lean lever.

- Remove the locking pins and reinstall them when not using the articulating function.
  - Move the switch to the right to articulate the grader to the right.
  - Move the switch to the left to articulate the grader to the left.
- The articulation indicator on the left-hand door post indicates the degree of articulation. Refer to the section - **Driving the Grader - Articulation** page 8-32.



### **⚠**WARNING

**Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.**



### Hand Throttle

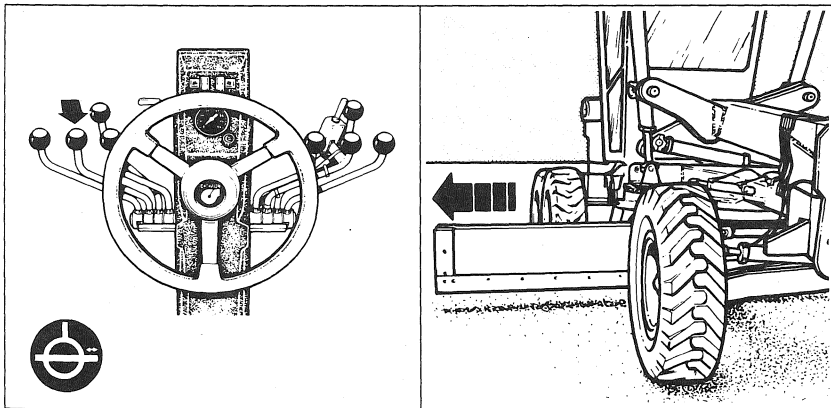
The hand throttle provides a fixed engine speed control during grading. Do not use the hand throttle when roading the grader.

The hand throttle offers two adjustments.

- For quick changes, depress the button in the center of the throttle knob. Pull the knob outward to increase engine speed or push the knob inward to decrease engine speed (A).
- For small, precise adjustments, rotate the knob counterclockwise to increase engine speed or clockwise to decrease engine speed (B).
- You can change the tension or 'tightness' of the hand throttle with the tension nut. Turn the nut clockwise to increase tension or counterclockwise to decrease tension (C).

### Moldboard Hi-Lift - Fixed Point Blade Lift System

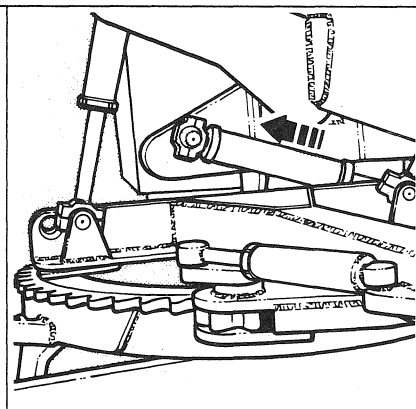
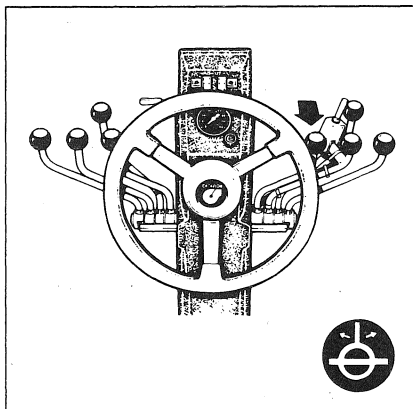
The following instructions describe the right-hand Hi-Lift procedure. If your circle shift cylinder is attached to the right side of the cylinder anchor (see step 2), you can perform this procedure on the right side of the grader only, without further adjustment. If the cylinder is attached to the left side of the anchor, you can perform the Hi-Lift procedure on the left side of the grader only, without further adjustment. **See this section** page 9-15 for the opposite side.



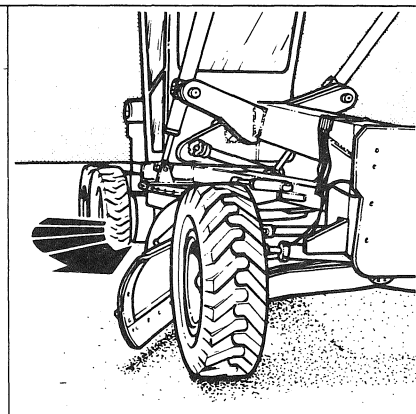
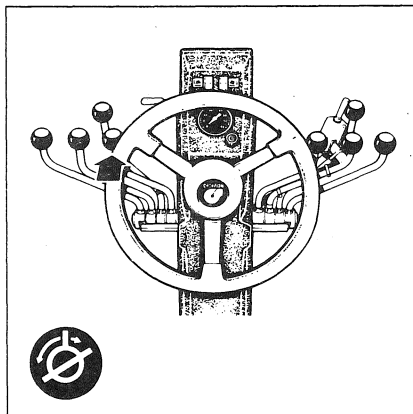
1. Use the moldboard slide shift lever to extend the moldboard as far as possible.

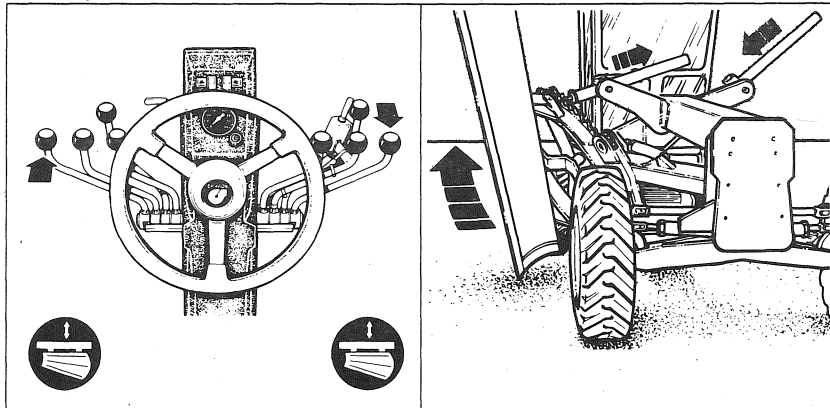
## Moldboard Hi-Lift - Fixed Point Blade Lift System *continued*

2. Fully retract the circle shift cylinder.



3. Use the circle turn lever to rotate the circle so that the end of the moldboard is close to the right front wheel.





### Moldboard Hi-Lift - Fixed Point Blade Lift System continued

4. Fully retract the right-hand blade lift cylinder.
5. Extend the left-hand blade lift cylinder until the moldboard reaches the desired angle.

## Moldboard Hi-Lift - Fixed Point Blade Lift System continued Circle Shift Cylinder Position Reversal

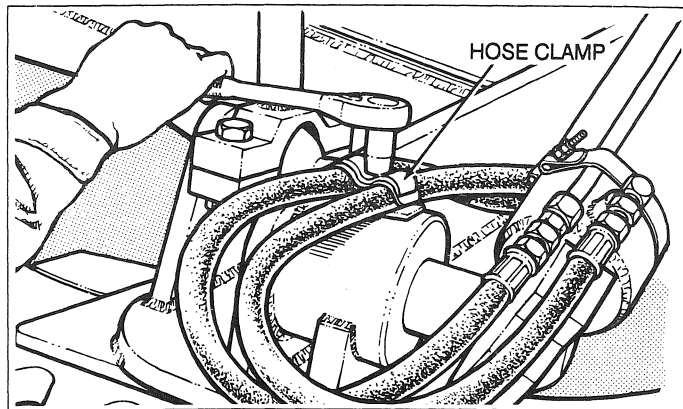
If you need to Hi-Lift the moldboard to the opposite side, you will have to reverse the position of the circle shift cylinder. Place the grader in the Service Position. Refer to the section - **Maintenance and Lubrication - Service Position** page 14-5, before performing any of the following procedures.

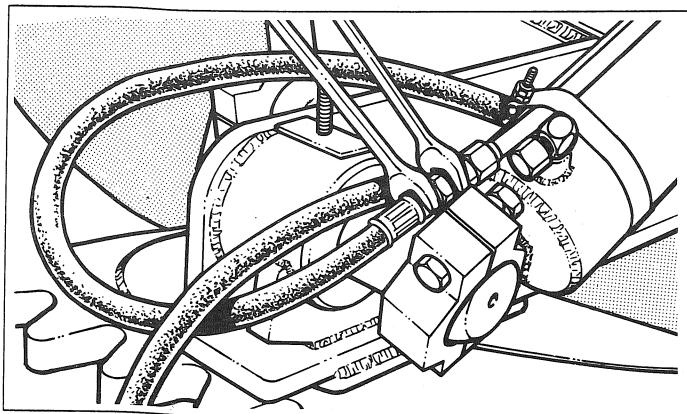
### **⚠ WARNING**

Fluid escaping under pressure can penetrate the skin causing serious injury. Relieve all pressure before disconnecting hoses. Do not use your hand to check for hydraulic leaks.

- If contact occurs seek medical attention immediately.
- Use cardboard or a similar material to check for hydraulic leaks.

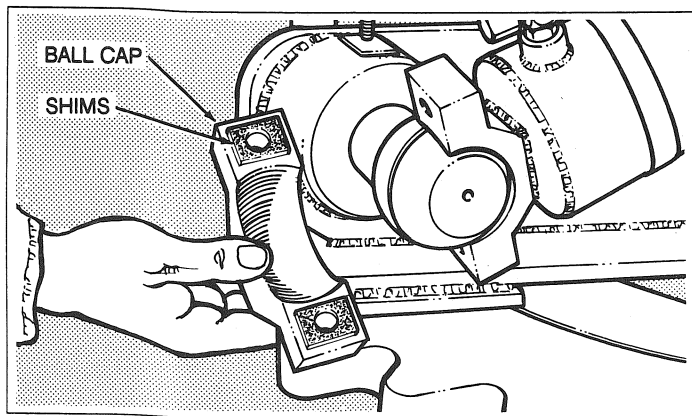
1. Remove the hose clamp.





### Circle Shift Cylinder Position Reversal continued

2. Disconnect the hoses from the cylinder. Plug the fittings and ports to prevent contamination.

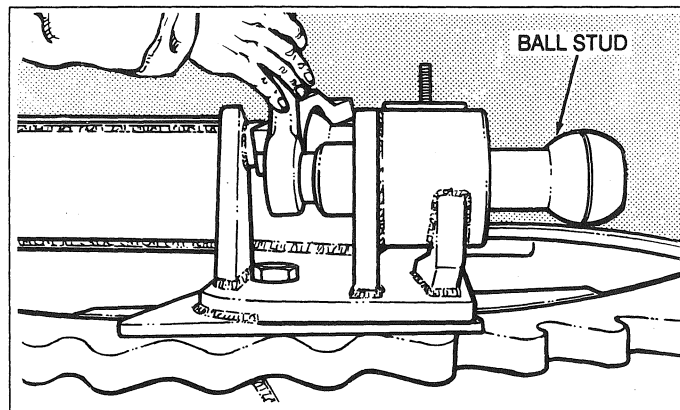


3. Remove the ball caps and shims from each end of the cylinder. Remove the cylinder.

## Circle Shift Cylinder Position Reversal continued

4. Remove the ball studs.

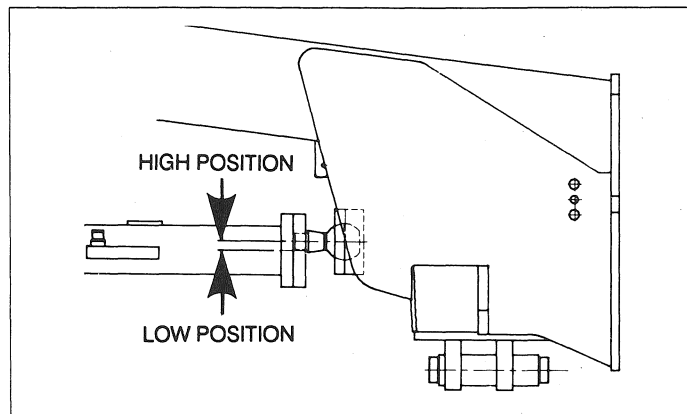
- Install the ball studs in the opposite locations on the drawbar and frame.
- Install the cylinder, ball caps, and shims.
- Reconnect the hoses and install the hose clamp.





### Moldboard Hi-Lift - Moveable Point Blade Lift System, Right-hand Side Procedure

- This procedure describes how to maneuver the moldboard into the right-hand side high bank sloping position. This system provides a total blade position range.
- Observe all moving parts to prevent structure fouling when Hi-Lifting the moldboard.
- The left-hand moldboard extension must be removed if fitted.
- Park grader and apply hand brake.
- Place transmission in NEUTRAL.
- Ensure the Hi-lift arm is fully horizontal.
- Fully lower the moldboard and all attachments.
- Ensure that there are no persons or vehicles near grader.

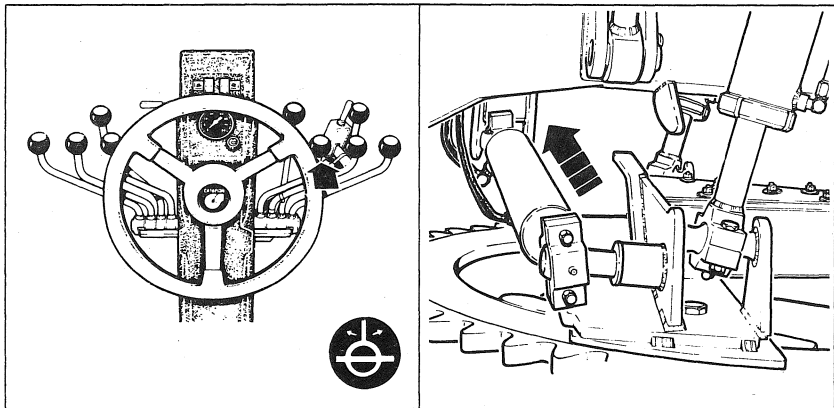


1. Before you start, ensure the drawbar ball stud is installed in the high position. This prevents hose damage and structure fouling between the drawbar ball stud and the grader nose side plate.

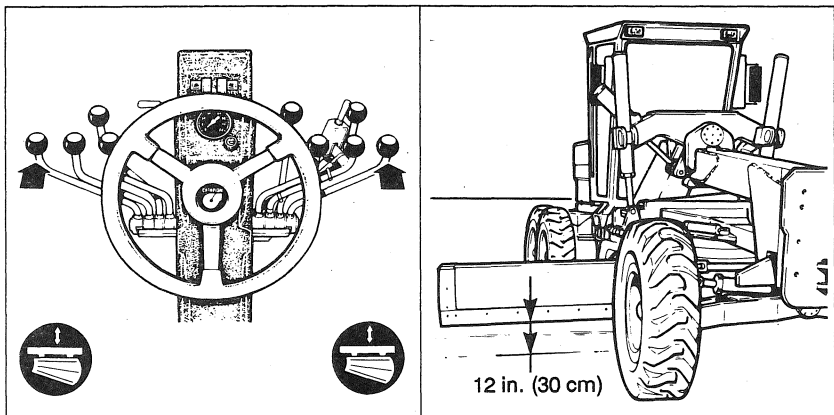
## Moldboard Hi-Lift - Moveable Point Blade Lift System continued

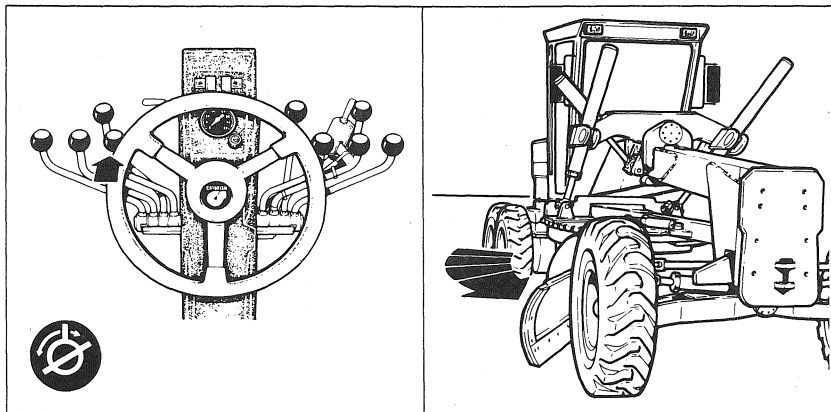
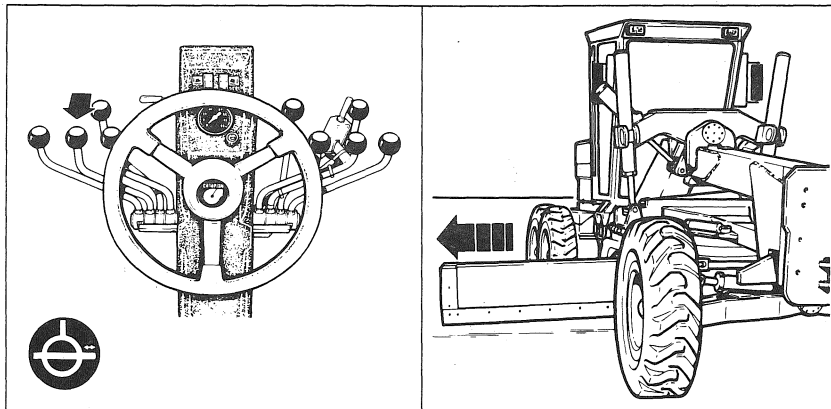
### Right-hand Side Procedure continued

2. Raise moldboard slightly and fully retract the circle shift cylinder.



3. Raise the moldboard 12 in. (30 cm) off the ground. This allows adequate clearance between the circle shift cylinder and the frame as the Hi-Lift arm pivots on its central pin.



**Moldboard Hi-Lift - Moveable Point Blade Lift System** continued**Right-hand Side Procedure** continued

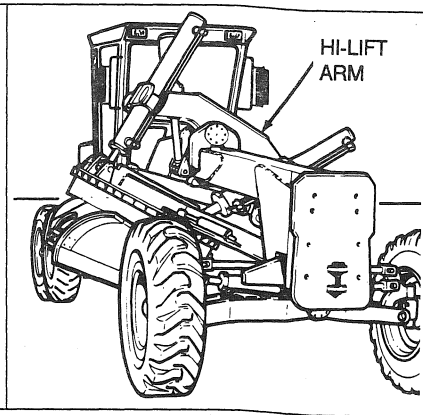
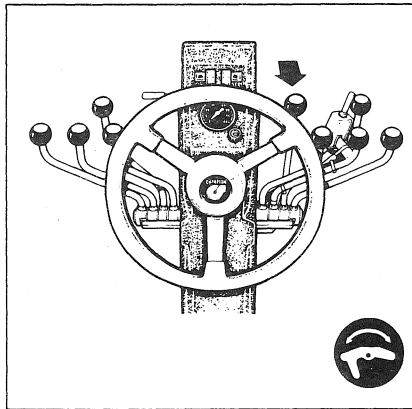
4. Use the moldboard slide shift lever to slide the moldboard as far to the right as possible.

5. Rotate the circle so that the end of the moldboard is close to the front tire.

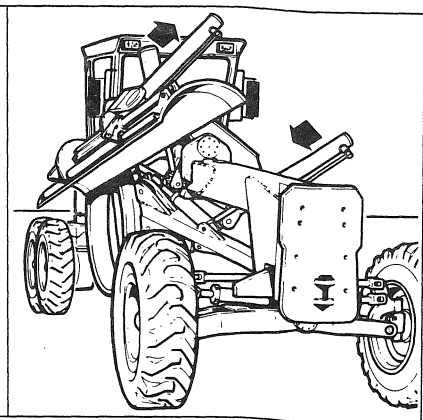
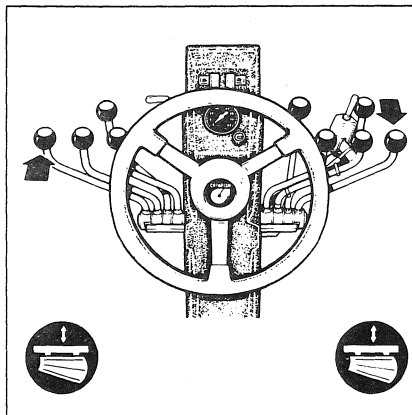
## Moldboard Hi-Lift - Moveable Point Blade Lift System *continued*

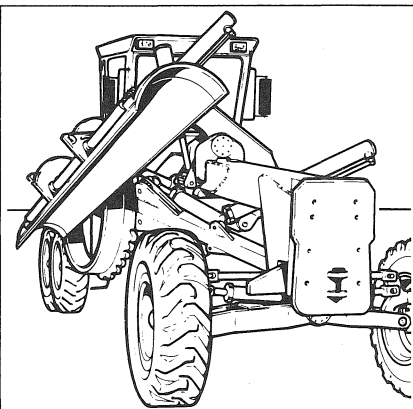
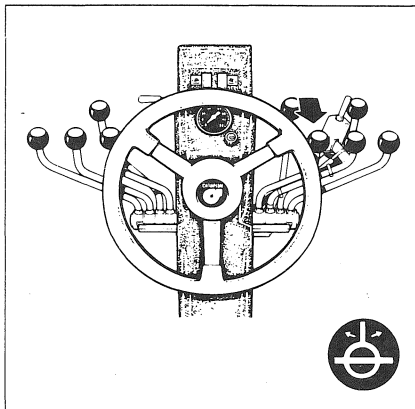
### Right-hand Side Procedure *continued*

6. Move the Hi-Lift arm lock cylinder control lever rearward to rotate the Hi-Lift arm to the right.



7. Fully retract the right-hand blade lift cylinder. Fully extend the left-hand blade lift cylinder until the moldboard reaches the desired position.





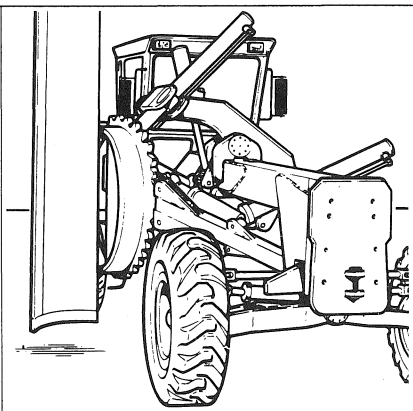
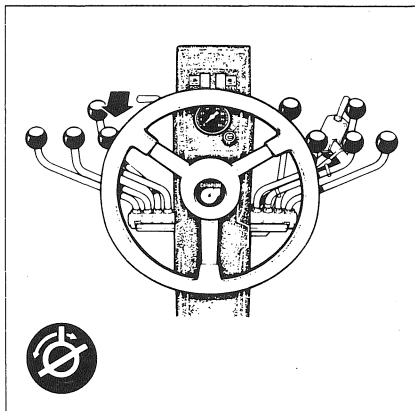
## Moldboard Hi-Lift - Moveable Point Blade Lift System continued

### Right-hand Side Procedure continued

8. Extend the circle shift cylinder to the desired blade position. Observe all moving parts to prevent structure fouling when Hi-Lifting the moldboard.

### ▲ CAUTION

Structure fouling hazard. Do not fully extend circle shift cylinder. Component damage could result.

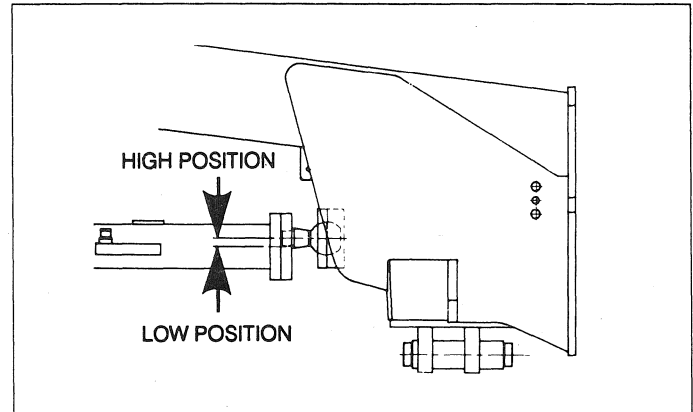


9. Rotate the circle to allow the end of the moldboard to clear the ground.

Reverse this procedure to return the moldboard to the normal grading position.

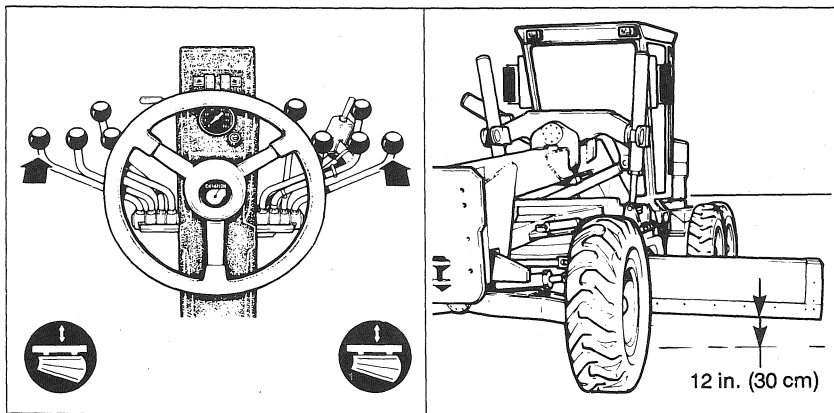
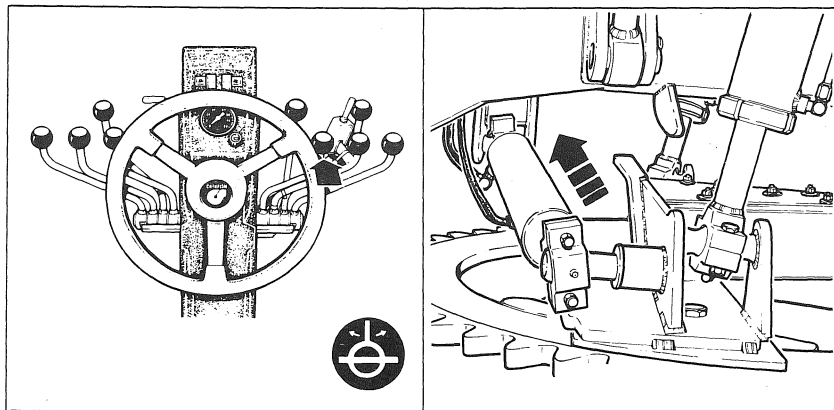
## Moldboard Hi-Lift - Moveable Point Blade Lift System, Left-hand Side Procedure

- This procedure describes how to maneuver the moldboard into the left-hand side high bank sloping position.
  - This system provides a total blade position range.
  - Observe all moving parts to prevent structure fouling when Hi-Lifting the moldboard.
  - Remove the right-hand moldboard extension if installed.
  - Remove 32 in. (81 cm) slide shift cylinder rod extension if installed.
  - Remove 8 in. (20 cm) slide shift cylinder rod extension only to achieve maximum reach to the left.
  - Park grader and apply hand brake.
  - Place transmission in NEUTRAL.
  - Ensure the Hi-lift arm is fully horizontal.
  - Fully lower the moldboard and all attachments.
  - Ensure that there are no persons or vehicles near grader.
1. Before you start, ensure the drawbar ball stud is in the high position. This prevents hose damage and structure fouling between the drawbar ball stud and the grader nose side plate.



**Moldboard Hi-Lift - Moveable  
Point Blade Lift System** *continued***Left-hand Side Procedure** *continued*

2. Raise the moldboard slightly and fully retract the circle shift cylinder.

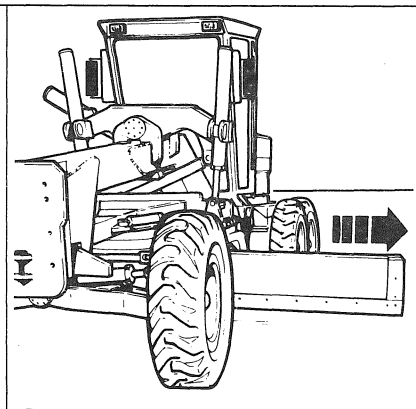
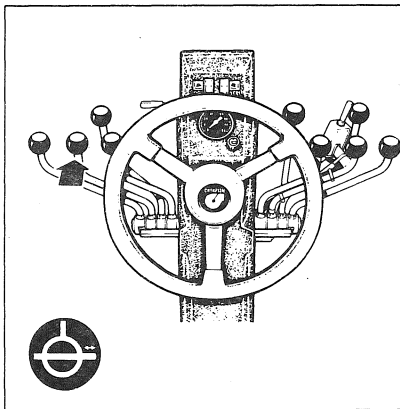


3. Raise the moldboard 12 in. (30 cm) off the ground. This allows adequate clearance between the circle shift cylinder and the frame as the Hi-Lift arm pivots on its central pin.

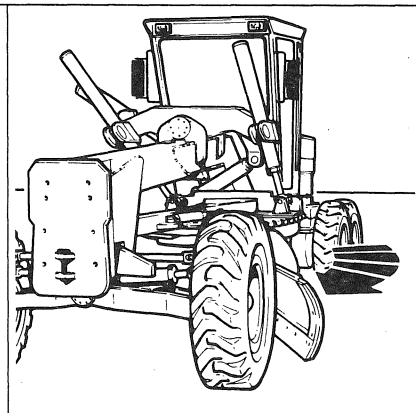
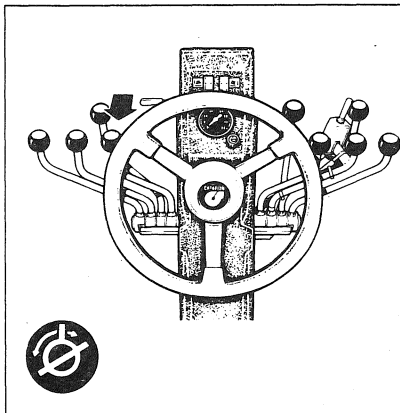
## Moldboard Hi-Lift - Moveable Point Blade Lift System continued

### Left-hand Side Procedure continued

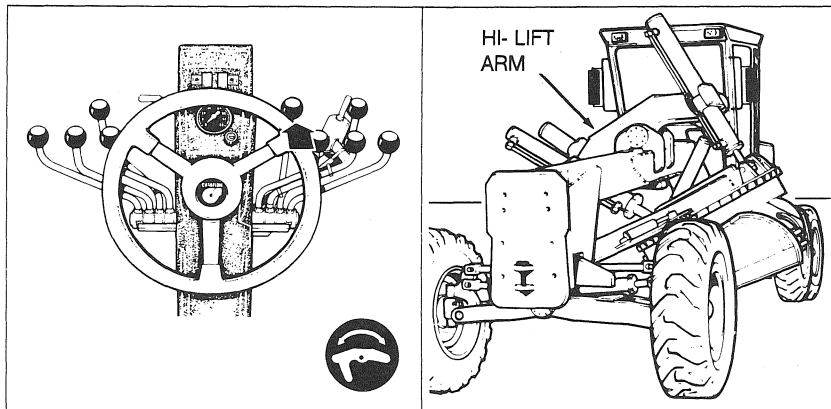
4. Use the moldboard side shift lever to slide the moldboard to the left.



5. Rotate the circle so that the end of the moldboard is close to the front tire.







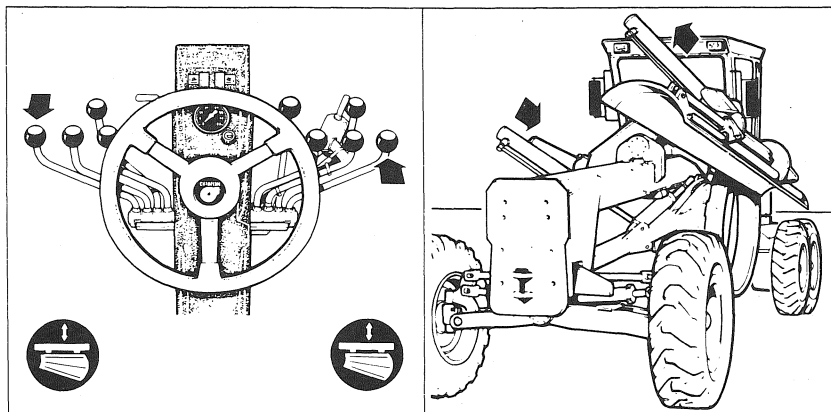
## Moldboard Hi-Lift - Moveable Point Blade Lift System continued

### Left-hand Side Procedure continued

6. Move the Hi-Lift arm lock cylinder lever forward to rotate the Hi-Lift arm to the left.

### ⚠ CAUTION

Structure fouling hazard. Do not fully extend right-hand blade lift cylinder when circle shift cylinder is fully retracted. Component damage could occur.



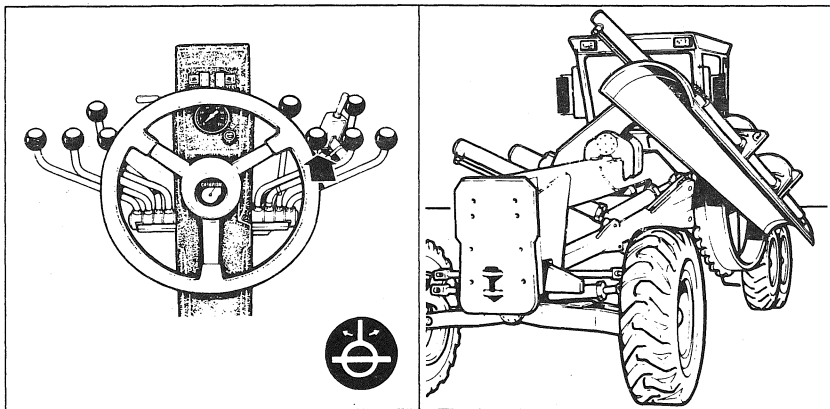
- Do not fully extend right-hand blade lift cylinder when circle shift cylinder is fully retracted.
- If grading position requires full extension of the right-hand blade lift cylinder, first extend circle shift cylinder to provide clearance between left-hand blade lift cylinder and Hi-Lift arm.

7. Fully retract the left-hand blade lift cylinder. Extend the right-hand blade lift cylinder.

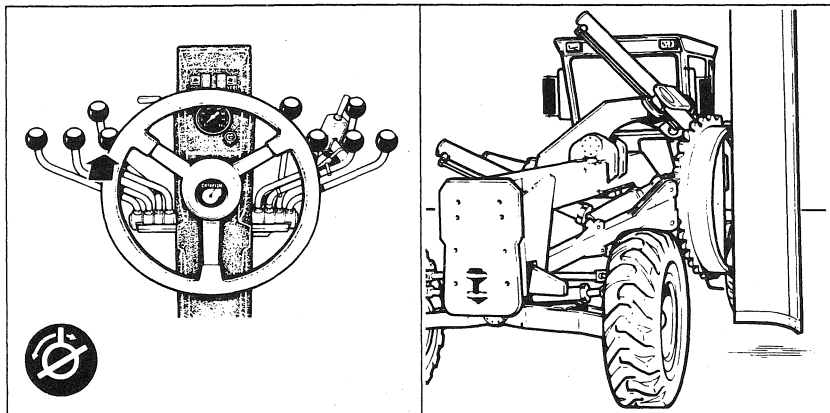
## Moldboard Hi-Lift - Moveable Point Blade Lift System continued

### Left-hand Side Procedure continued

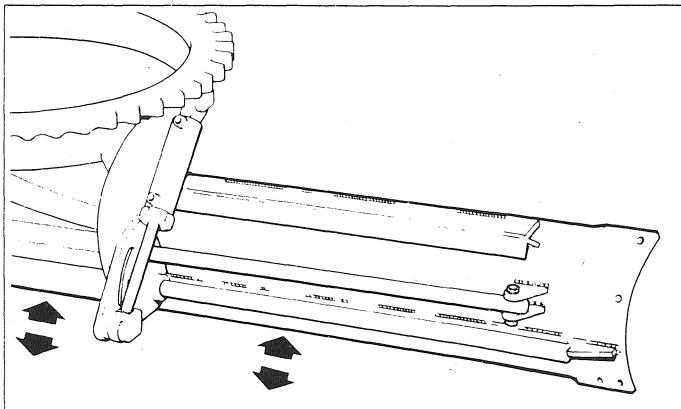
8. Extend the circle shift cylinder to achieve desired blade position.



9. Rotate the circle to allow the end of the moldboard to clear the ground.



Reverse this procedure to return the moldboard to the normal grading position.

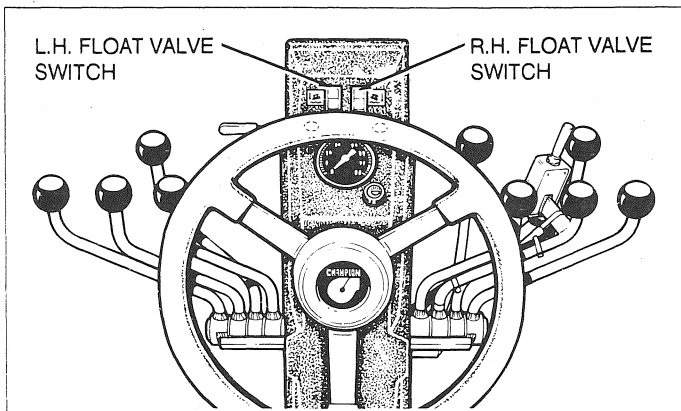


## Electric Float Valves

### ⚠ WARNING

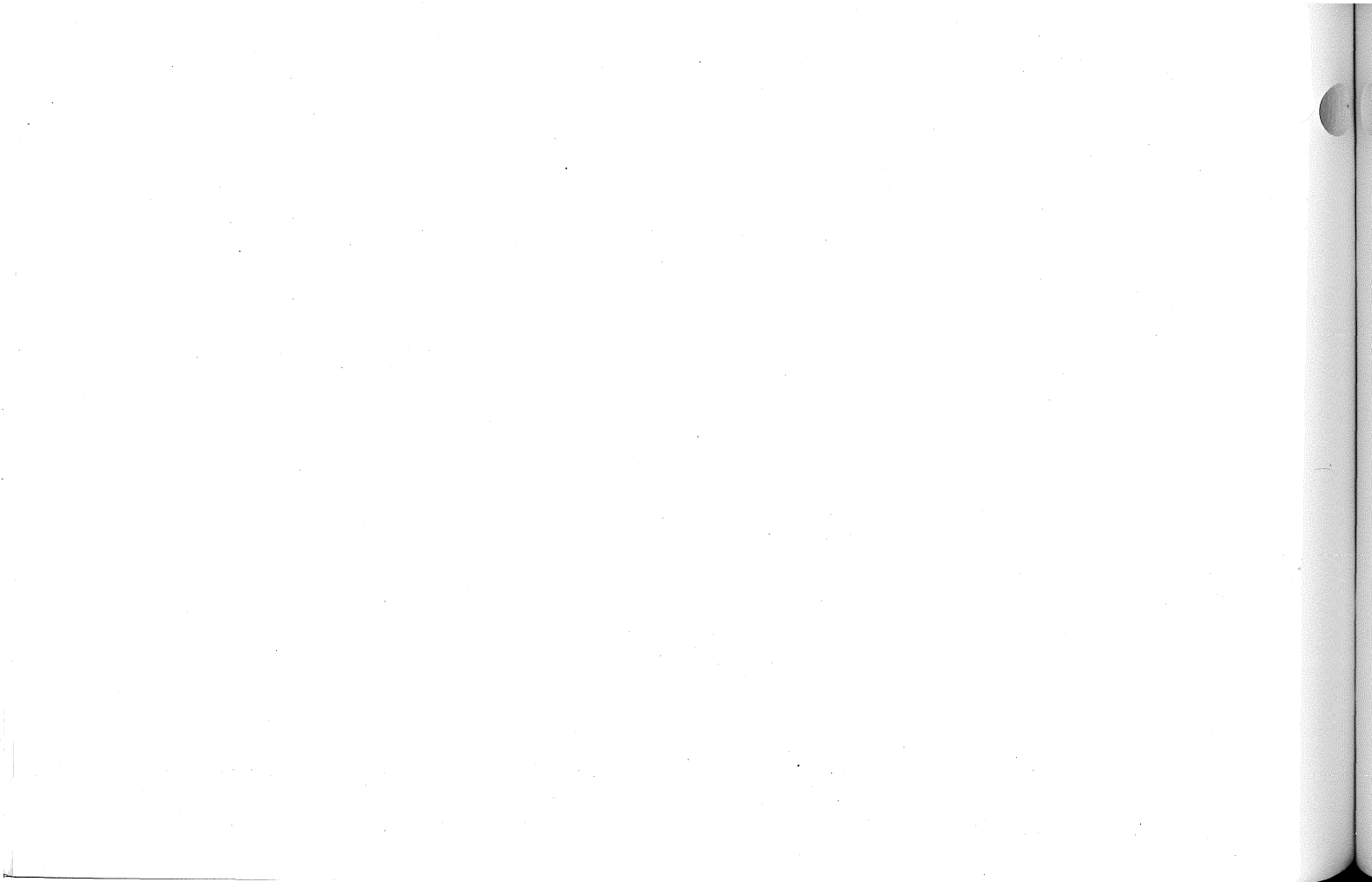
Do not use float control to lower moldboard. Loss of control of grader or damage to hydraulic system could result.

- Graders equipped with float valves allow the moldboard to 'float' along the ground by following the surface contours.
  
- The float valve switches are located on the pedestal, above the tachometer.
- Center and fully lower the moldboard.
- Push the float valve switches to the ON position. A glowing red light in the switches indicates the float valves are on.
- Disengage the float valves by pushing the switches to the OFF position. The glowing red light will de-energize.



# Operating Techniques

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## Introduction

Do not operate the grader until you read and understand the warnings and instructions in this manual. Failure to follow the instructions or heed the hazard alerts, safety signs and precautions could result in machine damage, injury or death.

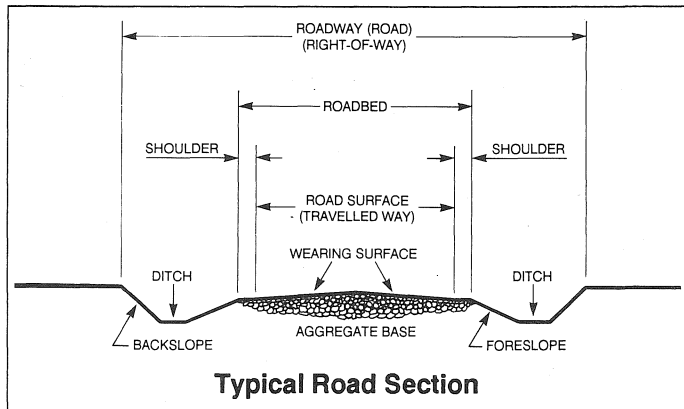
Ensure your grader is properly equipped. Such equipment as lights, flashing beacons, turn signals and warning devices such as flags and a slow moving vehicle sign may be required. Use and position cones and signs to alert traffic while grading highways. Check the local traffic laws for the correct operating requirements.

Operating techniques in this section are basic. Your skills and techniques will develop as you gain knowledge of your grader and its capabilities. This section will help you to

understand the operating characteristics of your grader. Read this section carefully. If any questions arise concerning the operation of your grader, consult your supervisor.

Champion graders are equipped with either a rigid or an articulated frame. The rigid frame grader can accomplish virtually all grading operations. A grader equipped with articulation can accomplish the same operations, but some with greater ease. Straight frame operation is usually used for long passes such as road maintenance and snow removal. With an articulated frame grader you can reduce your turning radius, counteract side thrust when grading wet ditches or during ditching applications and have the tandem wheels on solid ground for maximum traction while achieving maximum blade reach.

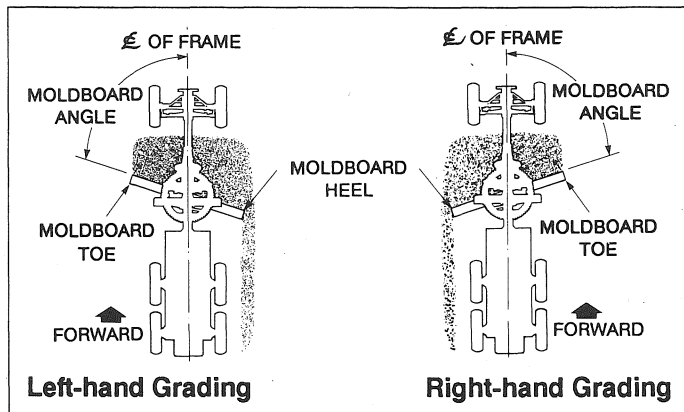




## Moldboard

Moldboard positioning is very important when grading. The moldboard is usually angled 15 to 75 degrees from the center line of the frame. The greater the moldboard angle, the more material is carried across the moldboard allowing for deeper cuts and heavier grading. The earth moved by the moldboard creates a side thrust on the grader. The operator can counteract this side thrust by leaning the front wheels in the direction the material is moving along the moldboard.

Moldboard pitch is also important. For normal grading, the moldboard should be tilted slightly forward from the vertical position. Tilting the moldboard forward allows material to roll for spreading or compacting. Tilting the moldboard backward increases the cutting ability and reduces the rolling action of the material.



Study these illustrations to familiarize yourself with the terms used in this section.

**Moldboard Toe** - The point of the moldboard closest to the front wheels.

**Moldboard Heel** - The point of the moldboard farthest away from the front wheels.

**Moldboard Angle** - The angle of the moldboard as measured from the moldboard toe to the center line of the front frame of the grader.

## Turning Around Using Articulation

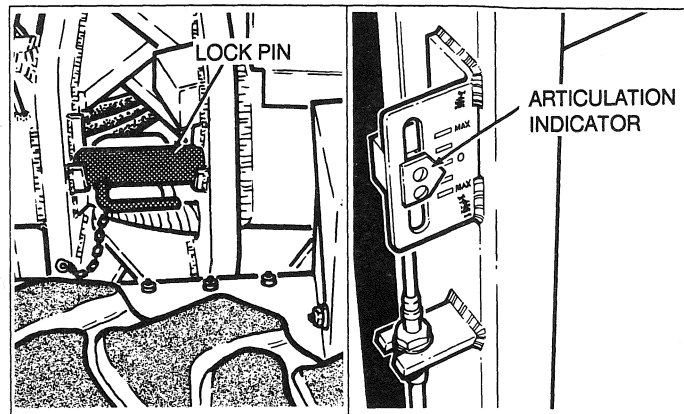
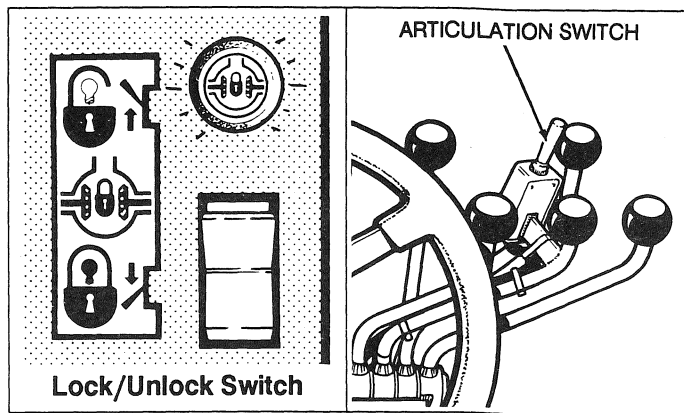
Watch for bystanders and never allow anyone to be under or to reach into the grader and its attachments while operating.

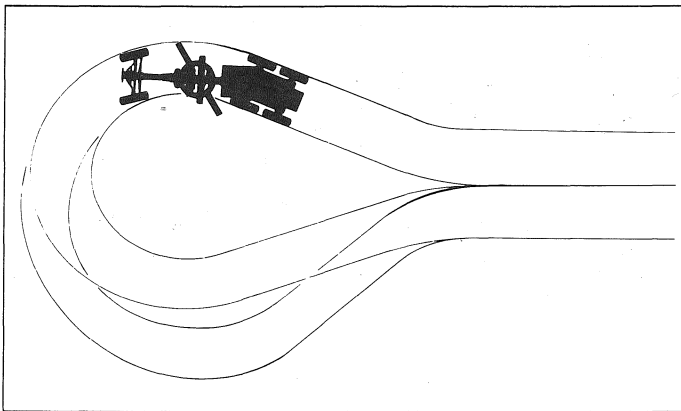
### **⚠ WARNING**

**Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.**

Ensure the control switch for the locking differential is in the 'UNLOCK' position before turning the grader around. This reduces strain on the final drive and reduces tire scuffing. Put the switch in the 'LOCK' position for normal grading.

Use the articulation switch to articulate the grader in the direction you wish to turn. Before articulating, ensure the articulation lock pins are removed and stored appropriately. Move the switch to the right to articulate the grader to the right. Move the switch to the left to articulate the grader to the left. The articulation indicator on the left-hand door post, indicates the degree of articulation. If the articulation feature is not used, install the articulation lock pins when traveling in traffic or at high speeds.



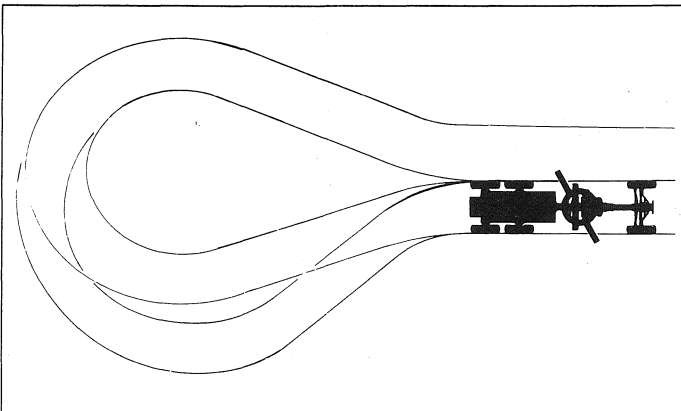


### Turning Around Using Articulation continued

#### Example: Turning Left

- Fully raise the moldboard and attachments, before you turn the grader around.
- Position the moldboard so it will not contact the front or rear tandem tires when articulating as severe damage can occur.
- With the grader moving forward, turn the wheels left and articulate the frame left.

- Upon completing the turn, turn the wheels right and articulate the frame straight.



## Making a 'Three (3) Point' Turn

- Watch for bystanders and never allow anyone to be under or to reach into the grader and its attachments while operating.
- Understand and obey the traffic laws, road signs and signals.
- When turning on a narrow road or highway, use your own judgement for the amount of area the grader requires to turn around

### Maneuver 1

- Fully raise the moldboard and attachments, before you turn the grader around.
- Lean the wheels slightly in the direction you are turning.
- Travel as far forward as possible.

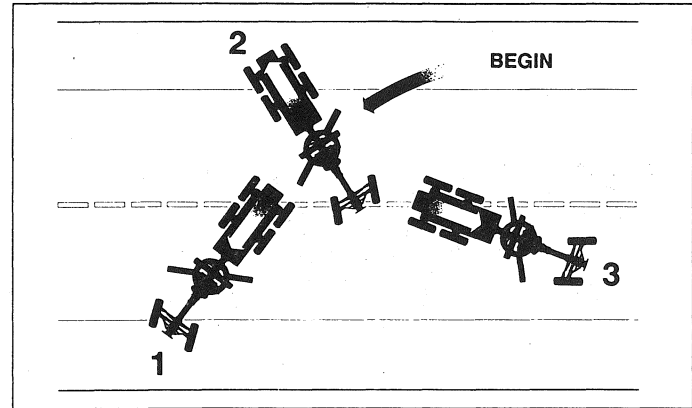
### Maneuver 2:

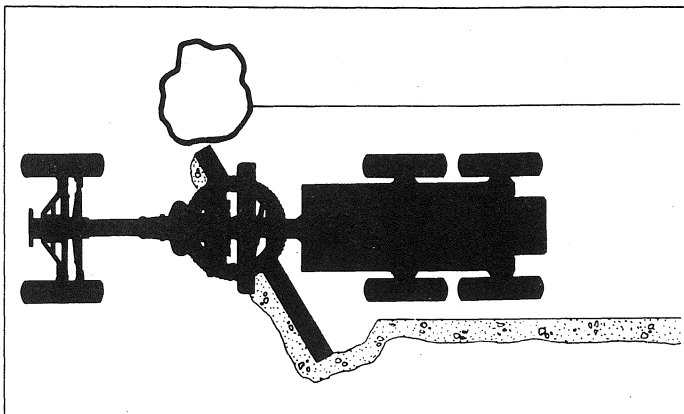
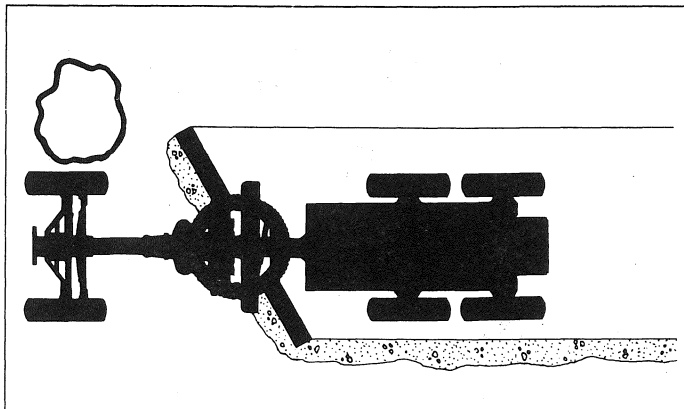
- Lean and turn the front wheels in the opposite direction.
- Select reverse gear and back up the grader as far as possible.

### Maneuver 3:

- Lean and turn the wheels to the new travel direction.
- Straighten the wheels after the turn is completed.

Repeat the previous procedures if using an articulated grader. Ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. Position the moldboard so it will not contact the tires when articulating as severe damage can occur.





### Grading Around an Object

- Note and avoid all hazards and obstructions such as overhangs, ledges, slide areas, electrical lines, underground cables, water mains, gas lines, etc.
- When operating close to electrical lines, underground cables, water mains or gas lines, contact the responsible authority and request assistance.

#### Maneuver 1

- Reduce your speed.
- Use the accelerator/decelerator to slowly maneuver the moldboard around the object.
- Drive as close as possible to the object to reduce the amount of hand shoveling required.

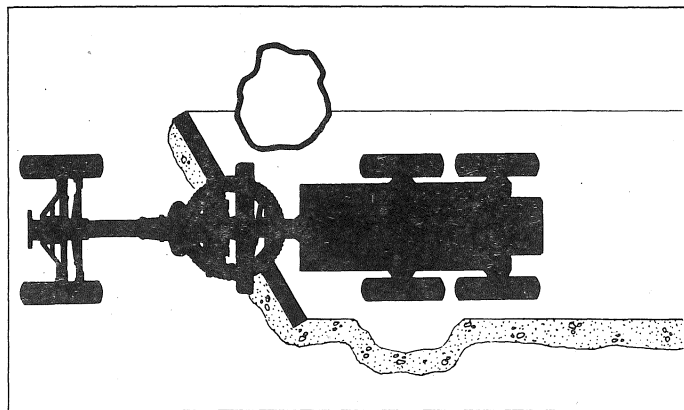
#### Maneuver 2

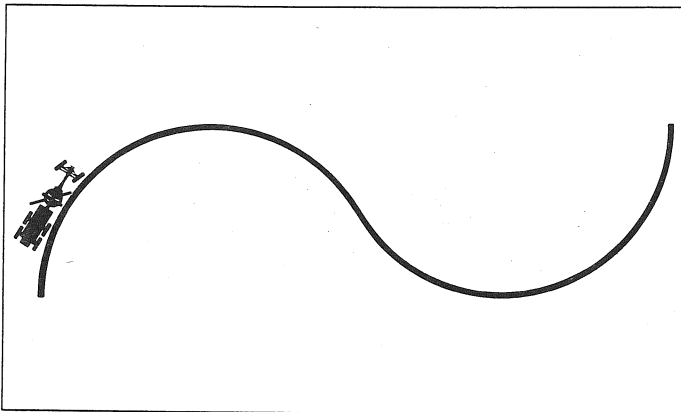
- Use the moldboard slide shift and side shift levers to follow the shape of the object.

## Grading Around an Object continued

### Maneuver 3

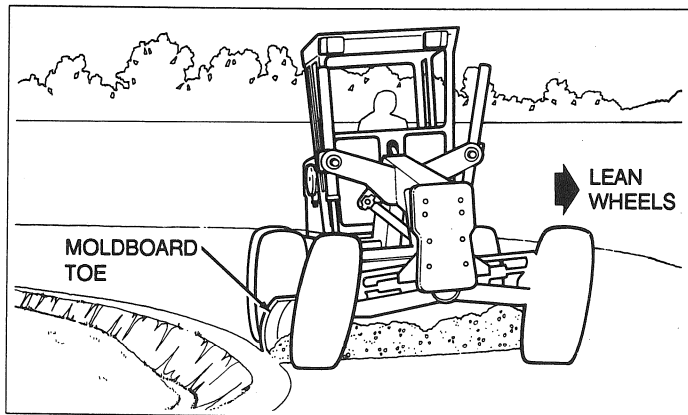
- Slide the moldboard back to its original position after you have passed the object and continue grading.





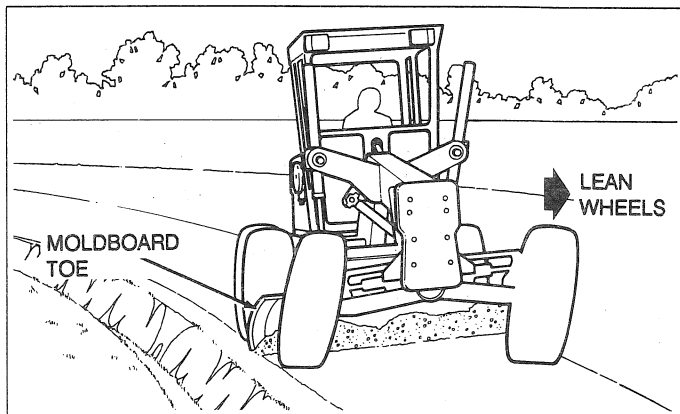
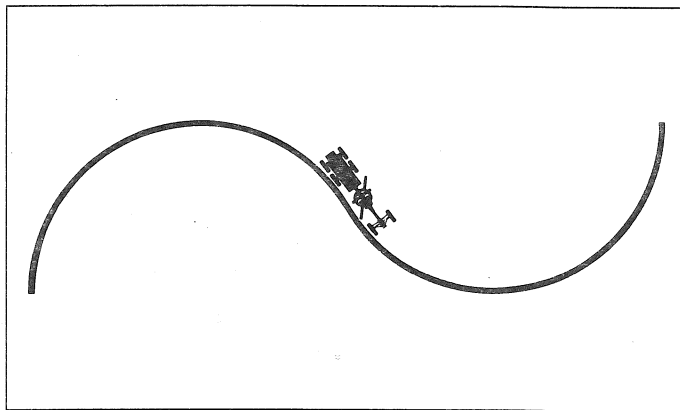
### Grading on an 'S' Curve Shoulder

- Slowly approach the first right-hand curve.
- Lean the front wheels slightly to the left to counteract side thrust.
- Turn right and follow the edge of the shoulder nearest the ditch.
- Position the toe of the moldboard behind and outside the front right-hand wheel. Always have the toe of the moldboard positioned on the edge of the shoulder nearest the ditch while grading.

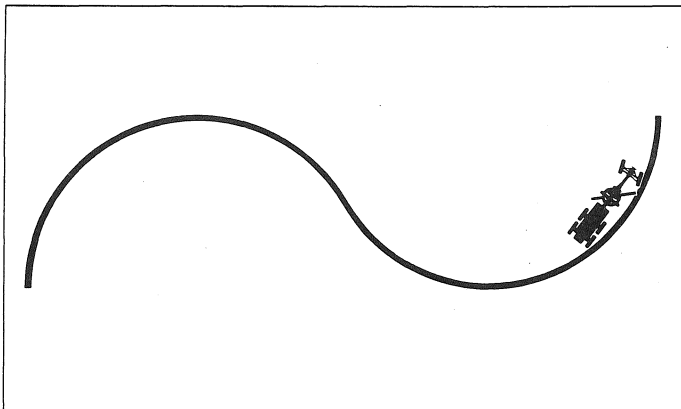


## Grading on an 'S' Curve Shoulder continued

- When finishing the right-hand curve, turn straight.

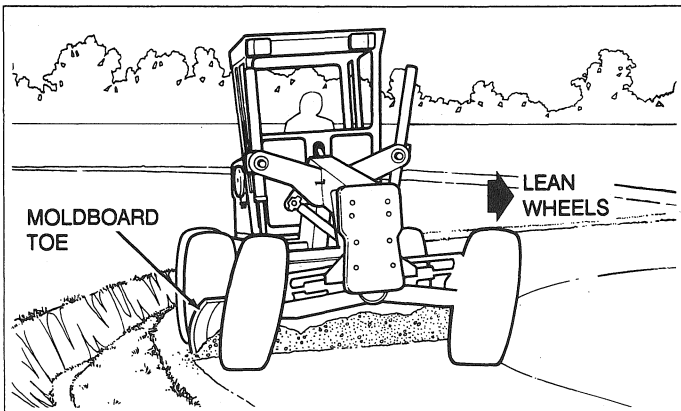






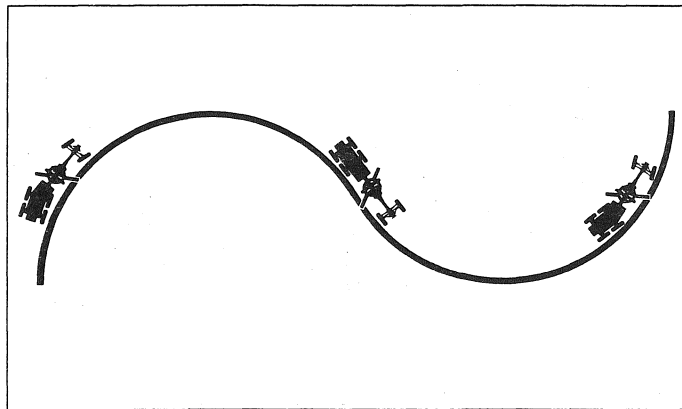
### Grading on an 'S' Curve Shoulder *continued*

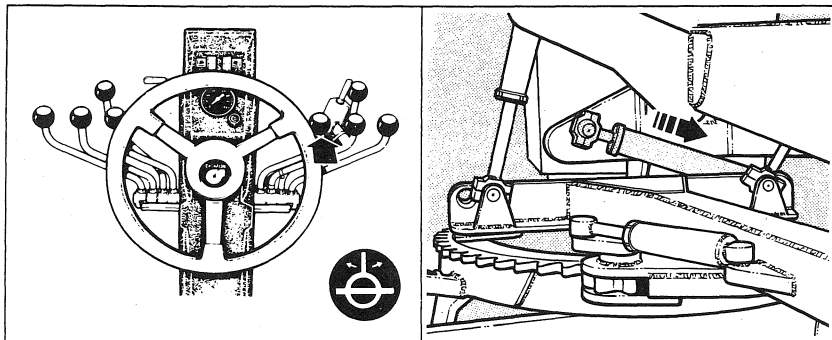
- As you approach the second curve, follow the edge of the shoulder nearest the ditch and turn left.
- Complete the curve and continue grading.
- If a windrow has been created, make a clean-up pass to remove the windrow and reshape the shoulder.



**Grading on an 'S' Curve Shoulder** continued

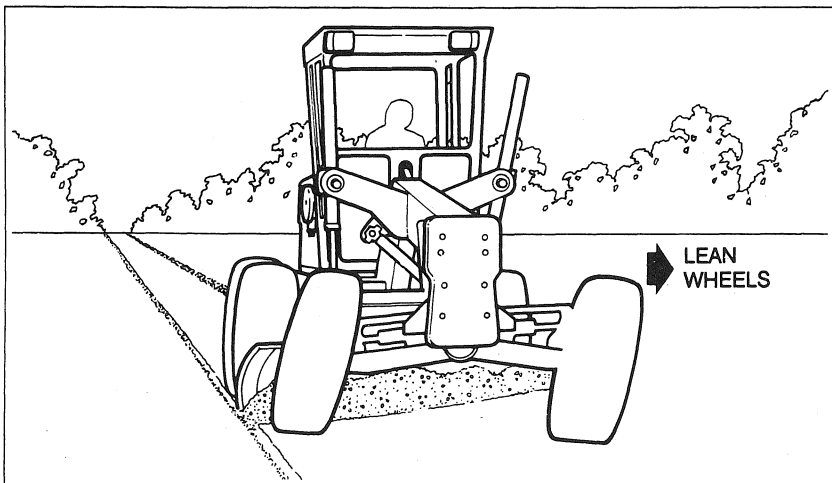
If using an articulated grader, ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. Articulate the grader in the direction of the curve and follow the edge of the shoulder nearest the ditch. Slide and position the moldboard as required. Do not allow the moldboard to contact the tires when articulating.





### Right-hand Leveling

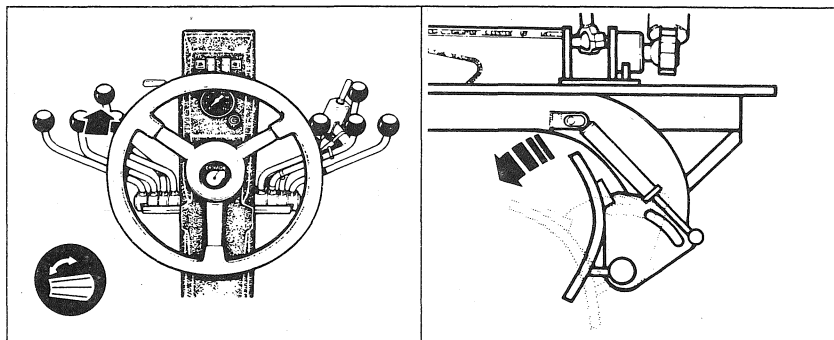
- Use the circle shift lever to offset the circle and drawbar slightly to the left of the frame.



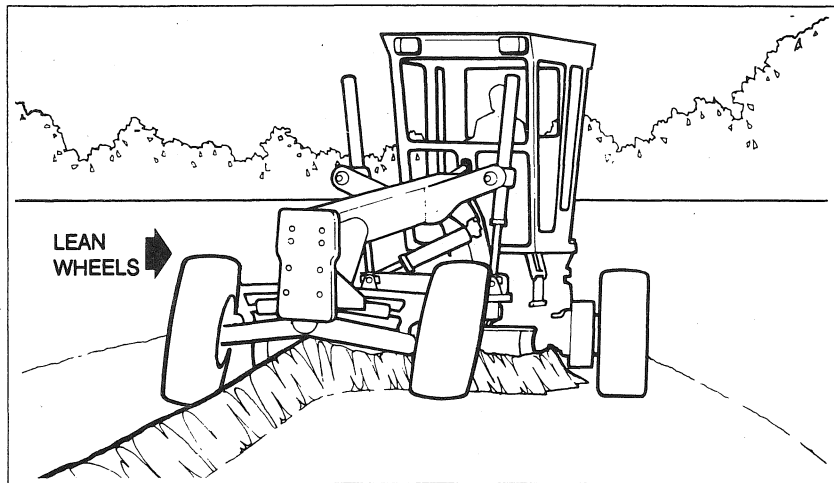
- Position the moldboard horizontally at the desired depth of the cut and deposit the windrow outside the left-hand tandem wheels.
- Lean the front wheels to the left to overcome the side thrust.

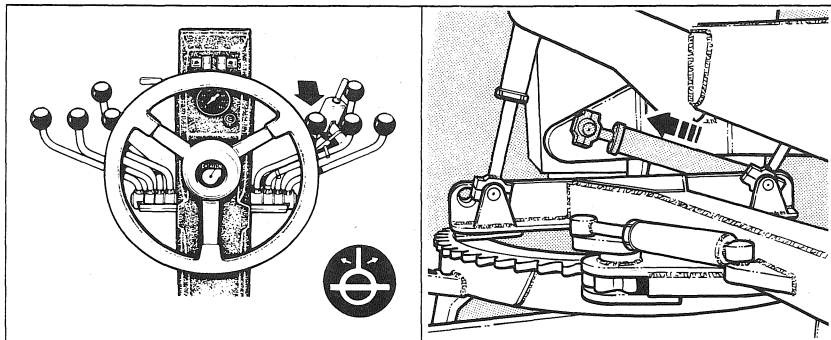
## Right-hand Leveling continued

- Tilt the moldboard forward until the material constantly rolls off the moldboard.



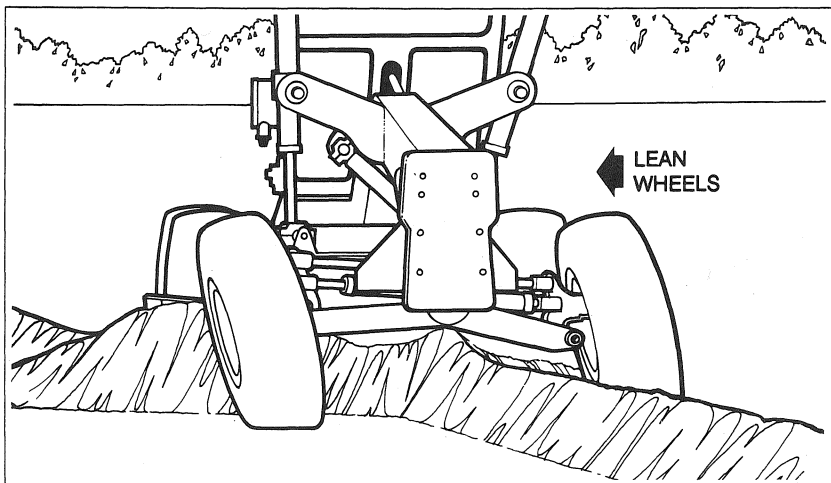
If using an articulated grader, ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. For right-hand leveling articulate the frame to the right. If the drive wheels lose traction, then reduce the articulation angle. This will decrease the cutting angle and side thrust allowing the drive wheels to regain traction. Deposit the windrow between the tandem wheels. Spread the windrow over the new surface until it is smooth.





### Left-hand Leveling

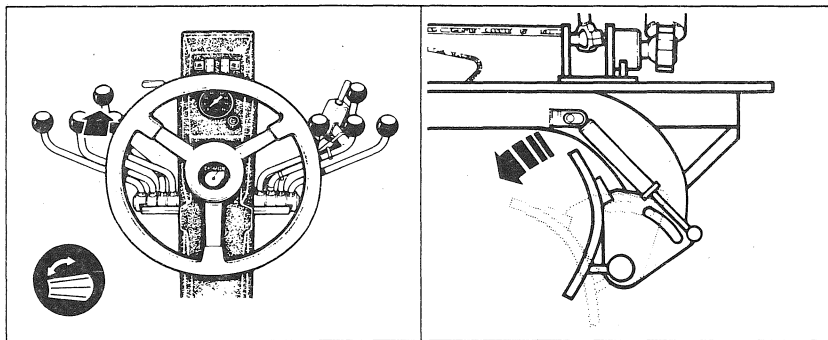
- Use the circle shift lever to offset the circle and drawbar slightly to the right of the frame.



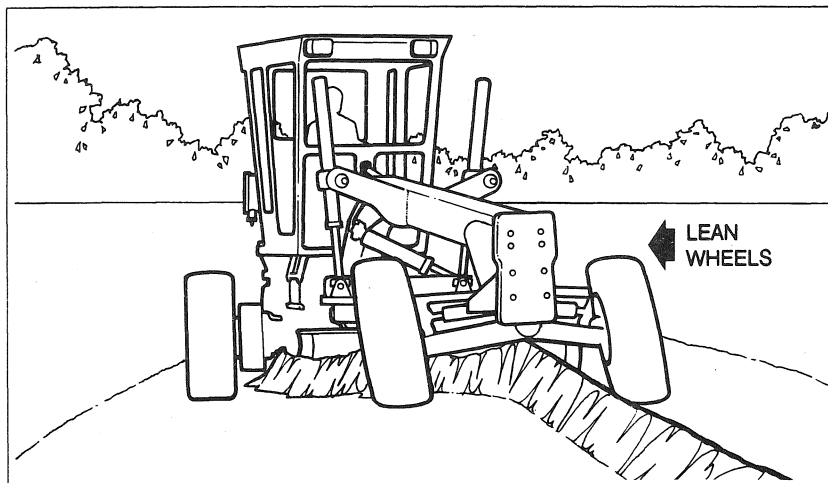
- Position the moldboard horizontally at the desired depth of the cut and deposit the wind-row outside the right-hand tandem wheels.
- Lean the front wheels to the right to overcome the side thrust.

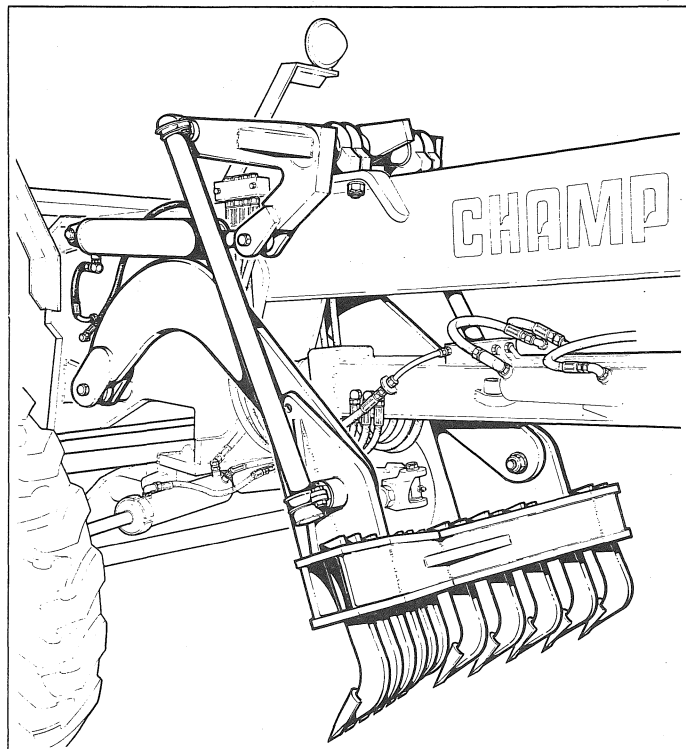
## Left-hand Leveling continued

- Tilt the moldboard forward until the material constantly rolls off the moldboard.



If using an articulated grader, ensure the articulation lock pins are removed before articulating, and install them when not using the articulation function. For left-hand leveling articulate the frame to the left. If the drive wheels lose traction, then reduce the articulation angle. This will decrease the cutting angle and side thrust allowing the drive wheels to regain traction. Deposit the windrow between the tandem wheels. Spread the windrow over the new surface until it is smooth.





### Scarifier and Ripper Operation

- When operating close to electrical lines, underground cables, water mains or gas lines, contact the responsible authority and request assistance.
- When scarifying or ripping across a slope, keep the moldboard parallel with the front axle, centered to the frame and lowered close to the ground to provide protection against rolling over.

A Champion scarifier or ripper is useful for breaking up hard surfaces such as asphalt, rocky subgrade and ice to ease grading

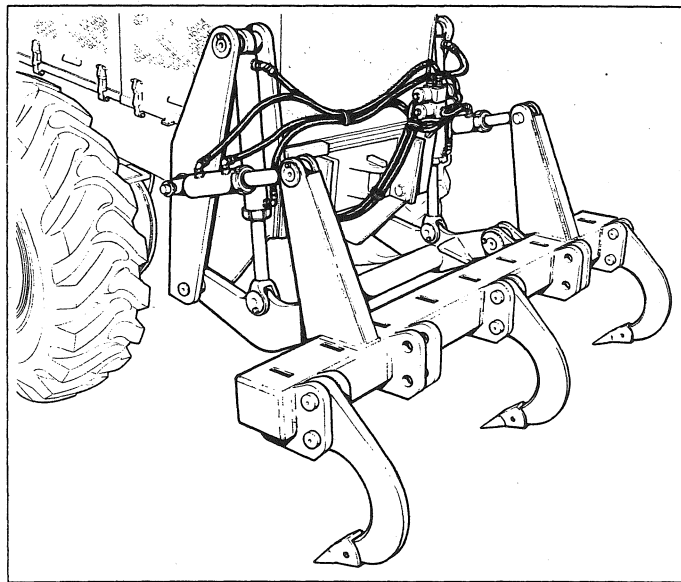
**Scarifier:** The scarifier is mounted behind the front wheels and is hydraulically operated from inside the cab. Refer to the section - **Operating the Controls - Control Lever for Scarifier, Dozer Blade or Snowplow** page 9-9. The scarifier can be used with other front mounted attachments.

The scarifier is equipped with up to eleven teeth that are adjustable and replaceable. Use the scarifier to break up surfaces that are too hard to cut with the moldboard. For especially hard surfaces, reduce the number of teeth. Always lower the scarifier teeth into the material slowly while the grader is moving at a low speed. Do not skid the teeth along hard surfaces such as large rocks or pavement. Do not use the scarifier when turning or articulating. This places side loads on the scarifier teeth and may result in equipment damage.

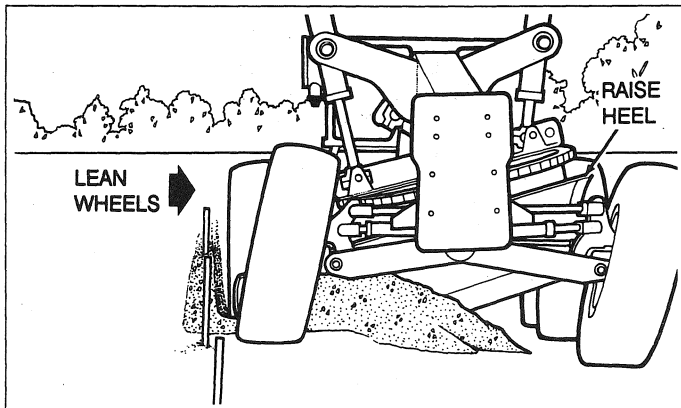
### **Scarifier and Ripper Operation** continued

**Ripper:** The ripper is very useful for breaking up asphalt pavement, large rocks and tree stumps. The ripper can be equipped with five ripper teeth or nine scarifier teeth. The ripper is controlled by a hand-held attachment controls switch box located in the cab. Refer to the section - **Controls and Instruments - Attachment Controls Switch Box** page 6-11.

When using the ripper, lower the teeth into the ground with the grader in motion. If the rear wheels lose traction, raise the ripper until the wheels regain traction. For especially hard surfaces, reduce the number of teeth. To break old pavement, lower the teeth under the pavement and raise the ripper. Avoid the use of the ripper when turning, this reduces wear on equipment.





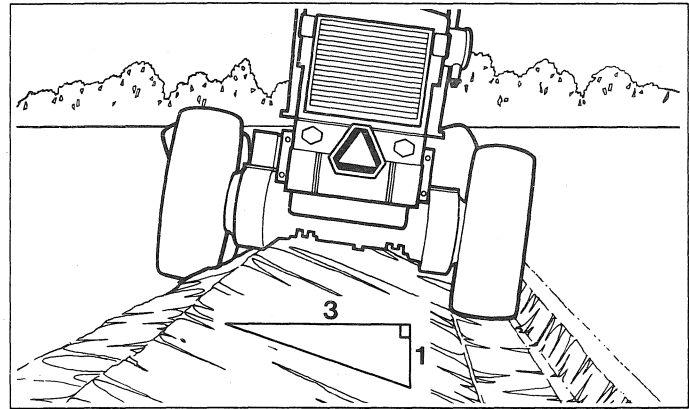


### Road Construction - Right-hand 'V' Ditching

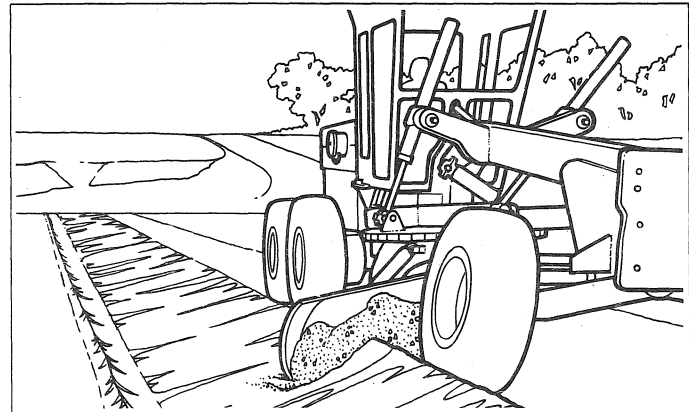
- Place a line of stakes to define where the ditch will be constructed.
- Position the moldboard with the toe just outside the front right-hand wheel and the moldboard heel just ahead of the left-hand tandem wheels.
- Tilt the moldboard back and raise the heel to carry the material inside the left-hand tandem wheels.
- Lean the front wheels left to counteract side thrust.
- Make the marking pass slowly.
- If using an articulated grader on a firm surface, keep the frame straight.
- If the surface is loose, articulate the frame to keep the drive wheels on firm ground. Remember to remove the articulation lock pins before articulating the grader. If the articulation feature will not be used, install the articulation lock pins.

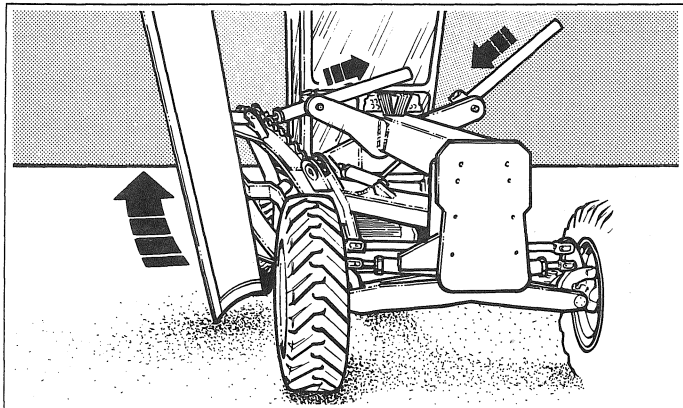
## Right-hand 'V' Ditching continued

- Make the second pass with the front right-hand wheel on the bottom of the first cut. Cut a 3 to 1 slope at a slightly higher speed.



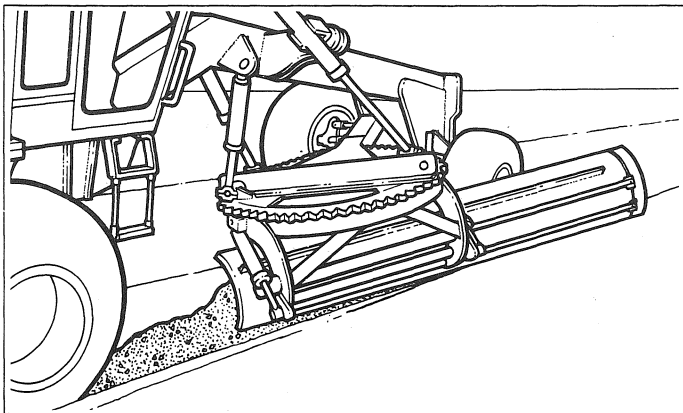
- A clean-up pass may be required as the windrow builds up on the roadside. Side shift the circle towards the ditch. Carry the material well inside the toe of the moldboard to prevent spillage back into the ditch.





### Right-hand 'V' Ditching continued

- Cut the ditch back slope by Hi-Lifting the moldboard to the right-hand side of the grader. Rotate the circle counter-clockwise and lower the left Hi-Lift cylinder while the circle is rotating. Refer to the section - **Operating the Controls - Moldboard Hi-Lift** pages 9-12 and 9-18.

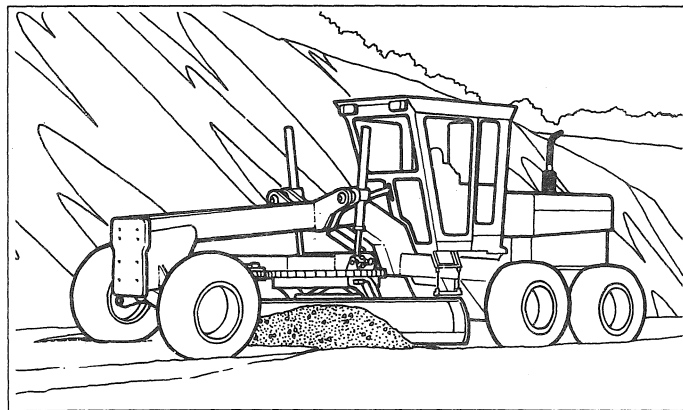


- Center the moldboard heel in front of the right-hand tandem wheels. Drive the grader with the tandem wheels in the ditch. Deposit the material in the ditch.
- When you have completed the back slope procedure, position the moldboard to complete the clean-up pass. This spreads the windrow created by the back slope, and builds up the road surface.

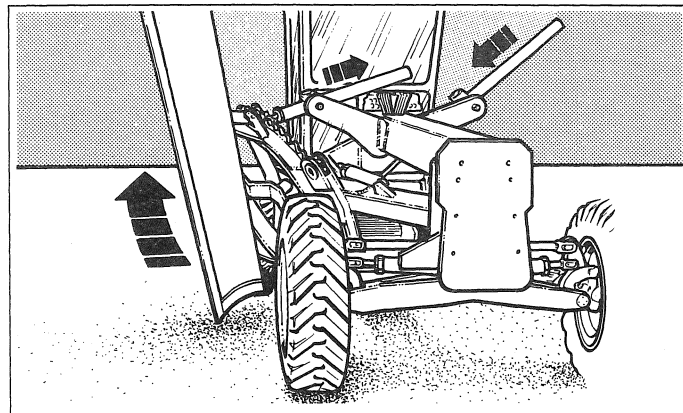
Repeat these procedures to cut the ditch on the other side of the road.

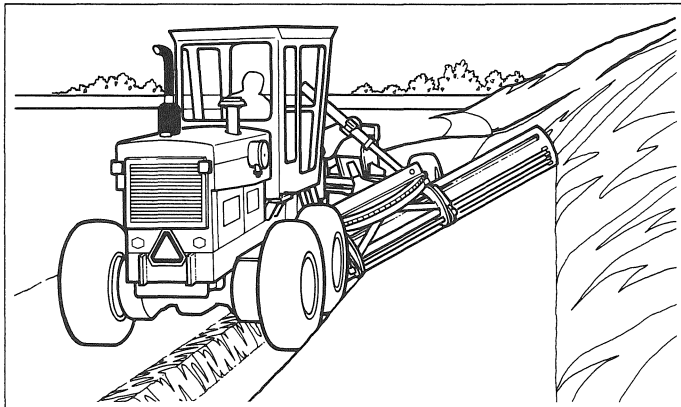
## High Bank Cutting

- Establish a level platform surface for grader operation.
- If the platform surface is hard, make a pass cutting into the platform. This pass should slope slightly towards the bank to stop the grader from sliding away while cutting into the bank slope.



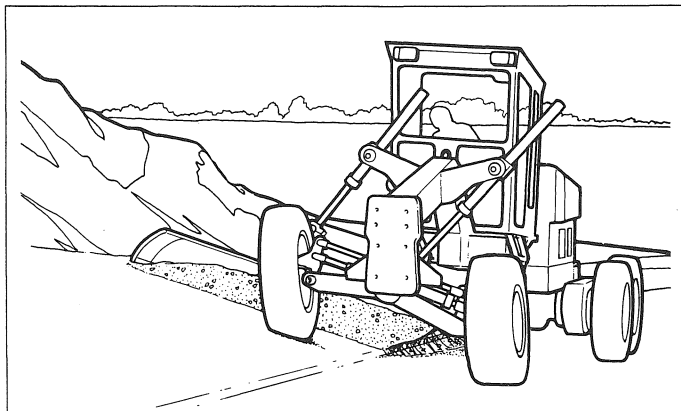
- Prepare your grader for cutting the bank slope by side shifting the circle and moldboard as far as possible to the side of the grader you will be working with.
- Rotate the circle and moldboard counterclockwise and lower the left Hi-Lift cylinder at the same time. Refer to the section - **Operating the Controls - Moldboard Hi-Lift** pages 9-12 and 9-18.





### High Bank Cutting continued

- Lower or raise the drag link cylinder to position the heel of the moldboard at the bottom of the bank slope and in-line with the inner edge of the tandem wheels.
- Move the grader slowly towards the bank. Check to see if the moldboard is angled correctly before actually cutting into the bank.
- While cutting the slope, ensure tandem wheels are near the base of the bank slope.
- The depth of cut or degree of slope required can be accomplished easily by raising or lowering the moldboard, tilting the moldboard, or leaning the front wheels.
- Keep your platform surface clean by moving the windrow after each pass on the bank slope.

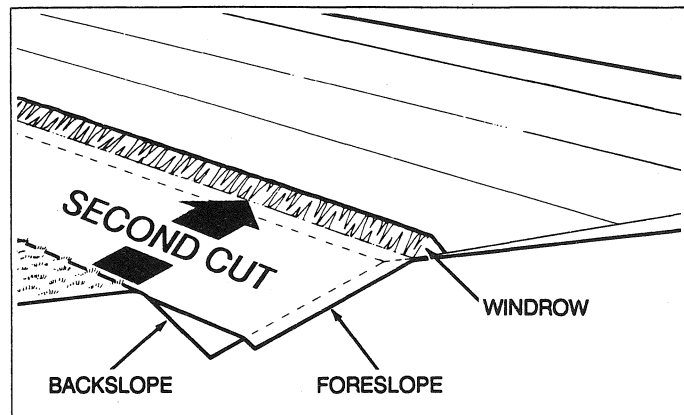
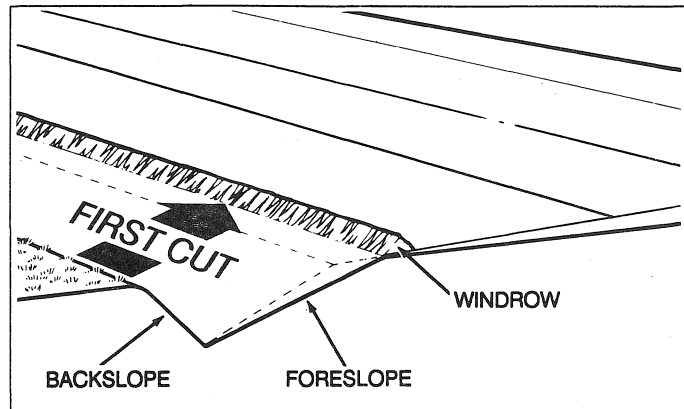


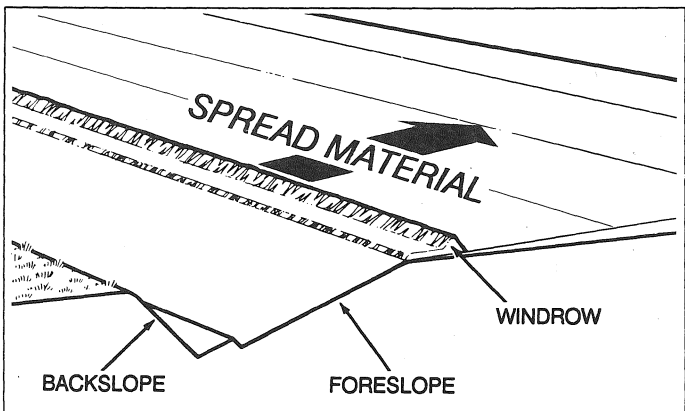
If using an articulated grader, ensure the articulation lock pins are removed before articulating, and install them when not using the articulating function. On the level platform surface articulate the front frame towards the bank slope and allow the front wheels to ride the bank slope and position the moldboard as required. The tandem wheels must be kept on the level platform surface.

### Flat Bottom Ditching - Gravel Roads

If no 'V' ditch exists, see this section - **Right-hand 'V' Ditching** page 10-22, and cut a ditch to the desired depth.

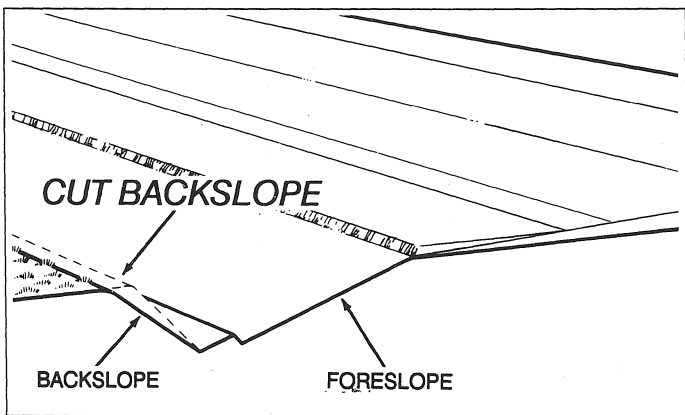
- The first step is to cut the ditch foreslope.
  - With the frame straight, operate the grader with the right-hand wheels riding at the bottom of the 'V' ditch.
  - Position the moldboard toe behind the front right-hand wheel, and the heel outside and in front of the left-hand tandem wheels.
  - Tilt the moldboard forward.
  - Lower the moldboard toe to the bottom of the ditch.
  - Raise or lower the heel to the required ditch foreslope and lean the front wheels to the left.
  - Deposit the material onto the shoulder.
- Reposition the moldboard to cut a second 'V' ditch closer to the road and not as deep as the first 'V' ditch cut. Deposit the material onto the shoulder.





### Flat Bottom Ditching - Gravel Roads continued

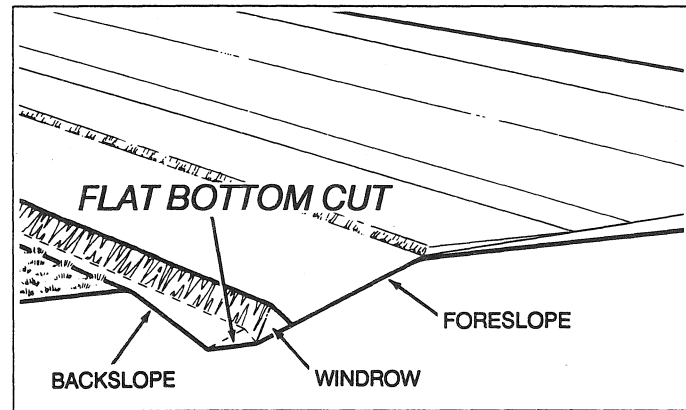
- Reposition the moldboard to make a clean-up pass for the material built up on the road shoulder. Side shift the circle towards the ditch. Carry the material well inside the toe of the moldboard to prevent spillage back into the ditch.
- Spread the material to the center of the road to create a crown. See this section - **Crowning a Road** page 10-30.



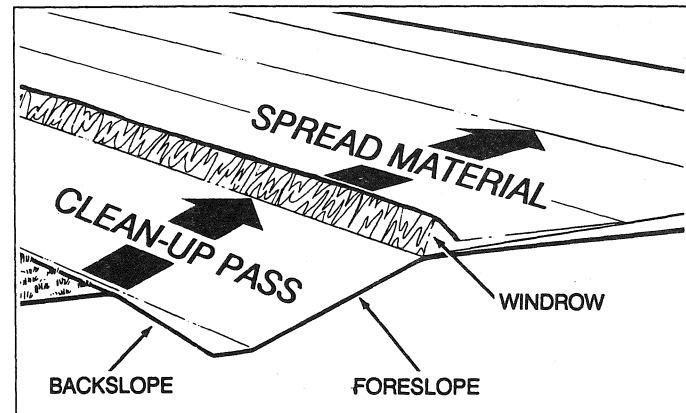
- If the backslope is insufficient or if you are building a new road make a pass to cut the backslope. See this section - **Right-hand 'V' Ditching** page 10-22.

## Flat Bottom Ditching - Gravel Roads continued

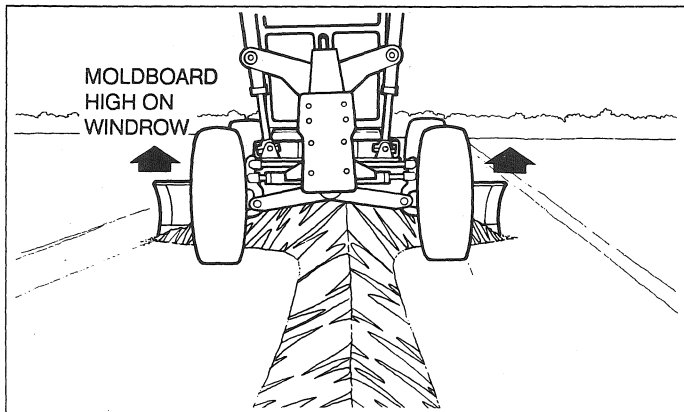
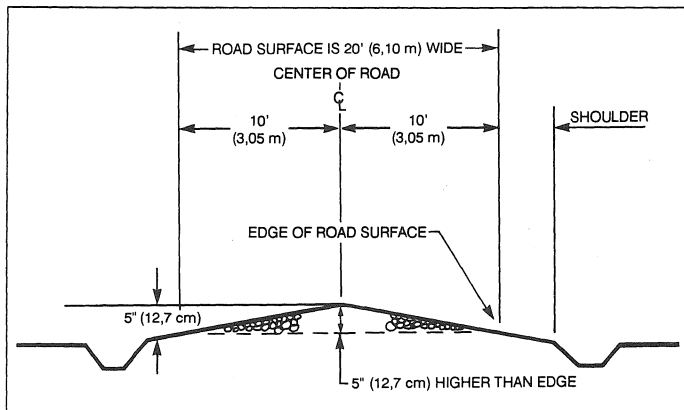
- To begin a flat bottom cut operate the grader with its right-hand side wheels riding in the first 'V' ditch cut.
- Position the moldboard toe at the bottom of the ditch backslope and the heel at the bottom of the ditch foreslope.
- Tilt and lower the moldboard for the required depth.
- Make a horizontal cut and lean the front wheels to the left.



- Reposition the moldboard to make a cleanup pass to spread the windrow created by the flat bottom cut up onto the shoulder. Spread this material and finish the final grade.







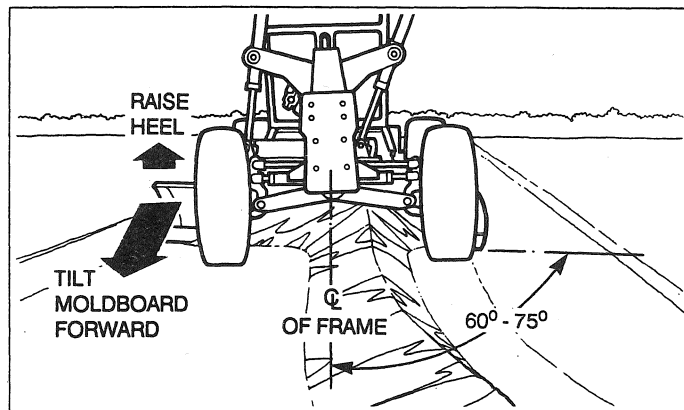
## Crowning a Road

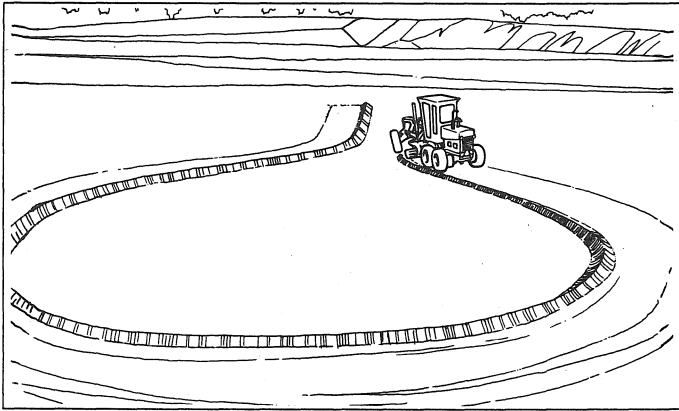
Crowning a road is simply constructing a road surface so that the center of the road is higher than the road edge. This allows water to drain into the ditches as quickly as possible. If the crown is not built properly, water will be trapped and break up the road crust producing potholes and washboards. The amount of crown is the amount of slope on the road. For good drainage, a road should have a crown of 1/3 in. (8,4 mm) to 1/2 in. (12,7 mm) for every foot (305 mm) of width measured from the center of the road to the outside edge where the road meets the shoulder.

- After the ditches have been constructed, grade the excess material to the center of the road, creating a windrow.
- Position the moldboard parallel to the front axle.
- Drive the grader straight down the center of the windrow, keeping the moldboard high on the windrow to feather the material to both sides of the grader.

**Crowning a Road** *continued*

- Construct the crown slope by tilting the moldboard forward and position it between a 60 and 75 degree angle. Place the transmission in a higher gear to increase your speed. Raise the heel of the moldboard slightly to allow the material to be feathered. Work both sides of the road constructing the slope at the same time.
- When you reach the shoulders, align the heel of the moldboard with the tandem wheels, to compact the excess material.





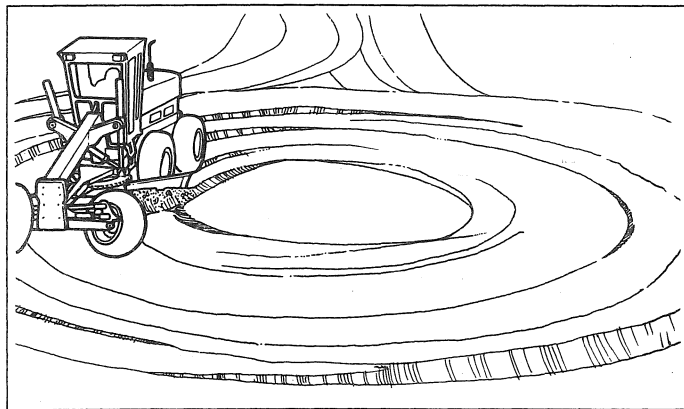
### Cul-de-sac Using Articulation

Cul-de-sacs can be constructed by rigid or articulated frame graders. In this situation, grading with an articulated frame grader is an asset.

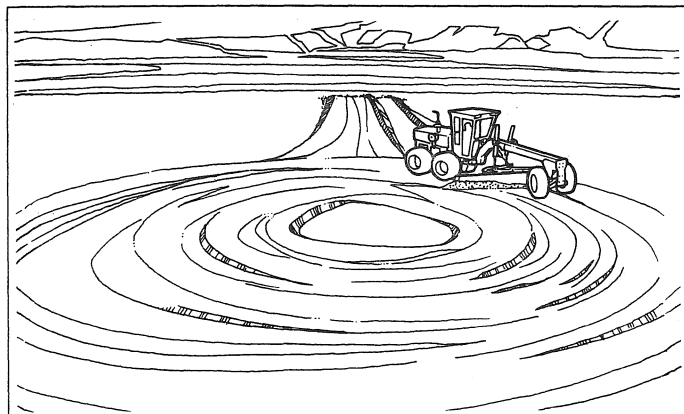
- Start grading at the perimeter of the cul-de-sac in a circular pattern and work the material towards the center. Angle the moldboard to deposit the material outside the tandem wheels.

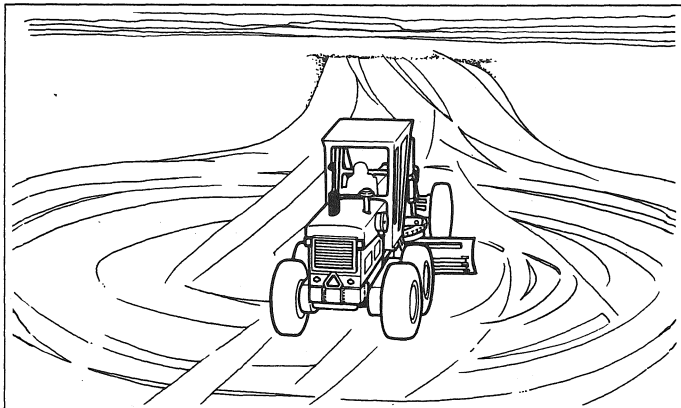
## Cul-de-sac Using Articulation continued

- Articulate the frame and lean the wheels in the direction you are turning to increase steering control as you approach the center of the cul-de-sac.



- To begin the finished grade of the cul-de-sac, drive the grader opposite to the direction you were previously operating at the outside edge and form a windrow towards the center.
- Tilt the moldboard forward and move the windrow towards the center of the cul-de-sac.
- Check the slope as you grade the windrow towards the center, making the center the highest point.



**Cul-de-sac Using Articulation** continued

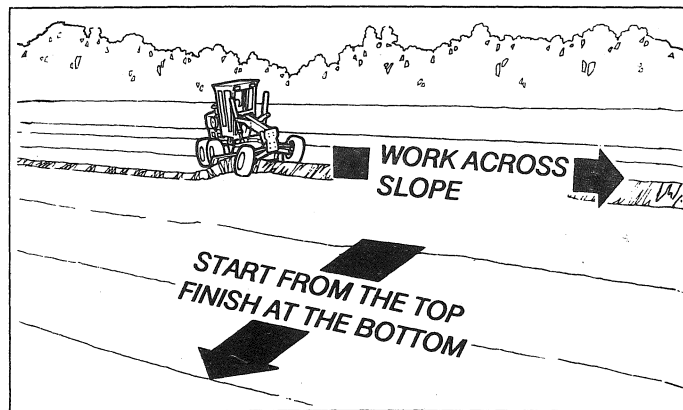
- When you have completed circling, grade the excess material out the cul-de-sac entrance.

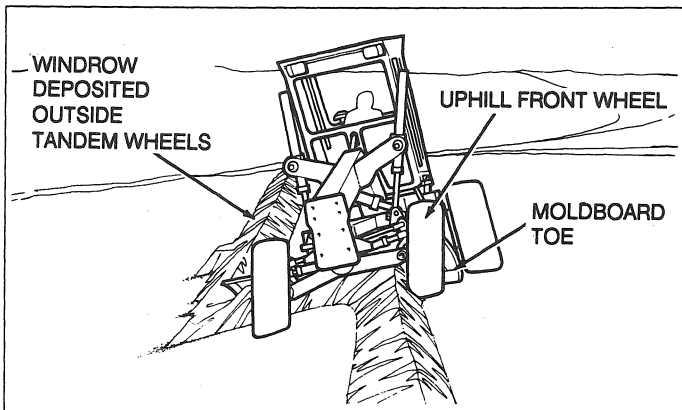
## Finishing a Gradual Slope Using Articulation

### **⚠ WARNING**

Do not articulate the grader when operating on steep slopes. Grader could roll over. Severe personal injury or death could result.

- It is best to start from the top and finish your grading at the bottom of the slope, if possible.
- Work back and forth across the slope.
- Always extend the moldboard down slope.





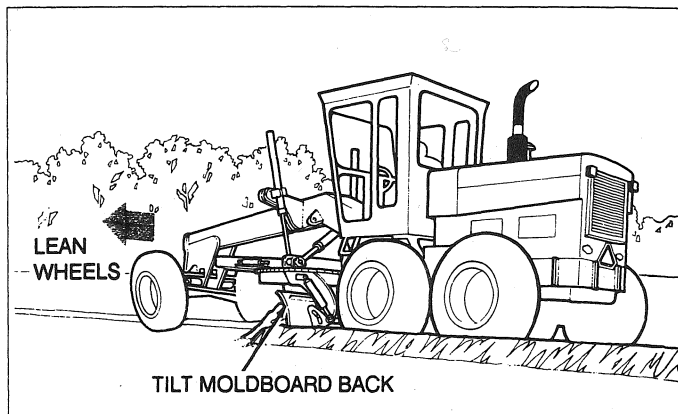
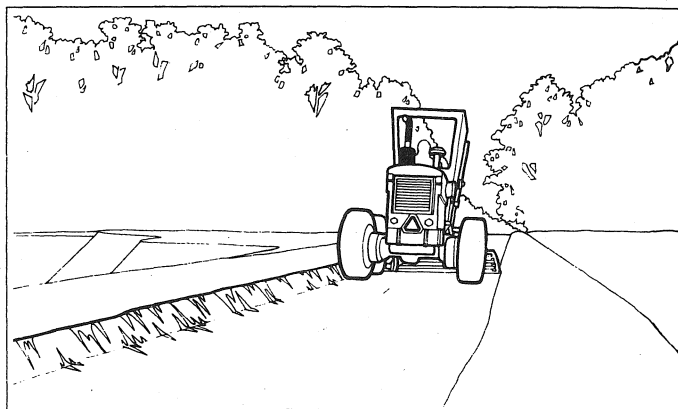
## Finishing a Gradual Slope Using Articulation continued

- Ensure the articulation lock pins are removed before articulating and install them when not using the articulating function.
- Articulate the grader. Keep the tandem wheels on the level surface.
- Lean the front wheels vertically and position the uphill front wheel on the edge of the windrow created from the previous pass. This provides stability and allows you to create an even grade.
- Position the toe of the moldboard outside and behind the uphill wheel so that the heel of the moldboard deposits the material outside the downhill tandem wheels.
- When you have completed grading the slope, spread the remaining material to make a smooth finished grade.

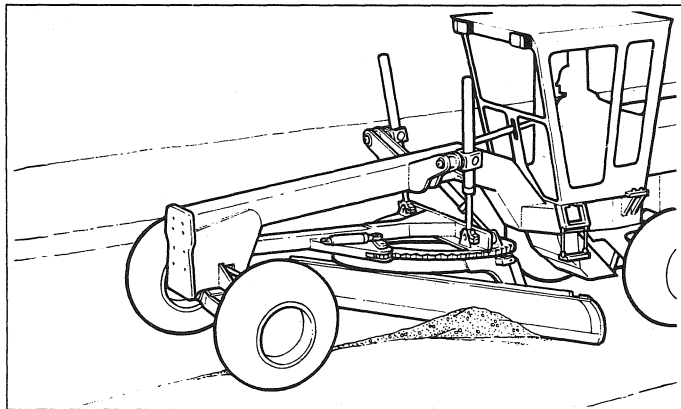
## Road Maintenance - Gravel Roads

Check the road surface material. If it is dry, use water to dampen it, resulting in a better finished surface. Washboard road surface or potholes need reshaping because of the effects of weather and traffic. Reshaping involves cutting and remixing aggregates and fines.

- Start at the edge of the shoulder and cut the material into a windrow. Deposit the material towards the center of the road outside the tandem wheels.
  
- Ensure the circle is centered and the moldboard is angled at 30 degrees to the frame center line.
- Tilt the moldboard back for maximum cutting to remove the ridges and potholes.
- Lean the front wheels towards the heel side of the moldboard as you work towards the center of the road.
- Repeat these procedures for the other side of the road surface.
- Generally, tilt the moldboard forward for grading and back for ditching.

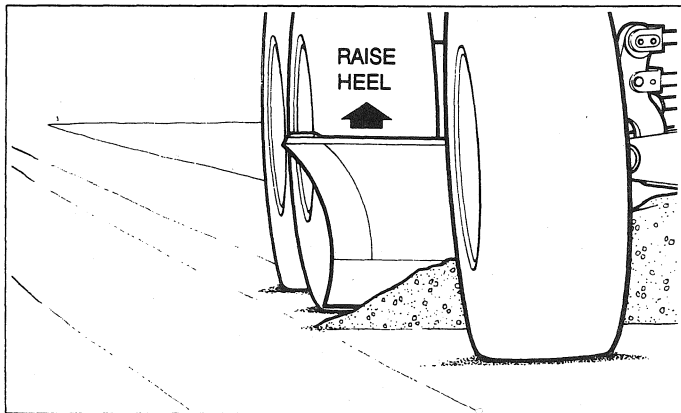






### Gravel Roads continued

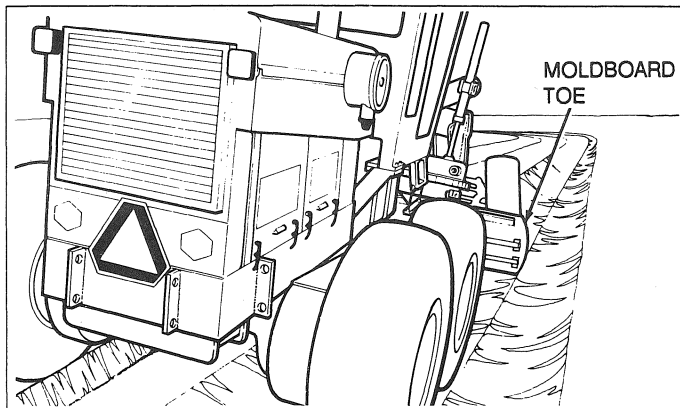
- Build the road surface by moving half the windrow towards the shoulder. Feather the material over the road surface as you check the crown and work towards the shoulder with each pass.



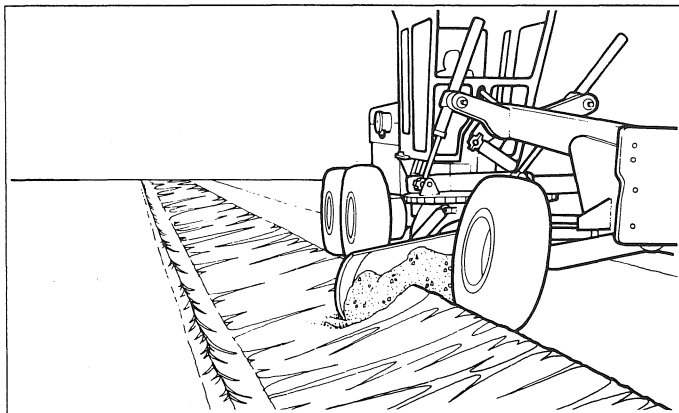
- As you make a final pass at the edge of the shoulder, raise the heel of the moldboard to feather the material and use the tandem wheels to compact any remaining material.

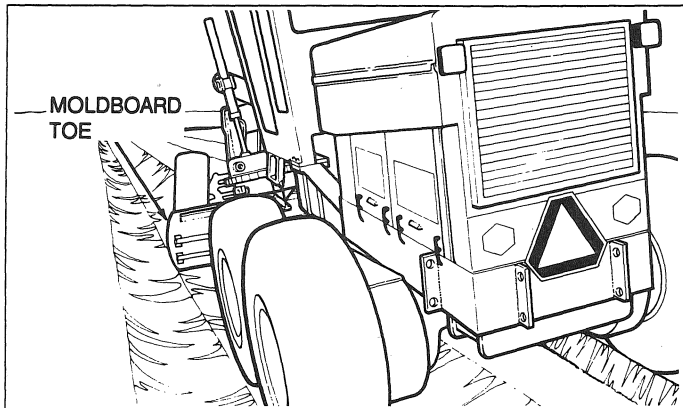
## Right-hand Ditch Clean-up

- Position the moldboard right end behind the right front wheel.
- Lower the right-hand Hi-Lift cylinder to position the moldboard to the depth of the ditch.
- Move the left-hand Hi-Lift cylinder to position the heel of the moldboard to deliver the material onto the foreslope between the tandem wheels, without cutting the foreslope.
- Lean the front wheels slightly left to counteract side thrust.



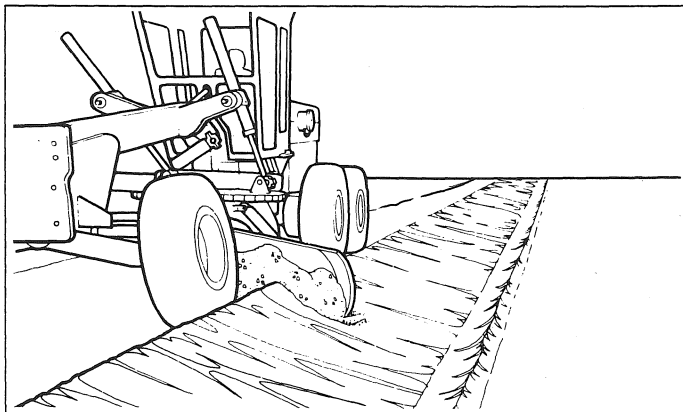
- For the next pass, reposition the moldboard as required to move the material up the foreslope and onto the shoulder.
- On the next pass spread the material to finish the shoulder grade.





### Left-hand Ditch Clean-up

- Position the moldboard left end behind the left front wheel.
- Lower the left-hand Hi-Lift cylinder to position the moldboard to the depth of the ditch.
- Move the right-hand Hi-Lift cylinder to position the heel of the moldboard to deliver the material onto the foreslope between the tandem wheels, without cutting the foreslope.
- Lean the front wheels slightly right to counteract side thrust.



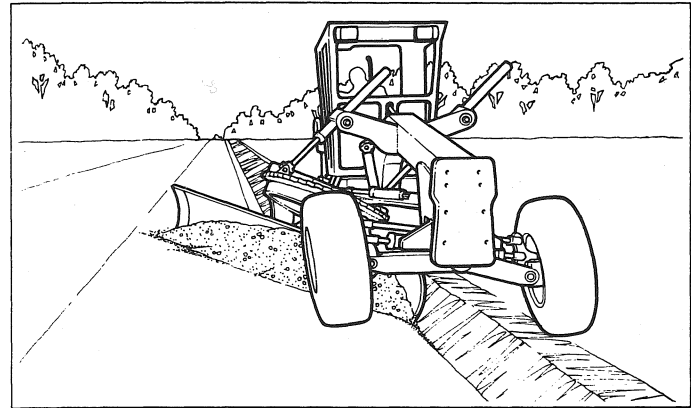
- For the next pass, reposition the moldboard as required to move the material up the foreslope and onto the shoulder.
- On the next pass spread the material to finish the shoulder grade.

## Cleaning a Wet Ditch

This application can be completed with a rigid frame grader, although an articulated grader may make the operation easier under some circumstances.

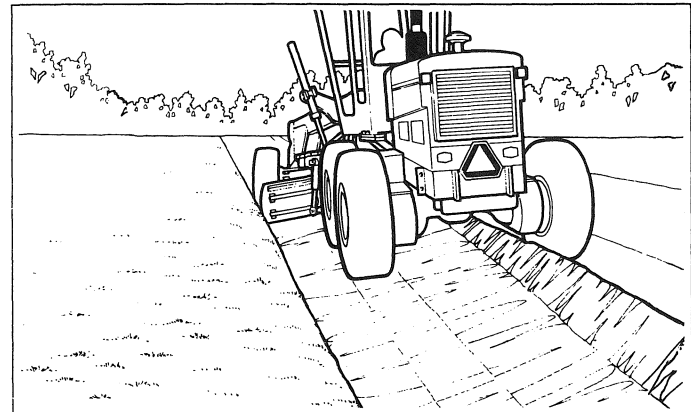
If you are using a rigid frame grader to clean a wet ditch, it is best to straddle the ditch. Straddling allows you to keep all the wheels on a dry surface.

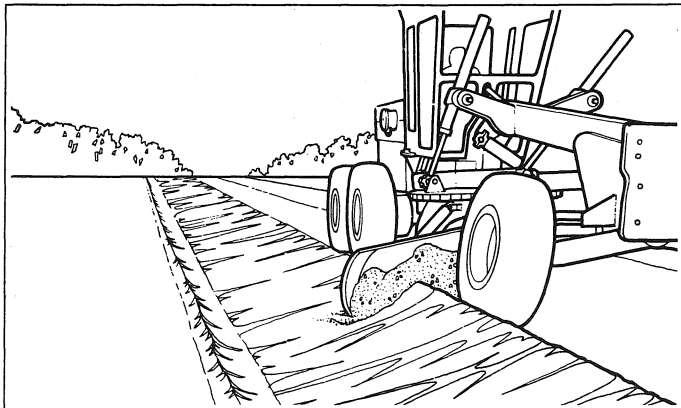
- Position the moldboard toe at the bottom of the ditch and move the material out of the ditch onto the shoulder outside the tandem wheels.
- Make the next pass by spreading the wet material over the shoulder.



If using an articulated grader, ensure the articulation lock pins are removed before articulating, and install them when not using the articulating function.

- Articulate the grader so that the front wheels are in the ditch.
- Keep the tandem wheels on the shoulder to prevent wheel slippage in the wet or soft material of the ditch.
- Side shift the circle and drawbar assembly towards the ditch.
- Tilt and angle the moldboard as required to move the material out of the ditch and to deposit it between the tandem wheels.





### Cleaning a Wet Ditch continued

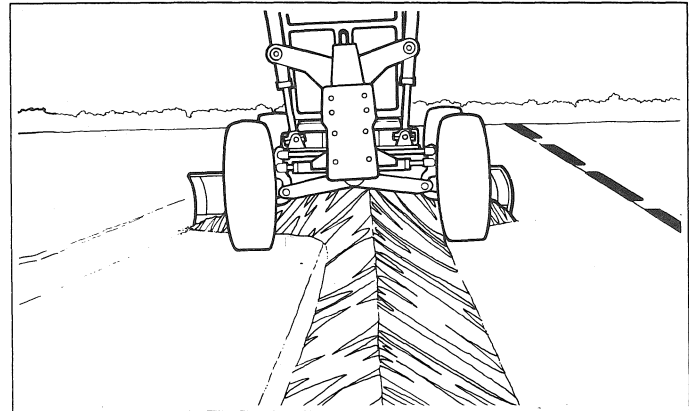
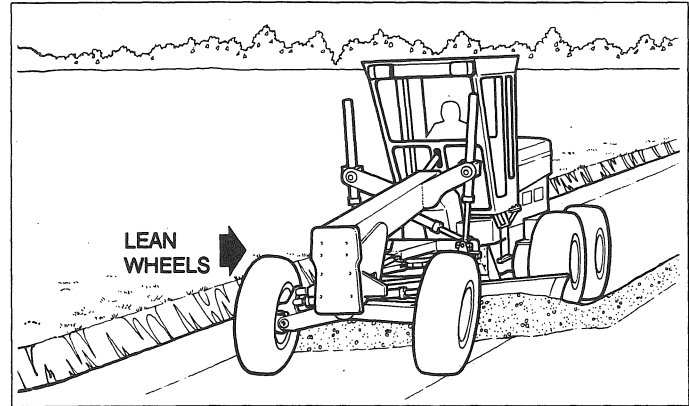
- For the next pass straighten the frame, side shift the circle and drawbar assembly and center it under the frame. Position and angle the moldboard as required to spread the wet material over the shoulder.

## Dragging a Shoulder (right-hand side)

Check the material you will be grading. If it is dry, use water to dampen it, resulting in a better finished surface.

- Position the right end of the moldboard in-line with the outer edge of the front right-hand wheel.
  - Angle the moldboard 30 to 45 degrees from the center line of the frame and tilt it forward to drag the material, not to cut it.
  - Lean the front wheels to the left to counteract side thrust.
  - Deposit the material outside the left-hand tandem wheels onto the edge of the road.
- 
- On the next pass, collect the windrow from the edge of the road and feather the material back onto the shoulder surface. Remember to adjust the moldboard to create a gentle slope towards the ditch.
  - Ensure you clean up the road surface before allowing traffic to use the road way.

Descriptive procedures and illustrations shown are for right-hand side grading. For left-hand side grading, lean the front wheels and position the moldboard opposite to the description and illustrations shown.

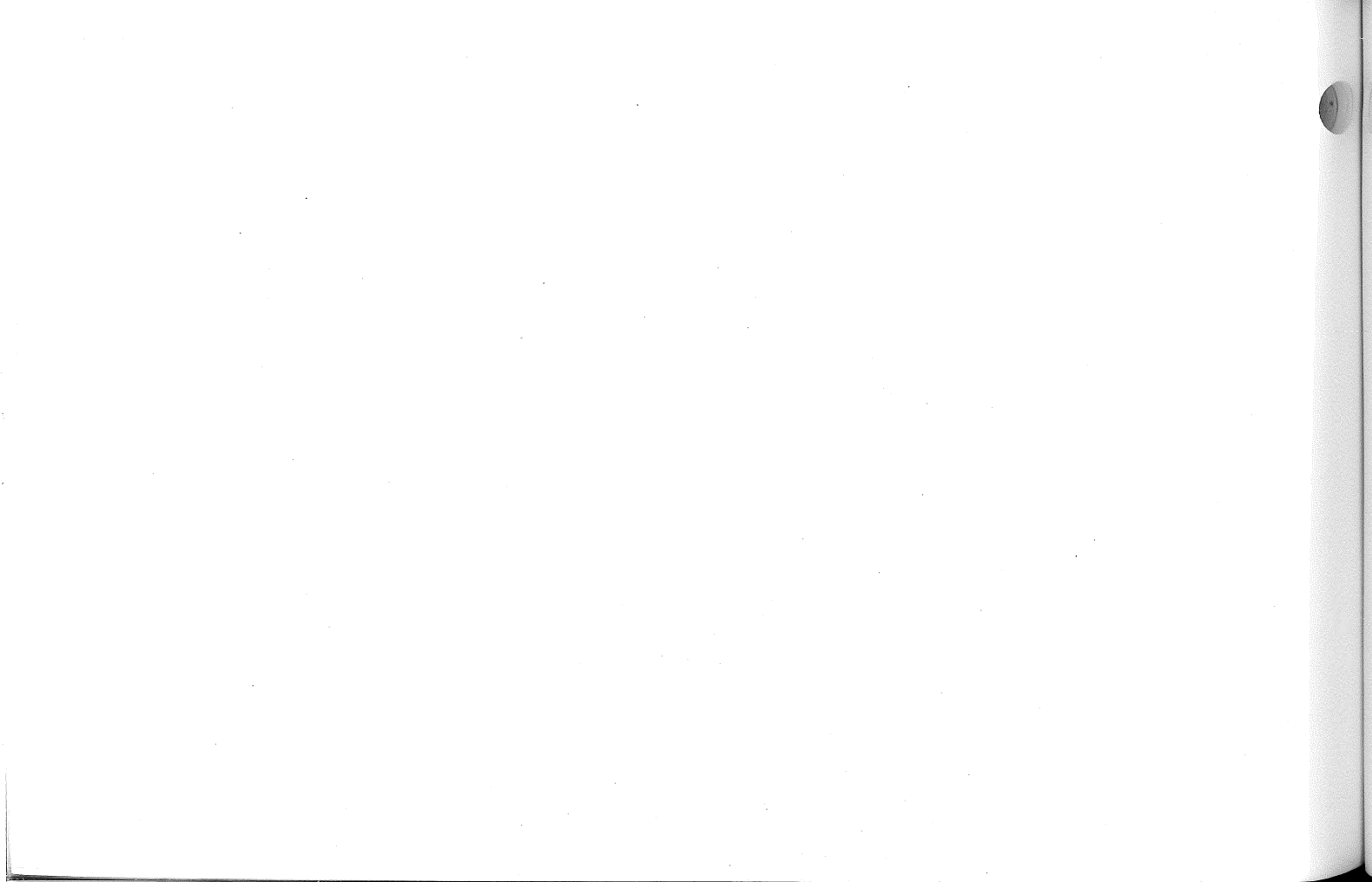




# **Towing and Transporting**

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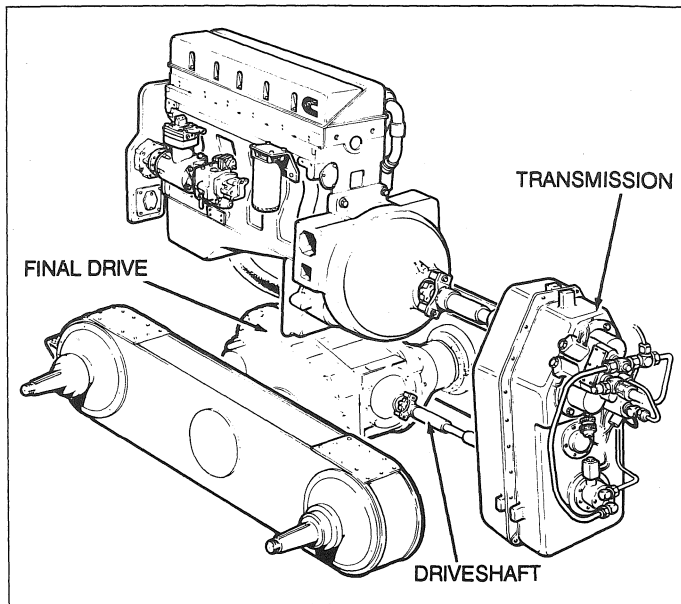
## Towing

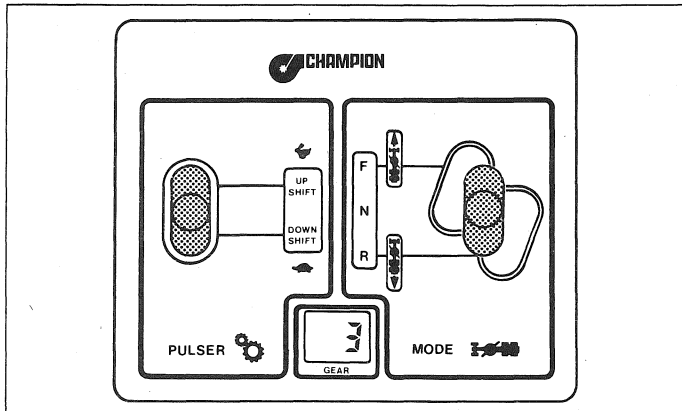
### **⚠ WARNING**

Improper towing methods or equipment could result in severe personal injury or death. Read and understand the towing instructions and precautions in this manual.

- Do not tow the grader if long distance moving is required. Transport it.
- Operator must be in the operator's seat to control steering and braking when towing the grader.
- Champion does not recommend towing the grader with the engine shut down. Braking and steering capabilities are reduced with the engine shut down.

- If the engine will not run, you must disconnect the drive-shaft between the transmission and the final drive.



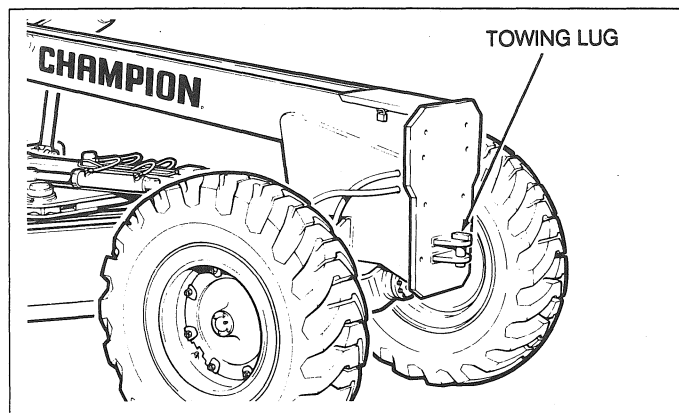


### Towing continued

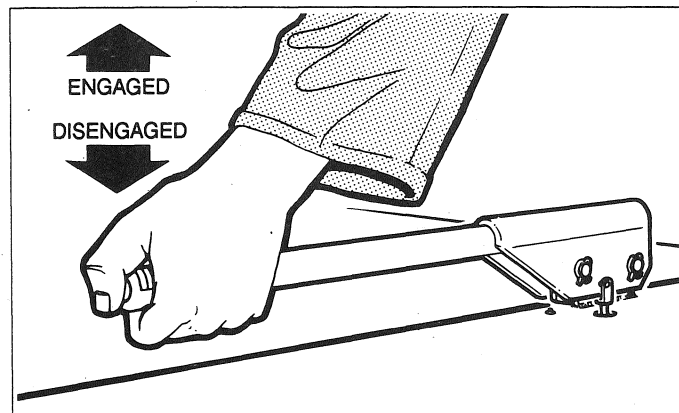
- If the engine runs, ensure the transmission mode lever is in NEUTRAL. Tow the grader with the engine running.
- If the final drive is damaged, do not tow the grader.
- Do not attempt to start the engine by towing. Damage to the transmission will result.
- Shielding of the operator against towline breakage must be provided.
- Do not tow the grader faster than 5 mph (8 km/h).
- Be sure the towing machine has sufficient braking capacity to stop the towed load.
- If the towed grader cannot be braked, a tow bar or two towing machines must be used - one in front pulling and one at the rear to provide braking. Do not tow over long distances.
- Ensure the towline or bar is in good condition and is strong enough for the towing situation. Mark the center of the towline with a flag or brightly colored cloth. Ensure that a 'slow moving vehicle sign' is attached to the rear of the grader.

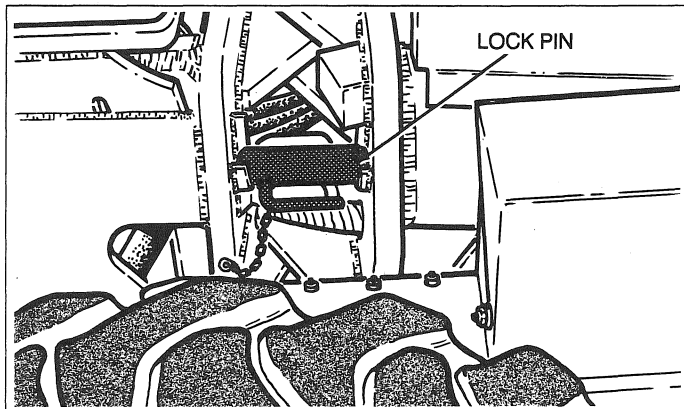
## Towing continued

- Tow the grader from the towing lug located at the front plate.
- Sudden machine movement can cause the towline or tow bar to break. Proceed gradually and smoothly.

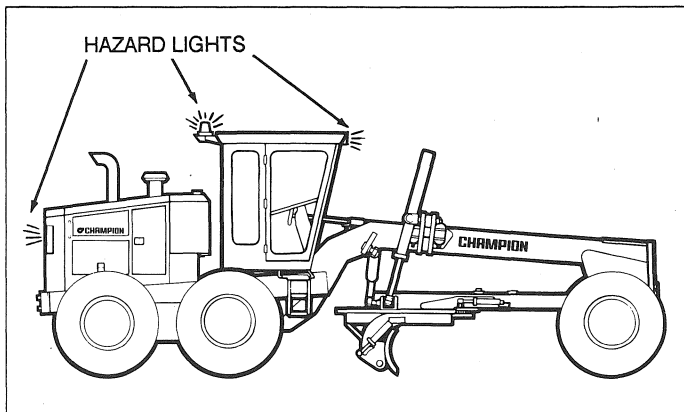


- Ensure the hand brake is working properly and is disengaged.
- Secure the moldboard and all attachments. Use chains or cables that are in good condition.



**Towing** continued

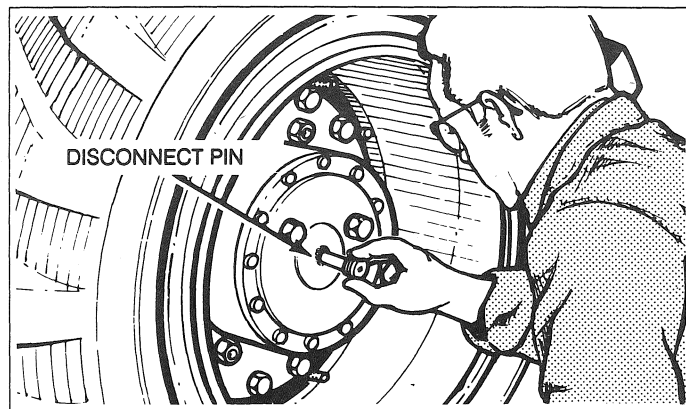
- Articulated graders must have the articulation lock pins installed.
- When turning, keep the towing angle and speed to a minimum.



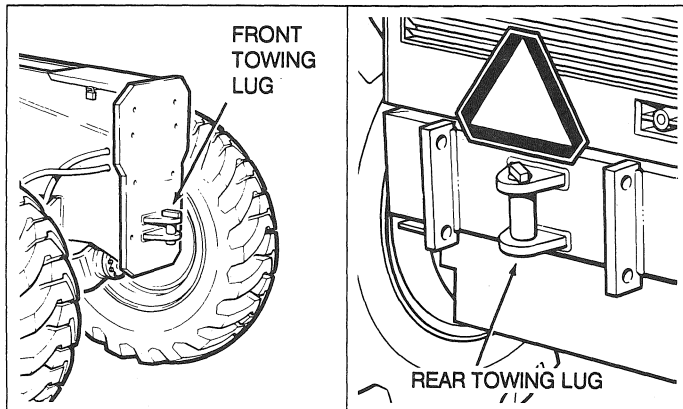
- Turn the hazard lights on while towing.

## Towing continued

- Graders equipped with All Wheel Drive, must have the disconnect pins installed in the planetary hubs prior to towing.
- Some state and local laws prohibit or limit the use of tow chains on highways. Check state and local regulations.





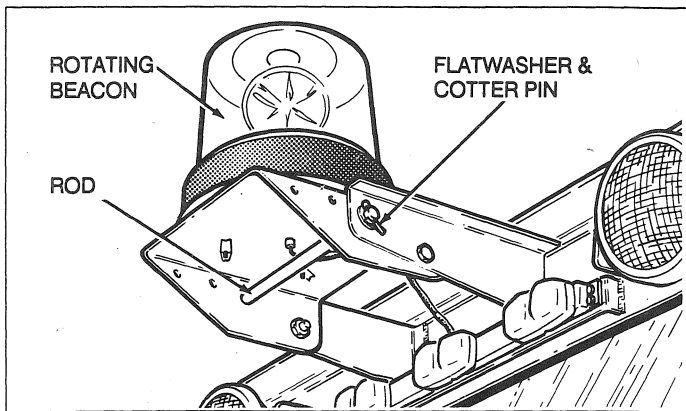


## Transporting

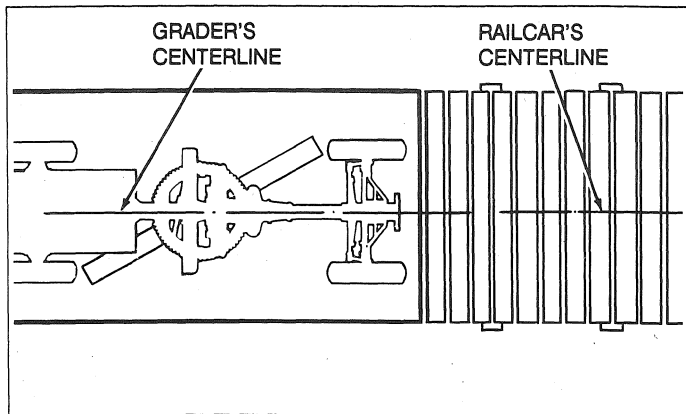
- Do not place tie-down cables or chains over or against hydraulic tubes, hoses, cylinders or valves etc. Attach tie-down cables or chains securely to the front and rear towing lugs.
- Obey all local laws concerning loading, unloading or transporting the grader. Wide load permits may be required for graders equipped with tires larger than 14.00.
- Keep the trailer bed clean.
- Use a ramp or loading dock. Ensure the ramp is strong enough and has a low angle of rise to the height of the trailer bed.
- Ensure the transporting equipment is adequate to hold the weight and size of the grader.
- Place chocks against the truck and trailer wheels.
- Load and unload the grader on a level surface.
- If the grader is an articulated model, install both articulation lock pins before loading it onto the trailer bed. **See this section** page 11-8.

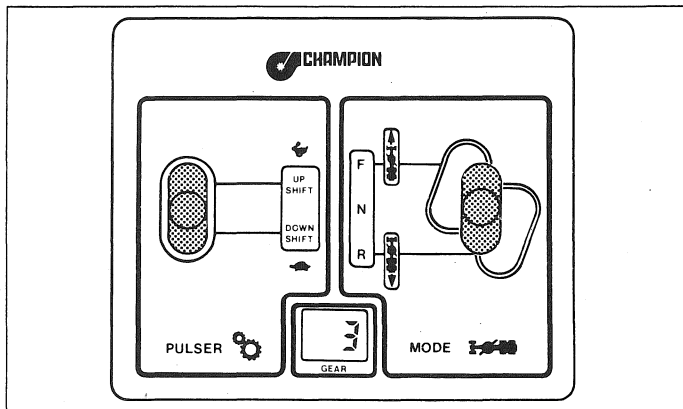
## Transporting continued

- The rotating beacon can be lowered for increased clearance. Remove the cotter pin, flatwasher and rod. Lower the beacon. Replace the rod, flatwasher and cotter pin.



- When loading the grader onto a trailer bed, drive the grader straight and centered with the width of the trailer bed. The grader's centerline must be over the trailer's bed or railcar's centerline.
- Wear seat belt when operating the grader. Refer to the section - **Driving the Grader - Seat Belt** page 8-8.

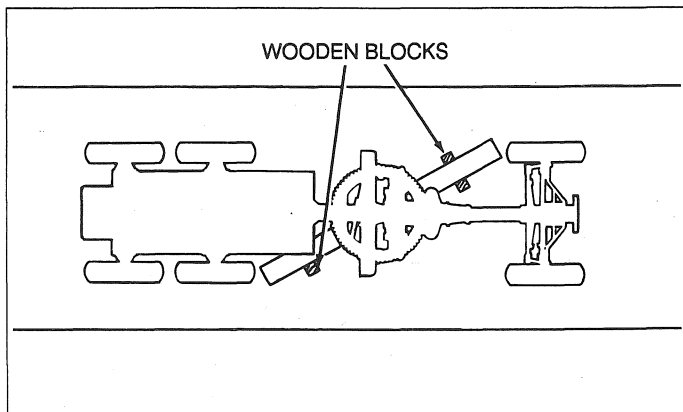




### Transporting continued

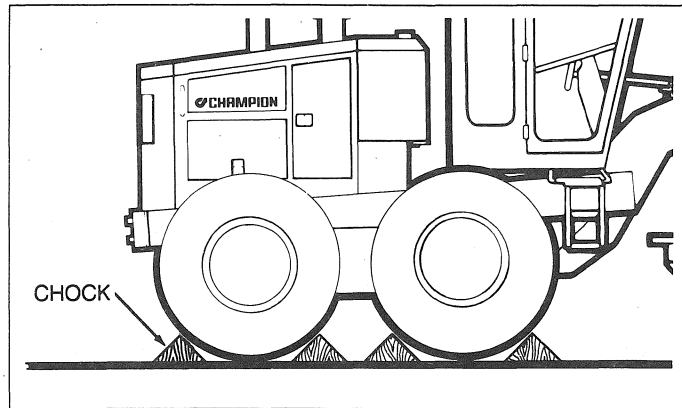
Before securing tie-down cables, position the grader on the trailer bed as follows:

1. Place the transmission in NEUTRAL and apply the hand brake.
2. Lower the moldboard lengthwise under the grader onto wooden blocks to protect the trailer bed. Do not apply down-pressure. Also lower any attachments such as a scarifier or ripper.
3. Shut down the engine.

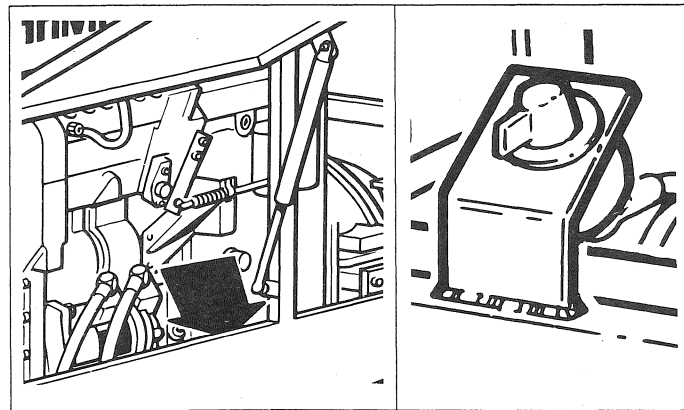


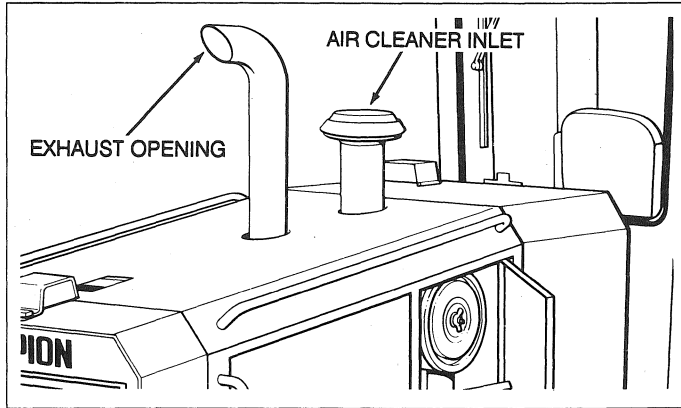
## Transporting continued

4. Install chocks at the front and rear tandem wheels. Wedge and nail the chocks in place.
5. Relieve residual hydraulic pressure by operating all the control levers.
6. Remove and retain the ignition key. Lock the cab doors.



7. Turn the battery isolation switch(es) to the OFF position.





### Transporting continued

8. Cover the exhaust opening and air cleaner inlet with heavy gauge plastic bags and secure them in place to prevent dust and moisture entering the engine. Remember to remove the plastic covers before starting the grader.

## Weights and Dimensions

- Dimensions are for graders with standard size tires and full cab with ROPS.
- Weights are approximate. See next page for attachments weights.
- Weights and dimensions subject to change without notice.
- Subtract 12 inches from height for low profile cab.

Model	Total Weight		on Front Wheels		on Rear Wheels		Length		Width		Height	
	lbs.	kg	lbs.	kg	lbs.	kg	ft.	mm	ft.	mm	ft.	mm
710/710A	27 700	12 548	8 310	3 764	19 390	8 784	27'-8"	8 433	8'-2"	2 489	11'-1"	3 378
720/720A	30 160	13 680	9 097	4 126	21 063	9 554	27'-7"	8 407	8'-2.5"	2 502	10'-11.5"	3 340
730/730A	32 160	14 588	9 755	4 425	22 405	10 163	27'-8"	8 433	8'-4.5"	2 553	11'-0"	3 353
740/740A	34 015	15 429	10 205	4 629	23 810	10 800	28'-2"	8 585	8'-4.5"	2 553	11'-0"	3 353
750/750A	37 200	16 852	11 160	5 056	26 040	11 796	28'-2"	8 585	8'-7"	2 616	11'-2"	3 404
780/780A	40 500	18 370	12 150	5 511	28 350	12 859	28'-4"	8 636	8'-7"	2 616	11'-2"	3 404
All Wheel Drive System add:	1 511	685	1 110	503	401	182						

Wheel Weights each add: 250 lbs. (113 kg)

**Attachments Weights**

<b>Attachments</b>	<b>lbs.</b>	<b>kg</b>	<b>Attachments</b>	<b>lbs.</b>	<b>kg</b>
Push Block	700	318	A-Frame	800	362
Dozer with A-Frame	1 600	726	One Way Plow with A-Frame	2 350	1 068
Scarifier	1 550	705	'V' Plow with A-Frame	2 776	1 259
Ripper	2 100	953	Snow Wing with Masts	3 100	1 406
Windrow Eliminator	1 300	362	Snow Wing	1 400	634

**All Wheel Drive**

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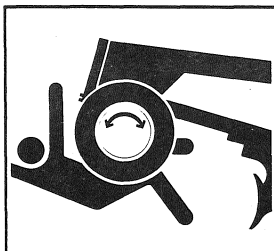
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## All Wheel Drive Safety Precautions

- Do not bypass or alter any switch or other component in the All Wheel Drive System. Modifications can cause premature engagement or prevent disengagement of the system. Property damage and personal injury can result.
- Do not drive the grader downhill in excess of its rated maximum speed. Excessive speed will cause damage to the wheel motors and planetary hubs.
- Do not allow the grader to coast (freewheel) downhill in NEUTRAL .
- Do not operate the All Wheel Drive System with the planetary hubs disengaged.
- Do not operate the All Wheel Drive System with the front wheels off the ground except when testing the system. Only qualified service personnel are allowed to test the system.

- Disconnect the planetary hubs before driving the grader for extended distances between work sites. This will eliminate unnecessary component wear, and extend the service life of these components.
- Disconnect the planetary hubs before towing a grader equipped with All Wheel Drive.
- Use clean, new oil and the cleanest possible shop practice when adding oil to the All Wheel Drive System. Small amounts of contamination can cause excessive wear to precision components, reducing service life.
- Do not use any oil or filter other than those recommended by Champion.
- Keep hose connections clean and tight to prevent contaminants from entering the system.
- Use extreme care around All Wheel Drive System components and hoses. The All Wheel Drive System operates at a higher pressure than most hydraulic systems. A high pressure leak could result in personal injury.



### **⚠ WARNING**

**Wheels may rotate unexpectedly when raised off the ground. Keep clear when engine is running.**

### All Wheel Drive Safety Precautions continued

- Check the All Wheel Drive System oil. Never operate the system with a low oil level. If a loss of oil or charge pressure occurs, stop the grader as quickly as possible and shut down the engine. Loss of fluid can result in component damage. Report the problem and have it repaired by a qualified service technician.
- Have defective components repaired or replaced immediately. Using defective components may cause serious damage to other parts in the system.
- Turn the All Wheel Drive System OFF and shut down the engine before leaving the operator's cab or when performing maintenance.

### All Wheel Drive Pre-start Checks

Make the following checks for graders equipped with All Wheel Drive in addition to those detailed in the section **Pre-start Checks** page 7-23

### Daily Pre-start Checks-Hydraulic Reservoir

The hydraulic reservoir is located between the fuel tank and the cab.

- Locate the level sight glass on the left-hand side of the grader, on the reservoir.
- Check the oil level in the sight glass.
- Add hydraulic oil as required. Refer to the section **Maintenance and Lubrication - Lubrication Specifications** page 14-26, for the correct oil type.

### Oil Cooler

The oil cooler is located at the rear of the grader mounted between the radiator and the radiator grille.

- Inspect the oil cooler for clogged or damaged cooler fins.
- If necessary, remove the radiator grille and clean the oil cooler.
- Clean the cooler with compressed air in the opposite direction to the normal air flow.

### WARNING

**When using pressurized air for cleaning, wear a face shield and protective clothing. Do not direct the air hose nozzle at yourself or others. Severe personal injury could result.**

## Hoses and Fittings

Inspect all hoses and fittings for wear, cracks or leaks.

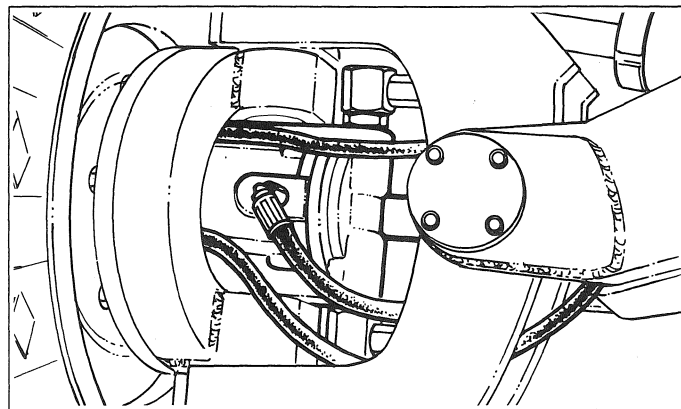
### **⚠ WARNING**

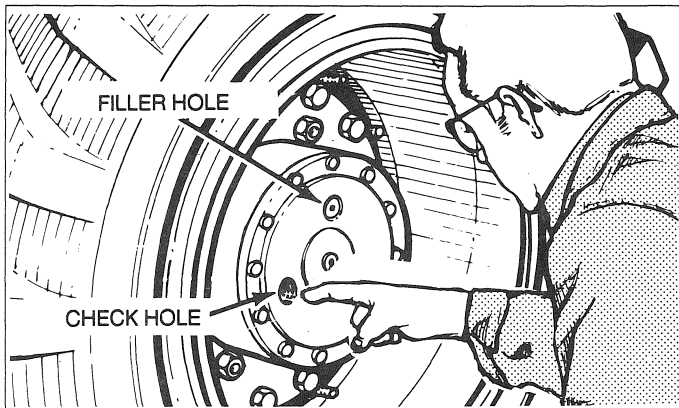
Sudden loss of any fluid indicates a serious malfunction. Stop grader. Consult a qualified service technician.

### **⚠ WARNING**

Fluid escaping under pressure can penetrate the skin causing serious injury. Relieve all pressure before disconnecting hoses. Do not use your hand to check for hydraulic leaks

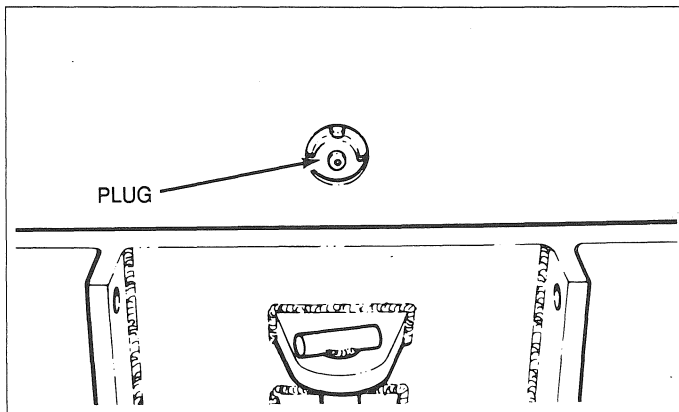
- If contact occurs seek medical attention immediately.
- Use cardboard or a similar material to check for hydraulic leaks.





### Weekly Pre-start Checks- Planetary Hubs

- Clean the planetary hub, especially the filler and check hole areas.
- Rotate the wheel until the oil filler hole is above the center hole and the oil check hole is left of the center hole.
- Remove the plug from the oil check hole. The oil should be at this level.
- Add oil through the filler hole as required. Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct oil type.
- Clean, inspect and install the plug(s).



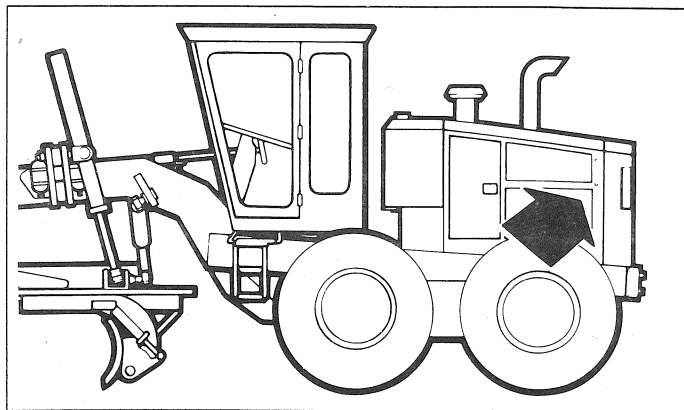
### Pump Drive Gearbox Oil Level

- To check the pump drive gearbox oil level, remove the plastic plug from the access hole in the gearbox cover plate.
- Remove the socket head plug from the gearbox housing. A small amount of oil should flow from the hole.
- Add more oil through the same hole as required. Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** page 14-27, for the correct oil type.

## All Wheel Drive Hydraulic Filter

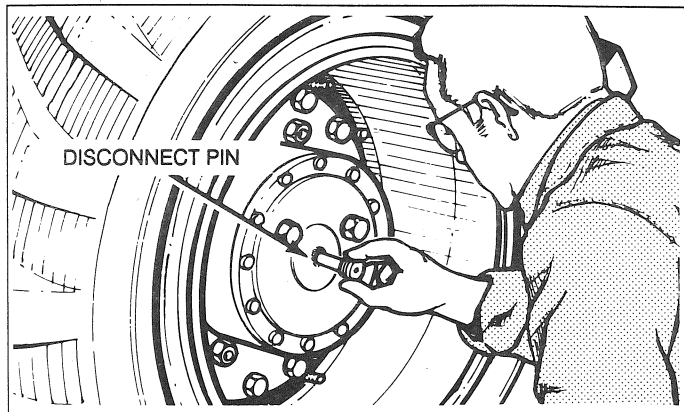
The All Wheel Drive hydraulic system oil filter is located inside the left rear engine compartment door at the top of the fan shroud.

- Replace it every 1000 hours of operation.
- The filter element is a spin-on type and can be removed with a filter wrench.
- Clean any accumulated dirt from the old filter before removing it.
- To install a new filter element, first apply a coating of clean hydraulic oil to the gasket.
- Install the new element on the filter head and hand tighten only.
- Do not use a filter wrench to tighten the element.

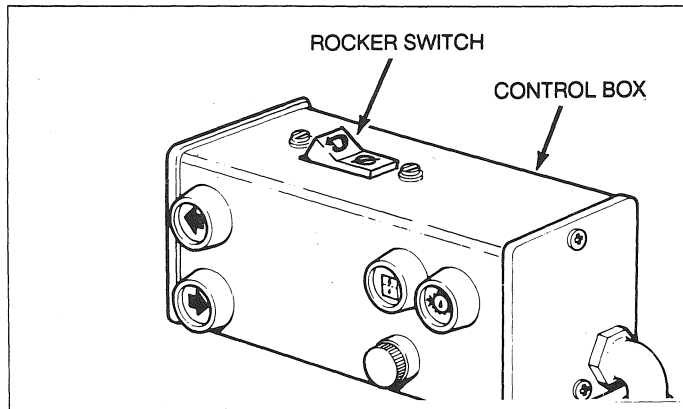


## Controls and Warning Lights- Planetary Hub Disconnect

- Disconnect the planetary hubs if you are not using the All Wheel Drive System for an extended period of time.
- Clean the planetary hub, especially around the the dowel pin plug hole.
- Remove the center plug.
- Install the dowel pin plug (one each side; found in the toolbox or the All Wheel Drive controller box bracket) in the center hole.
- Reverse this procedure to reconnect the hubs.



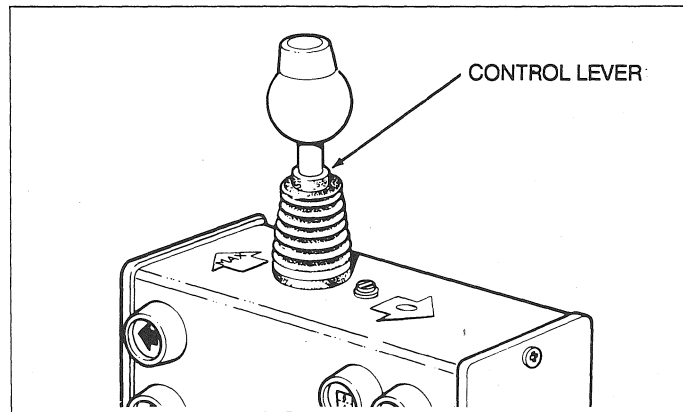




### Control Box

The control box is mounted on the right-hand side of the cab. It contains all the controls and warning lights to operate the All Wheel Drive System. These features are fully described on the next few pages.

The system is activated by a rocker switch on the top of the control box. On earlier machines, a control lever activates the system.



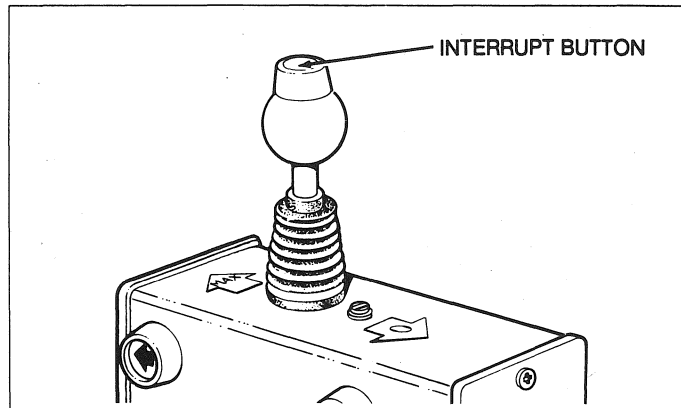
### Control Lever (Up To S/N 21528)

The control lever allows the operator to vary the torque at the front wheels.

- Move the lever to the '0' position to stop all torque at the front wheels. Lubrication pressure is maintained throughout the system.
- Move the lever to the 'MAX' position to obtain maximum torque at the front wheels.
- To vary the torque, choose a lever position between 'MAX' and '0'.
- Heavy attachments on the front end, or a change in tire pressure can affect front end performance. Compensate for these factors by adjusting the control lever.

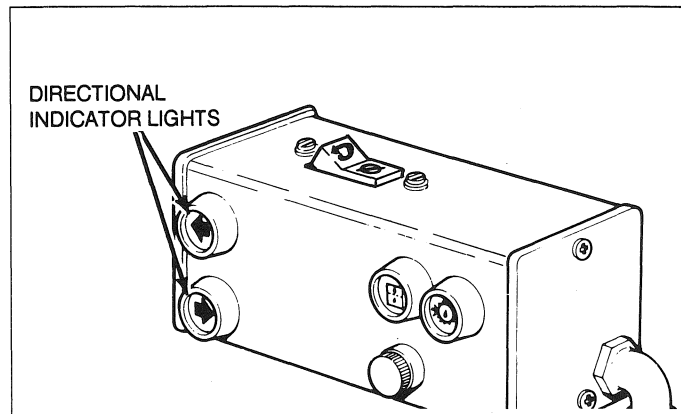
## Interrupt Button (Up To S/N 21528)

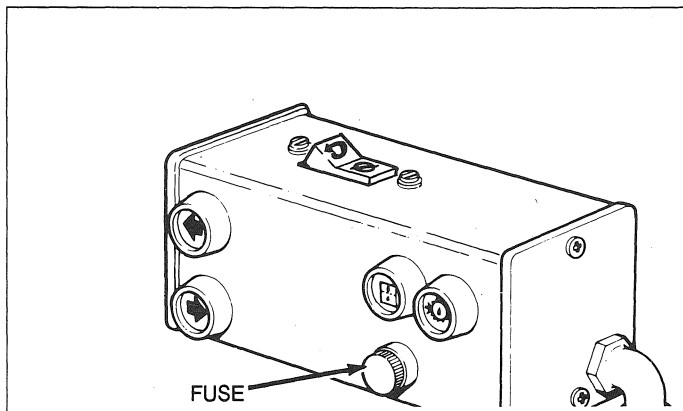
- The interrupt button is located at the top of the control lever.
- Push the interrupt button to momentarily disengage the system.



## Directional Indicator Lights

The directional indicator lights indicate the direction of travel.

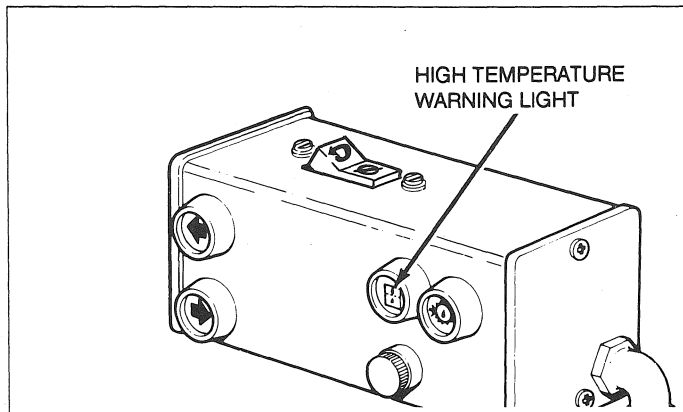




## Fuse

The fuse protects the electrical circuit from excess current.

- Replace a failed fuse by rotating the fuse holder counter-clockwise.
- Remove it from the control box and discard the old fuse.
- Replace with a 3AG slow blow fuse.
- If the fuse fails repeatedly, do not attempt to bypass the fuse or use the All Wheel Drive System.
- Report the malfunction to your supervisor and have a qualified service technician correct the problem.



## High Temperature Warning Light

If the oil temperature becomes too high, the system automatically turns off and the high temperature warning light energizes.

- Move the rocker switch to the OFF position, (on earlier models move the control lever to the '0' position).
- Allow the system to cool and investigate the cause of the overheating.
- Do not attempt to use the All Wheel Drive System until it is repaired.

## Charge Pressure Buzzer Light

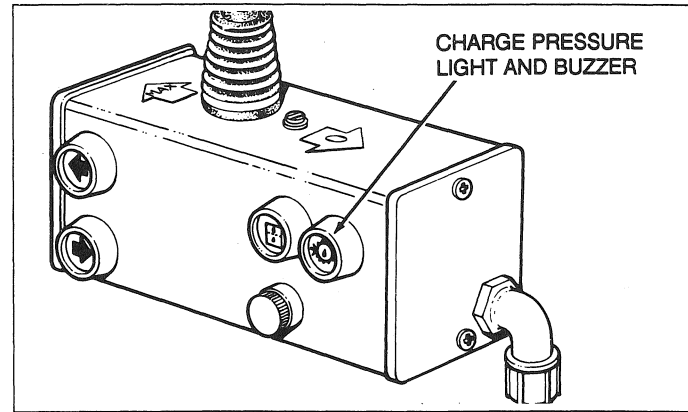
If the charging pressure drops below a safe value, the charge pressure light energizes and the buzzer sounds. Have the system repaired by qualified service personnel.

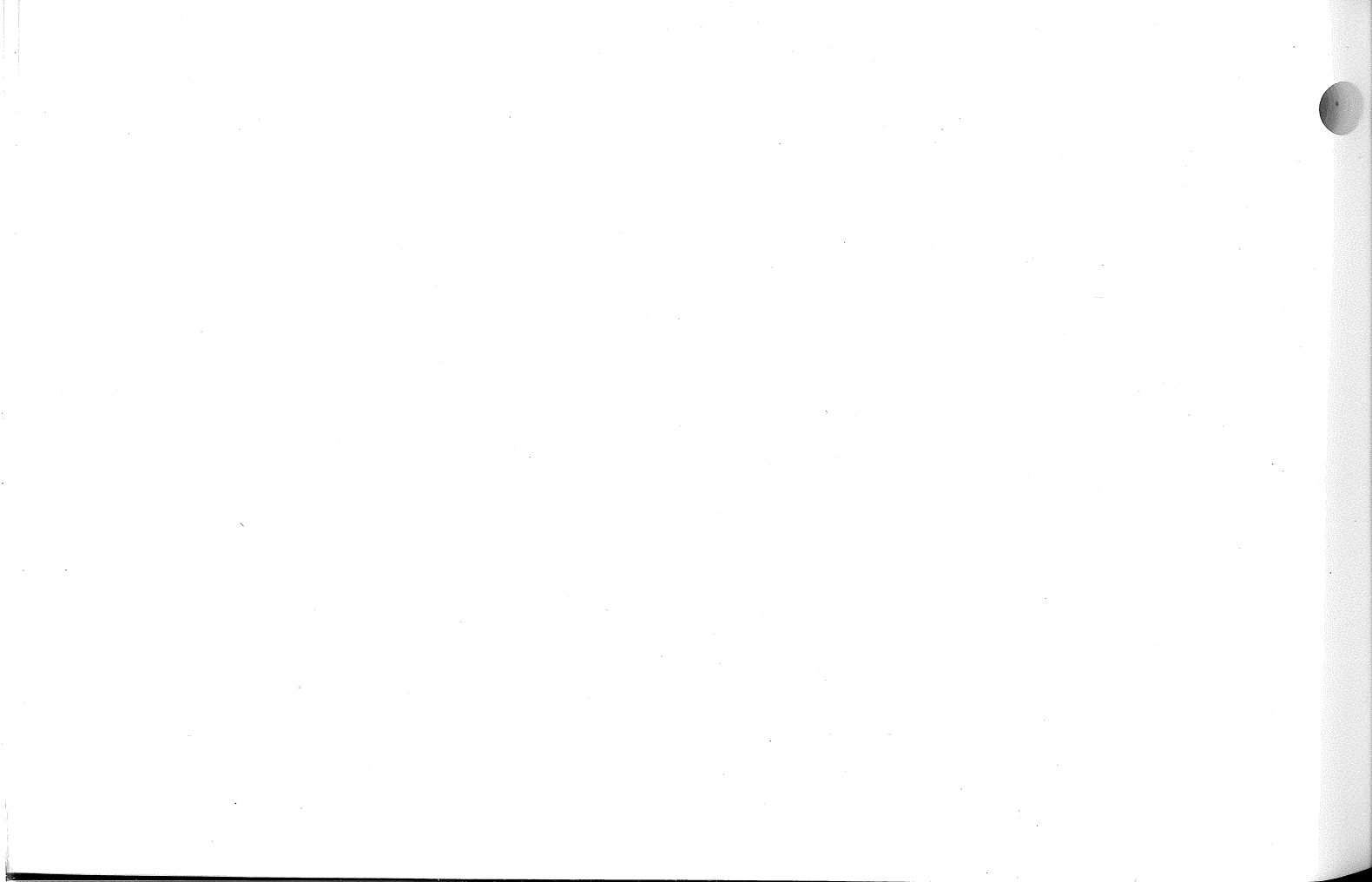
## Side Loading

You can counteract the side loads encountered when working across a slope or when grading heavy material by using All Wheel Drive. Driving the front wheels against the side loads maintains directional control.

## All Wheel Drive Applications- Traction and Steering Control

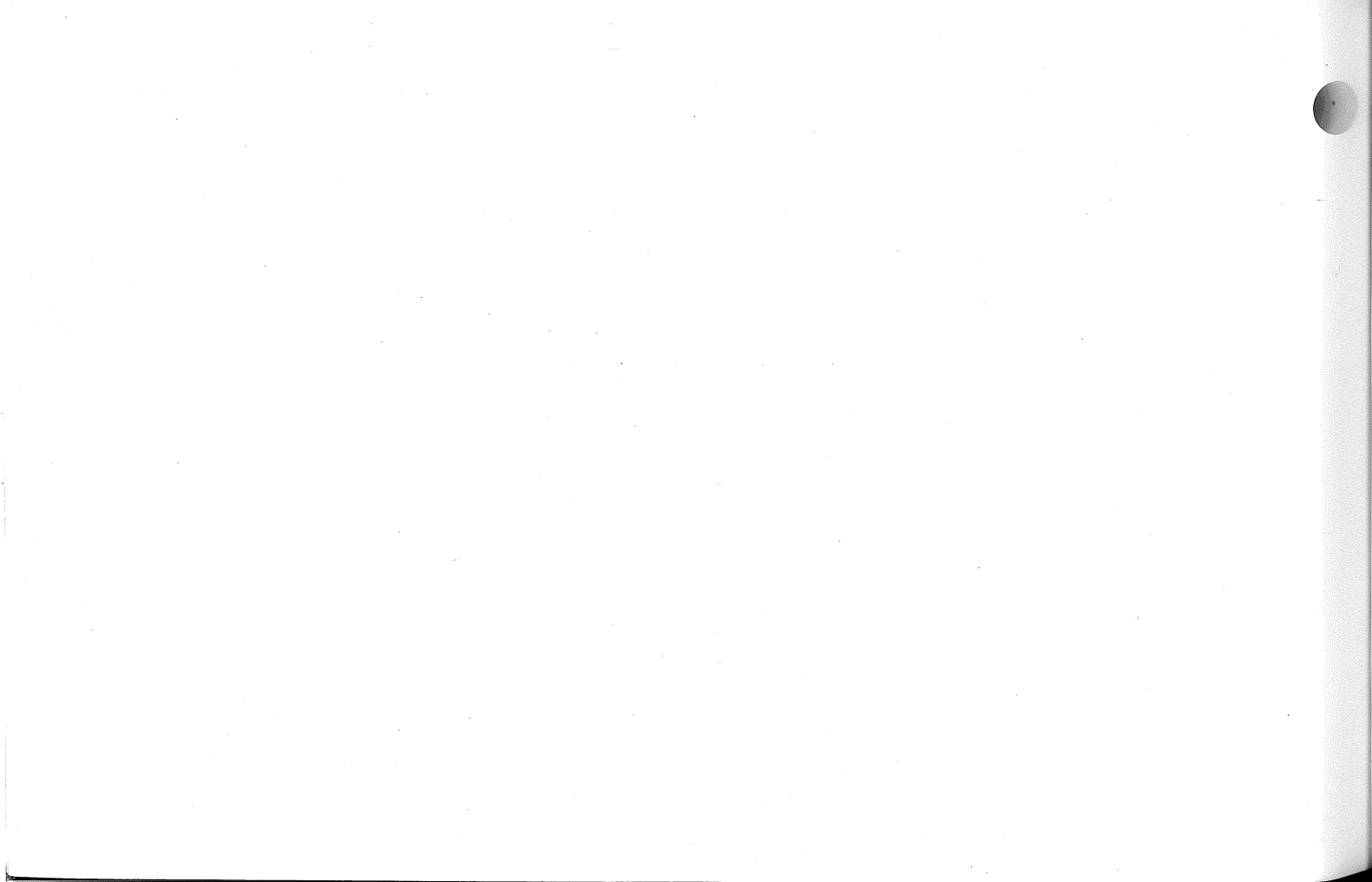
When traction is poor and the rear wheels of the grader are slipping, use the All Wheel Drive to transfer power to the front wheels. By counteracting rear wheel slip, All Wheel Drive allows the grader to carry a greater load on the blade, reduces rear tire wear and reduces shock loads on the primary drivetrain. All Wheel Drive can also give you better steering control on low traction surfaces by keeping the front wheels turning instead of sliding.





**Attachments**

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**⚠ WARNING**

Crushing hazard. Support the attachment before adjusting or servicing it. Hydraulic or mechanical failure could cause attachment to fall resulting in severe personal injury or death.

**⚠ WARNING**

Do not work on graders supported only by mold-board or attachments. Hydraulic or mechanical failure could cause grader to fall resulting in severe personal injury or death.

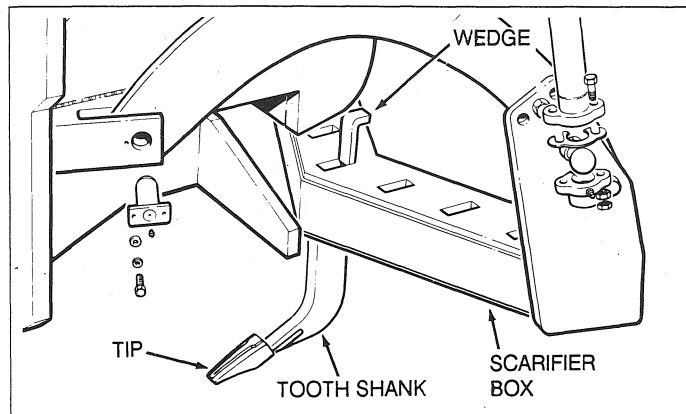
**Scarifier**

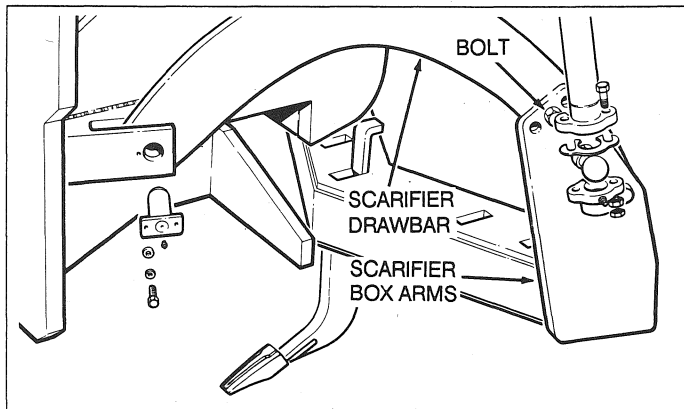
The scarifier is hydraulically raised and lowered using a control lever on the pedestal. Refer to the section - **Operating the Controls** page 9-9.

- Do not skid the teeth along the surface, always lower the teeth directly into the ground.
- Do not use the scarifier when turning, or with the frame articulated.
- Scarify downslope whenever possible. Refer to the section - **Operating Techniques** pages 10-20.

**Scarifier Tooth Depth Adjustment**

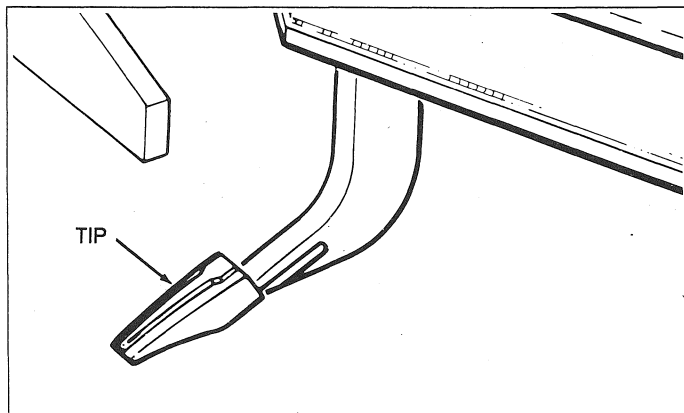
- Lower the scarifier to within several inches of the ground.
- Remove the wedge from each tooth.
- The teeth incorporate adjustment notches. Move the tooth to the desired depth and engage the appropriate notch with the scarifier box.
- Install the wedge.





### Scarifier Tooth Angle Adjustment

- Lower the scarifier to the ground.
- Remove the bolts, lockwashers and nuts that hold the scarifier box arms to the scarifier drawbar.
- Tilt the scarifier box to the desired angle and align the bolt holes. You may have to loosen the ball stud nuts. Install and tighten the bolts.



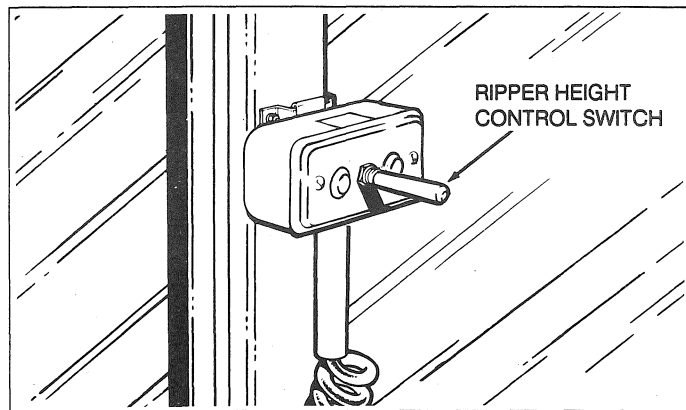
### Scarifier Tooth Tips

- The hardened tips of the scarifier teeth are replaceable. Use a hammer and drift to force the tip forward and off the tooth shank.
- Install a new tip and tap onto the shank.

## Ripper

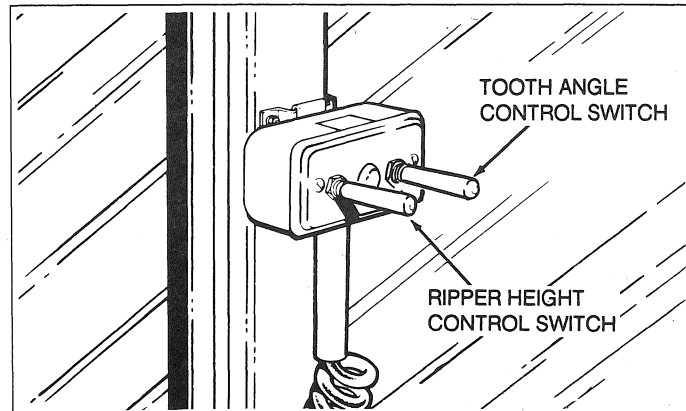
- The height of the ripper is hydraulically controlled by an electric solenoid valve.
- The ripper height control switch is a hand held control box located on the right-hand door post.
- Move the switch up to raise the ripper.
- Move the switch down to lower the ripper.

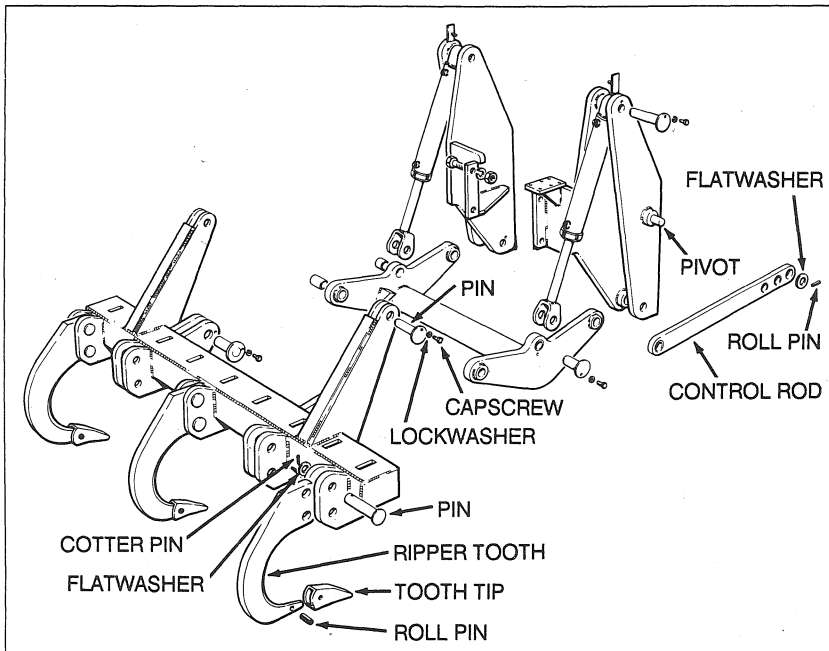
Refer to the section - **Operating Techniques** page 10-21.



## Tooth Angle Adjustment

- The ripper tooth angle is adjustable hydraulically or manually.
- For a ripper equipped with hydraulic tooth angle, an additional switch is in the hand held control box.
- Move the switch up to increase tooth angle.
- Move the switch down to decrease tooth angle.





### Manual Tooth Angle Adjustment

- For a ripper equipped with manual tooth angle, lower the ripper to the ground. Do not apply down pressure.
- Remove the roll pins and flatwashers from the control rod pivots.
- Remove the capscrews, lockwashers and pins from the control rods & ripper arms.
- Remove the control rods.
- Raise or lower the ripper slowly, to the desired tooth angle.
- Align the control rod appropriately.
- Install the flatwashers and roll pins.
- Install the pins, lockwashers and capscrews.

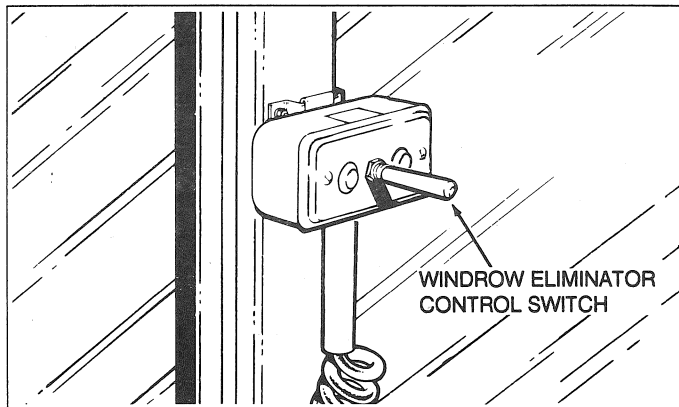
### Ripper Tooth Removal

- Lower the ripper onto a support.
- Remove the cotter pins, flatwashers and pins that hold the teeth in the ripper box.
- Remove the teeth carefully. They are heavy.
- To change ripper tooth tips, remove the roll pin. Replace the tip. Install the roll pin.

### Windrow Eliminator

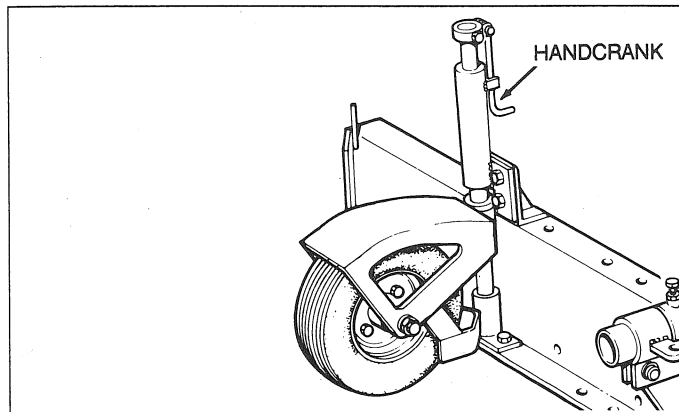
The windrow eliminator is hydraulically controlled by an electric solenoid valve. Raise or lower the windrow eliminator by using the hand held control switch box located on the right-hand door post.

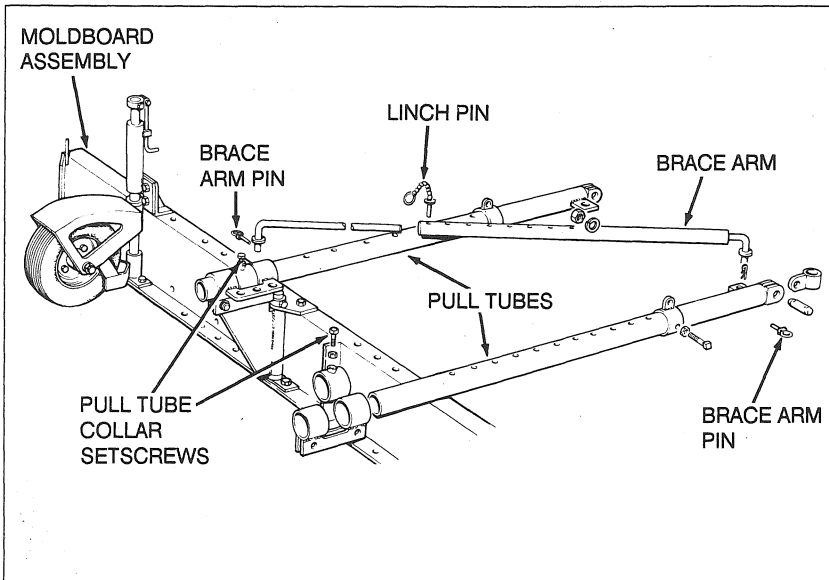
- Move the switch up to raise the windrow eliminator.
- Move the switch down to lower the windrow eliminator.



### Moldboard Height Adjustment

- Lower the windrow eliminator to the ground.
- Turn the hand cranks clockwise to increase the spreading height.
- Turn the handles counterclockwise to decrease the spreading height.



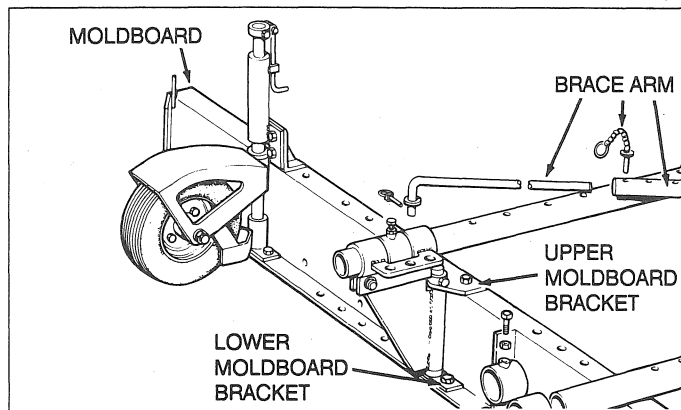


## Moldboard Angle Adjustment

- Lower the windrow eliminator to the ground.
- Remove the brace arm pins and the brace arm.
- Loosen the pull tube collar setscrews.
- Maneuver the moldboard assembly to the desired angle.
- Align the appropriate holes in the pull tubes and the pull tube collars.
- Tighten the pull tube collar setscrews.
- Adjust the brace arm length. Remove the linch pin and slide the brace arm tube in or out as required. Replace the linch pin.
- Install the brace arm and secure with the brace arm pins.

## Moldboard Position Adjustment- Right-hand to Left-hand grading

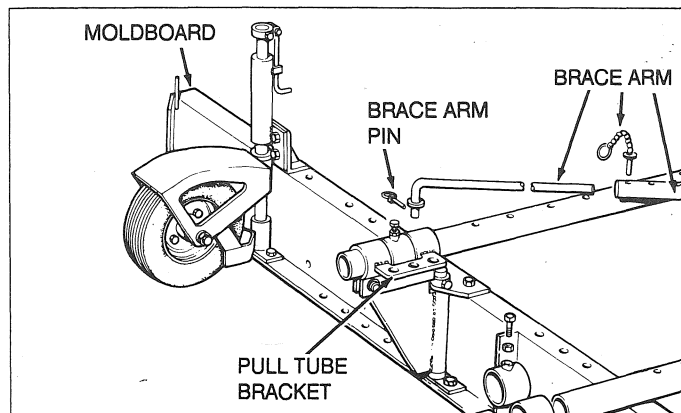
- Lower the moldboard to the ground.
- Remove the brace arm.
- Unfasten the upper and lower moldboard brackets.
- Position the moldboard to the right or left as required.
- Fasten the upper and lower moldboard brackets.
- Replace the brace arm in the opposite position.



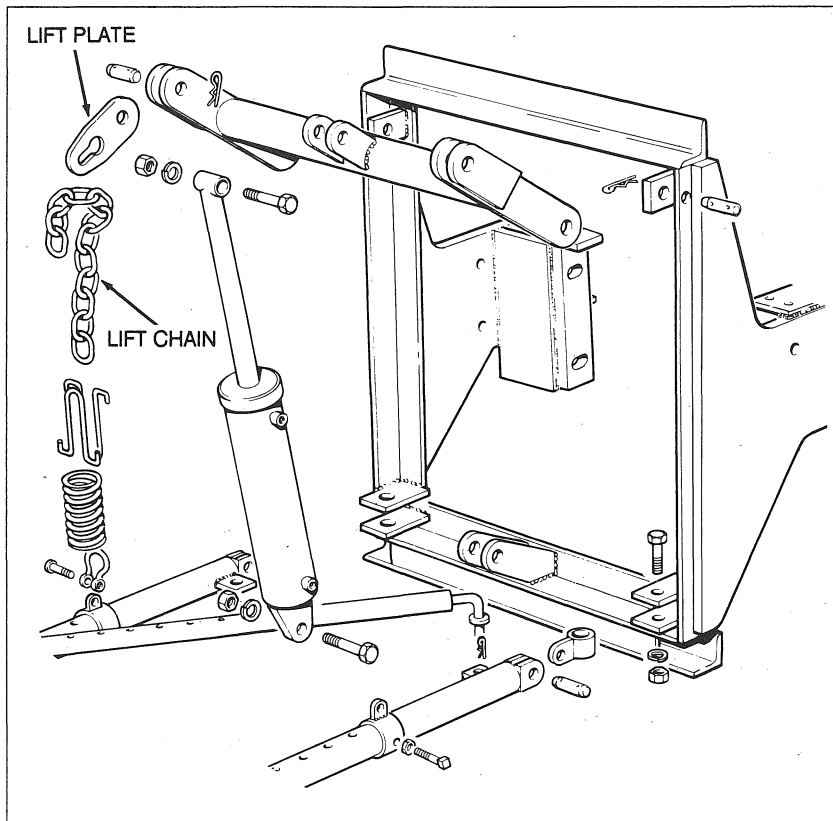
## Moldboard Position Adjustment

The moldboard is adjustable to three different positions.

- Remove the brace arm pin.
- Remove the brace arm from the pull tube bracket.
- Move the moldboard to the desired position.
- Reinstall the brace arm in the appropriate bracket hole.
- Replace the brace arm pin.







### Lift Chain Adjustment

Both ends of the window eliminator should be the same distance from the ground when raised. Adjust the lift chains if they are not.

- Lower the window eliminator until the lift chains are slack.
- Vary the number of lift chain links through the lift plates on either or both sides. Raise the window eliminator. Repeat adjustment as necessary.

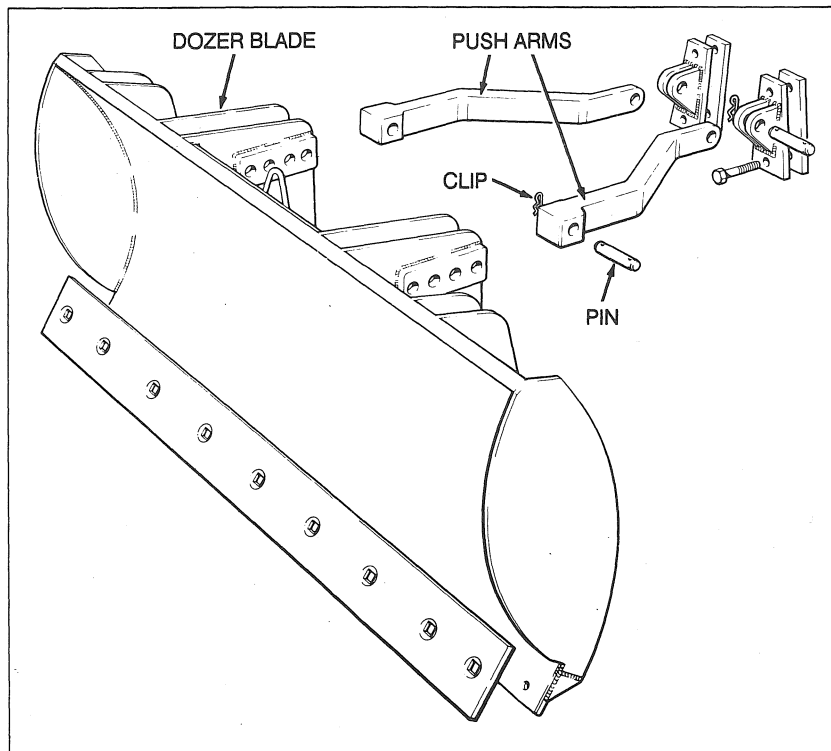
## Dozer Blade

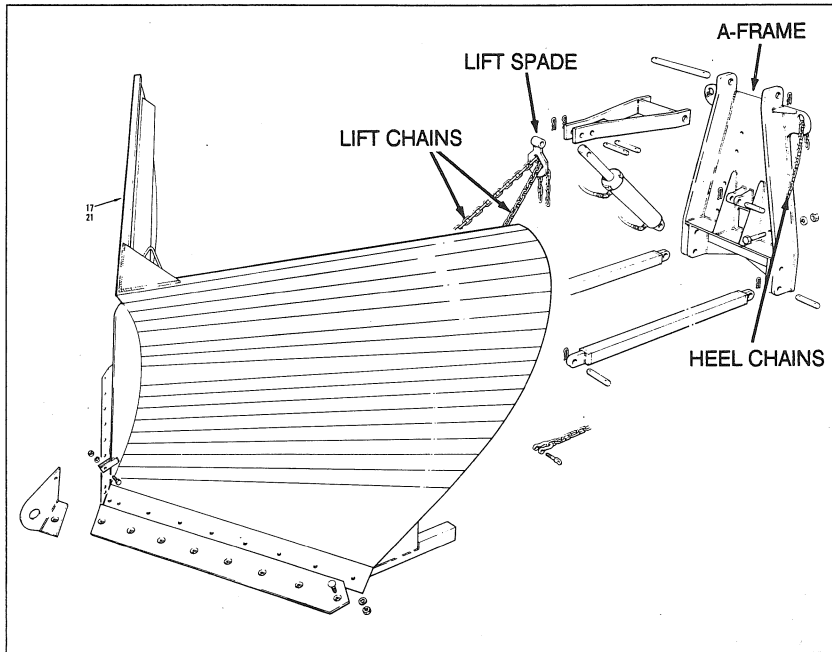
The dozer blade is hydraulically raised and lowered using a control lever on the pedestal. Refer to the section - **Operating the Controls** page 9-9.

## Blade Angle Adjustment

The blade angle has four adjustments.

- Lower the dozer blade to the ground. Do not apply down pressure.
- Remove the push arm clips and pins.
- Raise or lower the blade carefully to the desired blade angle.
- Align the appropriate holes in the blade with the holes in the push arms.
- Install the pins and clips.





## V-Plow

The V-Plow is hydraulically raised and lowered using a control lever on the pedestal. Refer to the section - **Operating the Controls** page 9-9.

## Chain Lift Adjustments

Periodically check and adjust the heel chains and lift chains. The heel chains keep the V-Plow parallel to the ground preventing the tip from digging into the ground.

- Lower the V-Plow to the ground.
- Remove any slack in the chains by adjusting the number of chain links passing through the lift spade and A-frame.
- The lift chains and heel chains must be adjusted the same on both sides.

Optional down pressure V-Plows do not have lift chains or heel chains. Adjustment is not applicable.

## Skid Shoe Adjustment

Adjust the skid shoes to allow the V-Plow to clear obstacles in the road surface.

- Lower the V-Plow to the desired height and support it adequately.
- Adjust the shoes to contact the ground.

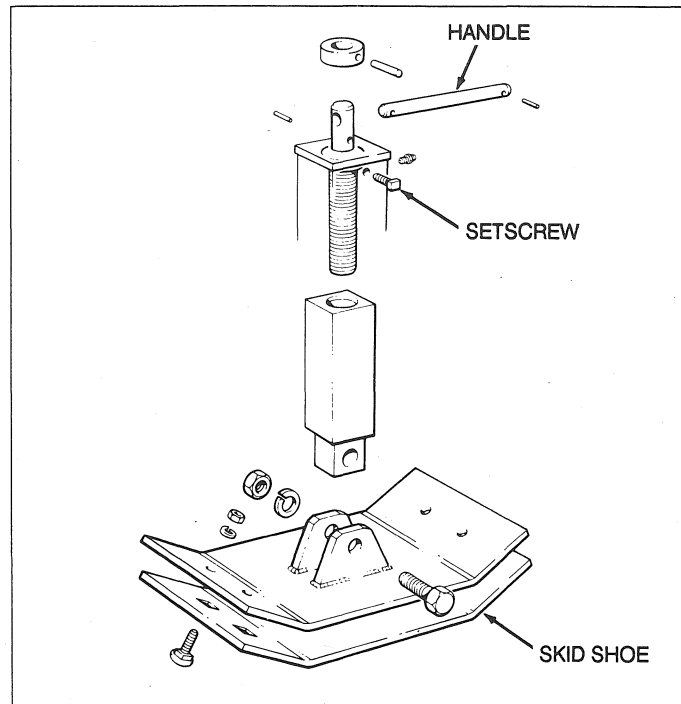
## One Way Plow

The One Way Plow is hydraulically raised or lowered using a control lever on the pedestal. Refer to the section - **Operating the Controls** page 9-9. It has several adjustments and includes a spring loaded safety trip design that allows the blade to lift if it strikes an obstacle.

## Skid Shoe Adjustment

Adjust the skid shoes to allow the plow to clear obstacles in the road surface.

- Lower the plow to the desired height and support it adequately.
- Loosen the adjuster set screws and turn the handles until the shoes contact the ground.
- Tighten the set screws.



## **One Way Plow Adjustments- Push Rod Adjustment**

The skid shoes may be adjusted to provide more clearance on either side of the plow for specific plowing conditions. This adjustment will cause the push rods to flex or twist. The twist can be removed by adjusting the stabilizer position.

- Lower the plow to the ground.
- Carefully remove the bolt that joins the stabilizer to the cross bar.
- Adjust the skid shoes to the desired plow height.
- Align the appropriate holes on the stabilizer and the cross bar.
- Install and tighten the bolt, lockwasher and nut.
- This adjustment may also be required if different size tires are fitted to the grader.

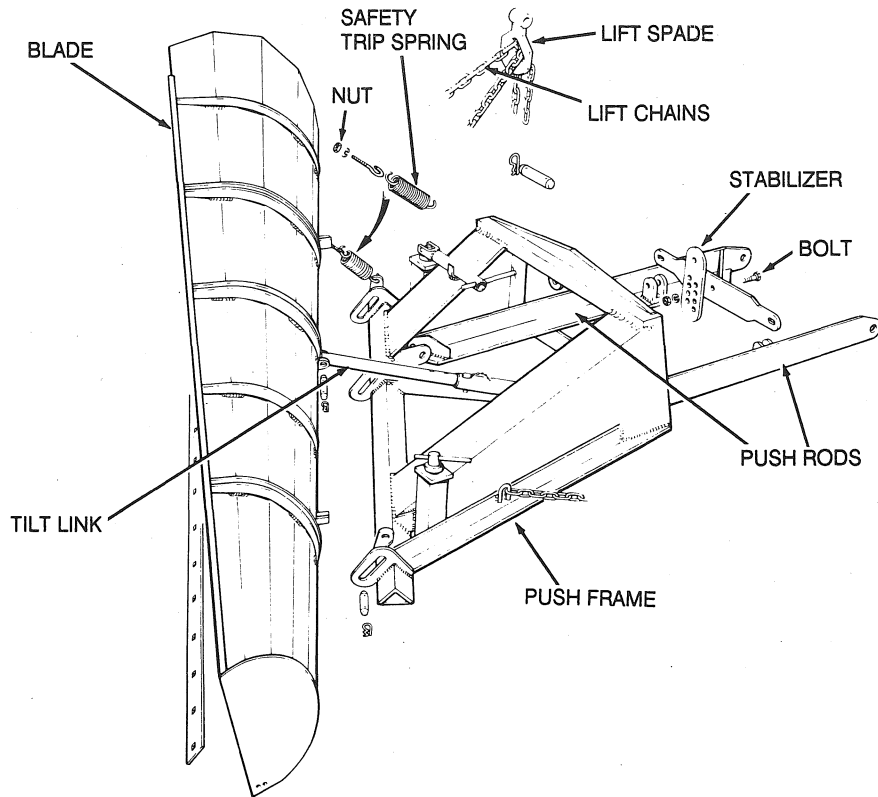
## **Blade Tilt Adjustment**

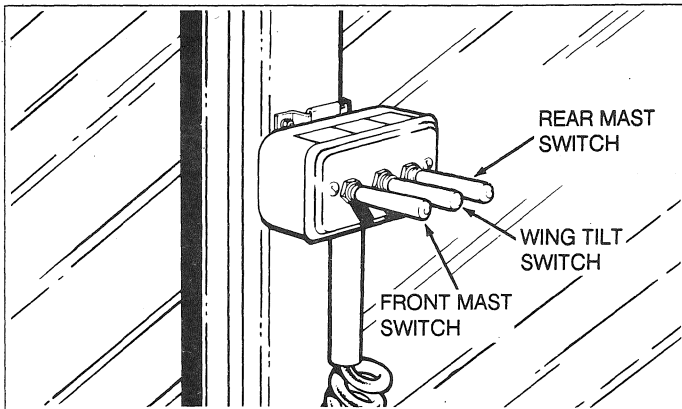
- Lower the plow to the ground.
- Release the tension in the safety trip springs by loosening the nuts.
- Remove the pin from the tilt link.
- Tilt the blade to the desired angle and align the appropriate holes.
- Install the pin.
- Apply tension to the safety trip springs by tightening the nuts.

## **Lift Chain Adjustment**

- Periodically check and adjust the lift chains at the lift spade.
- Lower the plow to the ground.
- Remove any slack in the chains by adjusting the number of chain links passing through the lift spade.

## One Way Plow Adjustments

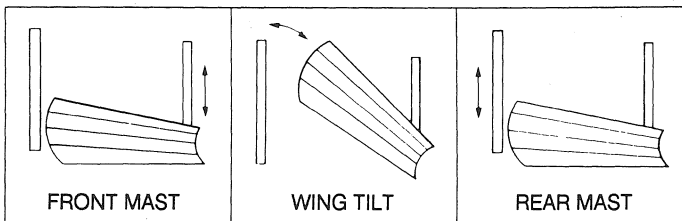




## Snow Wings

The snow wing position is hydraulically controlled by electric solenoid valves. The wing control switches are mounted in a hand held control box located on the right hand door post.

- Push up or down on the front mast switch to raise or lower the inboard end of the wing. Position it to catch snow from the moldboard or plow.
- Push up or down on the wing tilt switch to increase or decrease the angle of the wing. Angle the wing to discharge snow at the desired height.
- Push up or down on the rear mast switch to raise or lower the stand-off arms. Keep the mast end of the stand-off arms higher than the wing end to prevent wing collapse under load.



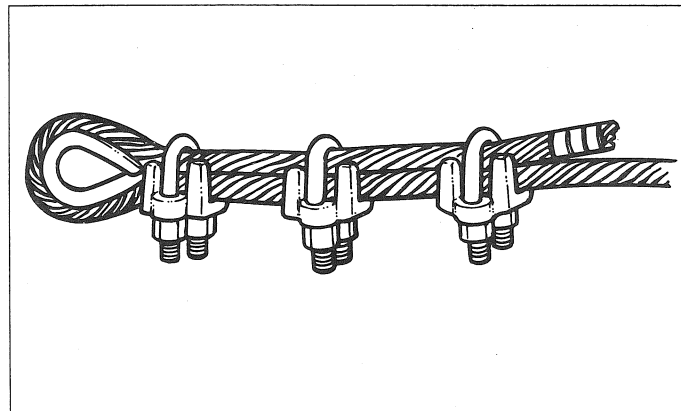
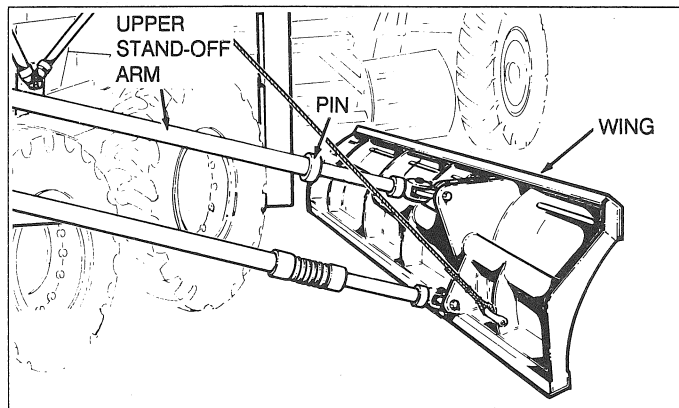
### Snow Wing Pitch Adjustment

The wing should be pitched forward enough to roll the snow off the outboard end.

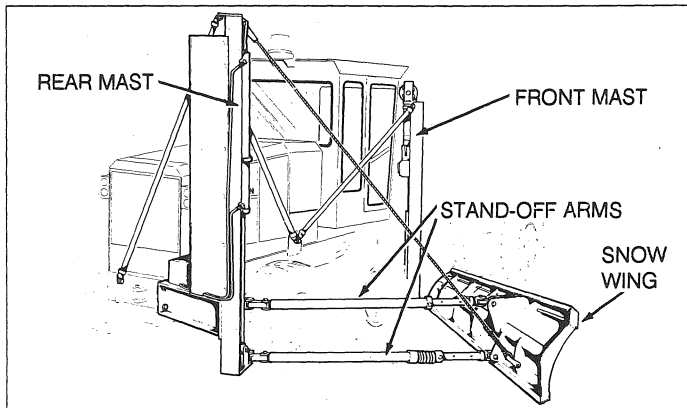
- Lower the wing to the ground.
- Remove the pin from the upper stand-off arm.
- Tilt the wing to the desired pitch, align the appropriate holes and install the pin.

### Snow Wing Tilt Cable Tension Adjustment

- Lower the wing to the ground.
- Lower the stand-off arms to the bottom of the mast.
- Retract the wing tilt cylinder.
- Remove the ice shield from the rear mast.
- Loosen the cable clamps and pull the cable tight. Tighten the clamps.
- Operate the wing tilt switch to raise and lower the wing several times to seat the cable in the sheaves.
- Lower the wing to the ground.
- Loosen the clamps and extend the wing tilt cylinder 6 inches (15 cm.)
- Pull the cable tight and torque the clamps to 65 lbf.ft. (88 N.m). Always use 3 cable clamps.
- Operate the wing tilt switch to raise the wing slightly and check the cable clamp torque.
- Cut off excess cable, but leave enough for future adjustment.
- Replace the ice shield.







### Snow Wing Position For Ridding

- Lower the stand-off arms to the bottom of the mast.
- Raise the wing toward the rear mast but stop halfway to prevent the stand-off arms from contacting each other.
- Raise the stand-off arms 12 to 18 inches (30 to 46 cm.)
- Continue to raise the wing as close to the rear mast as possible.
- Secure the wing with the safety chain.
- Operate the front mast switch to remove any slack in the front mast cable.

### **⚠ WARNING**

Ensure the snow wing is fully raised when not in use and secured with the proper chains. Hydraulic or mechanical failure could cause the snow wing to fall resulting in severe personal injury or death.

# Maintenance and Lubrication

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## Service Position

Before making any service, maintenance or inspection procedure, the grader must be placed in the **Service Position**.

1. Park the grader on a level surface.
2. Place the transmission in NEUTRAL and apply the hand brake.
3. Lower the moldboard and all attachments to the ground. Do not apply down-pressure.
4. Shut down the engine.
5. If the grader is an articulated model, install both articulation lock pins.
6. Install chocks at the front and rear tandem wheels. Wedge the chocks in place.
7. Relieve residual hydraulic pressure by operating all control levers.
8. Some hydraulic circuits may contain lock valves. Operating the control levers in these circuits will not relieve residual hydraulic pressure. Such pressure must be relieved by loosening a fitting or electrically activating the solenoid valve. Wear face and eye protection. Danger of spraying oil!

9. Fasten a 'DO NOT OPERATE' or similar warning tag on the steering wheel.

10. Remove and retain the ignition key.

11. Turn the battery isolation switch(es) to the OFF position.

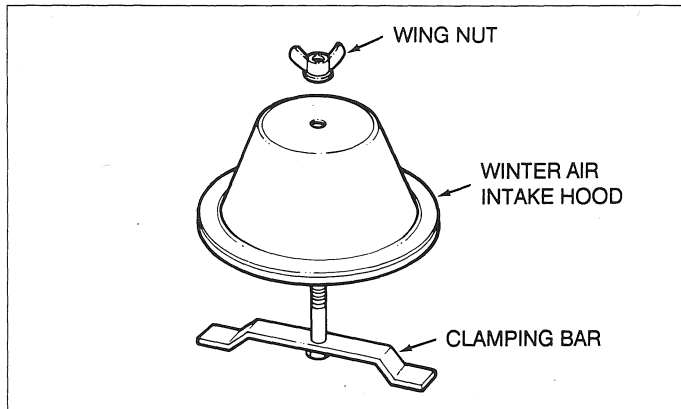
12. If the service procedure includes welding, you must disconnect the following items:

- a) The negative battery cable(s).
- b) Positive battery cable(s).
- c) Main power supply harness at the transmission controller.
- d) Transmission wiring harness at the transmission controller.
- e) Alternator wiring harness.

Connect the arc-welder ground cable adjacent to the work area. Install the battery box cover(s). After completing your welding procedure, connect items a) through e) in the reverse order. Ensure to connect the negative battery cable(s) last.

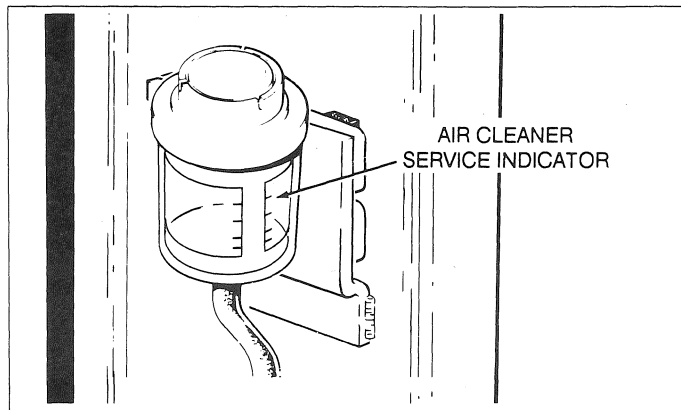
13. Allow the engine and hydraulic system to cool before working in these areas.

14. Be aware of other service personnel in your work area.



### Winter Air Intake Hood

Use the winter air intake hood in place of the air intake stack and rain cap when clearing snow. Installing the winter air intake hood prevents snow clogging the air filter assembly.



### Engine Air Filter Elements

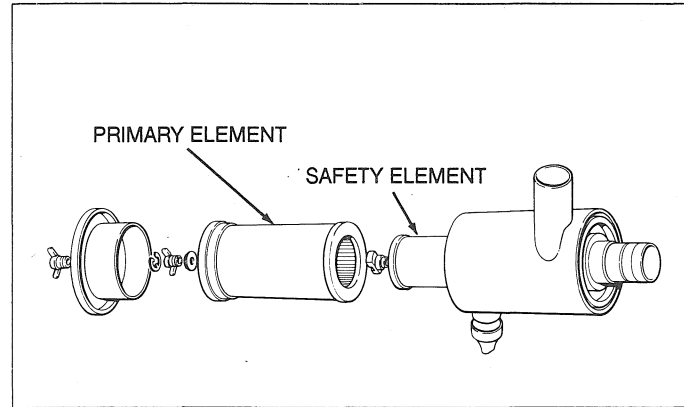
Champion graders are equipped with service indicators which show the actual condition of the filter elements. Service the primary element only when the indicator reaches the red 25 in. (635 mm) line on the transparent body. To reset the indicator after service, press the button at the bottom of the body.

### **⚠ WARNING**

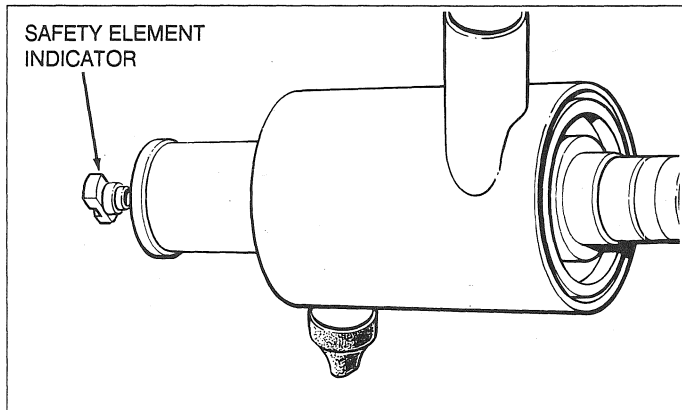
When using pressurized air for cleaning, wear a face shield and protective clothing. Do not direct the air hose nozzle at yourself or others. Severe personal injury could result.

## Engine Air Filter Elements continued

- To service the air cleaner, remove all the dirt from around the housing cover.
- Remove the wing nut and cover.
- Remove the primary element from the housing. Take care not to damage either the primary or safety elements.
- Using regulated compressed air, clean the primary element. Always direct the pressurized air from inside the element outward and in the opposite direction of the normal air flow. High air pressure can destroy the element. Hold the air nozzle 1 to 2 in. (25 to 50 mm) away from the filter element.
- Carefully check the element, replace it if it shows any signs of damage. Re-use of a damaged element can cause contamination of the engine.
- Remove any dirt from inside the housing by wiping with a damp cloth.
- Do not attempt to clean the primary element by striking it. This can easily damage the element.







### Engine Air Filter Elements continued

- Check the safety element indicator. If the indicator shows a small green dot in the indicator window, the element is good. Do not remove the safety element. If the window is completely red, the element is clogged.
- Clean the air cleaner housing completely and remove the indicator and safety element.
- Install a new safety element.
- Apply suction to the indicator window to reset it.
- Install the indicator and tighten it only enough to seat the safety element firmly inside the air cleaner housing.
- Install the primary element, cover and wing nut. Tighten the wing nut by hand.
- Check the tubes and connections leading from the air cleaner to the engine. Look for loose clamps, cracks, or accumulation of dust which may indicate a leak. Periodically check the restriction indicator hose and the vacuator valve to ensure they are unclogged and in good condition.

### All Wheel Drive Hydraulic System Filter

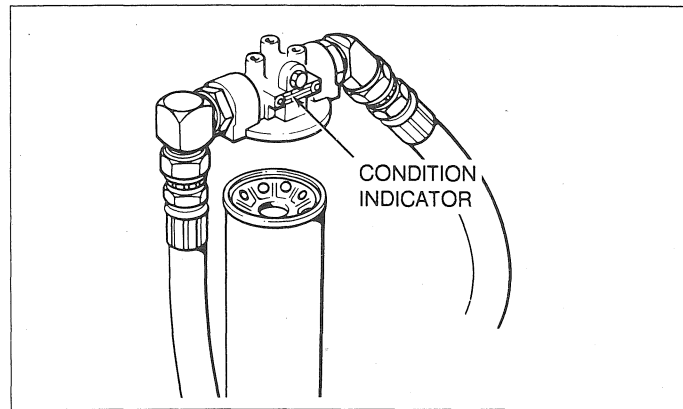
Refer to the section - All Wheel Drive, page 12-9.

## Other Engine Filter Elements

Detailed information on the lubricating oil filter element(s), coolant conditioner/filter and fuel filter element(s) can be found in the engine operation and maintenance manual that is included in your manual package.

## Hydraulic Oil Filter Condition Indicator

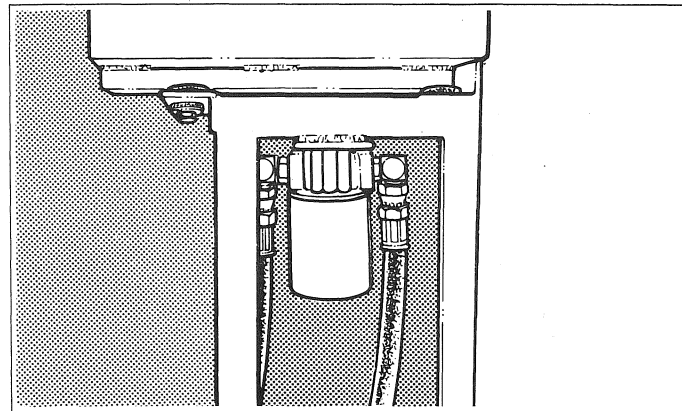
Some machines are equipped with a visual filter condition indicator mounted on the primary hydraulic and/or transmission filter heads. If the indicator shows green, the filter is working correctly. If the indicator shows red, you must change the filter element. Check the indicator with a cold engine running at high rpm.

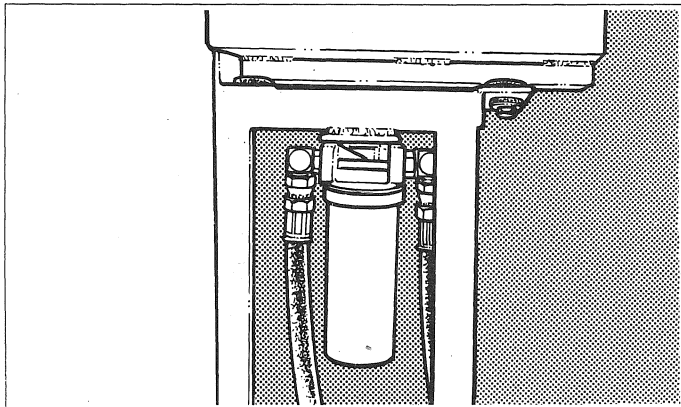


## Hydraulic System Filter Element

The primary hydraulic filter is located beneath the fuel tank, inside the left-hand access cover.

- Replace it every 500 hours of operation.
- The filter element is a spin-on type and can be removed with a filter wrench.
- Clean any accumulated dirt from the old filter before removing it.
- To install a new filter element, first apply a coating of clean hydraulic oil to the gasket.
- Install the new element on the filter head and tighten it as far as possible by hand only.
- Do not use a filter wrench to tighten the element.

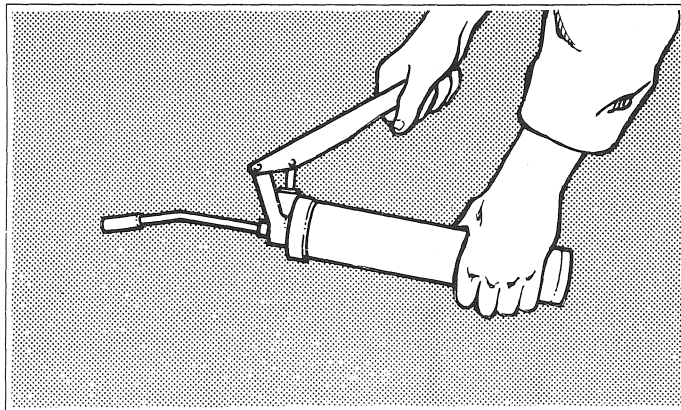




### Transmission Filter Element

The transmission filter is located beneath the fuel tank, inside the right-hand access cover.

- Replace it every 500 hours of operation.
- The filter element is a spin-on type and can be removed with a filter wrench.
- Clean any accumulated dirt from the old filter before removing it.
- To install a new filter element, first apply a coating of clean hydraulic oil to the gasket.
- Install the new element on the filter head and tighten it as far as possible by hand only.
- Do not use a filter wrench to tighten the element.

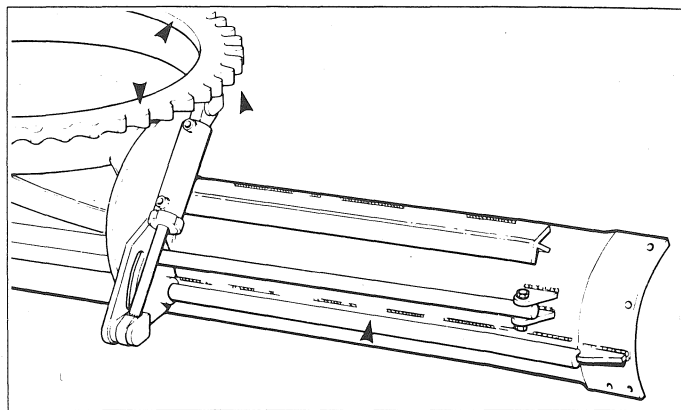


### Grease Fittings

- Refer to **Lubrication Points** page 14-24, for the location of all grease fittings.
- Be sure to clean all dirt and accumulated grease from the fittings before attaching the grease gun.
- By following the recommended service intervals, one or two strokes of a hand-lever grease gun will supply the parts with enough grease. Do not over-lubricate. Pressure from excess grease can damage the seals.

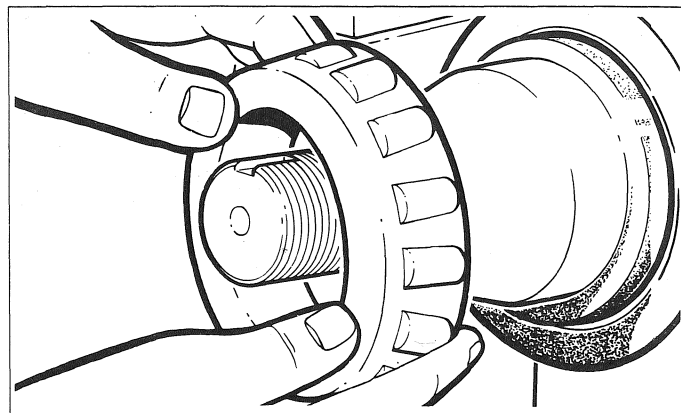
## Circle Lubrication

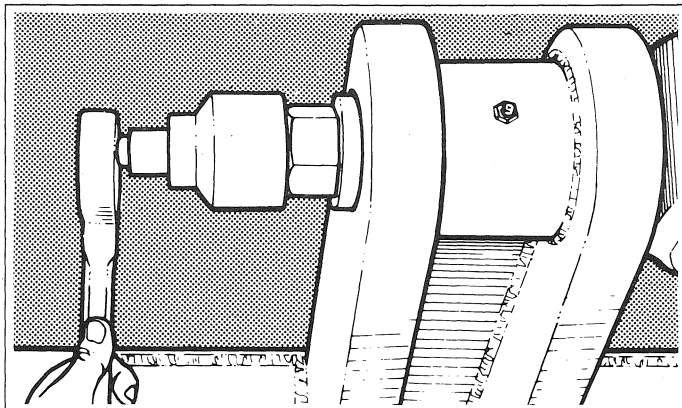
- Once a week, use diesel fuel to clean the moldboard slide surfaces, and the top, bottom and inside edges of the circle.
- Lubricate these circle and moldboard areas with a diesel fuel, Champion graphite spray P/N 300CL moistened with diesel fuel or a multi-purpose grease.
- Consult your Champion dealer for other recommendations on circle lubrication for your particular working conditions.



## Front Wheel Bearings

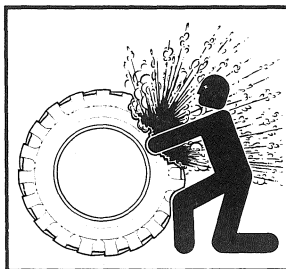
- Disassemble, inspect and reset the pre-load of the front wheel bearings every 500 hours. Refer to the **700 Series Shop Manual P/N L-2005**.





### Blade Lift Stirrup Nuts

- Check the tightness of the jam nuts periodically.
- If a jam nut is found loose, then the Blade Lift Stirrup Assembly must be inspected. Refer to the **700 Series Shop Manual P/N L 2005**, for the correct inspection and repair procedures for the Blade Lift Stirrup Assembly.



### ⚠ WARNING

Failure to use a safety cage when inflating tires could result in severe personal injury or death.

### Tire Inflation

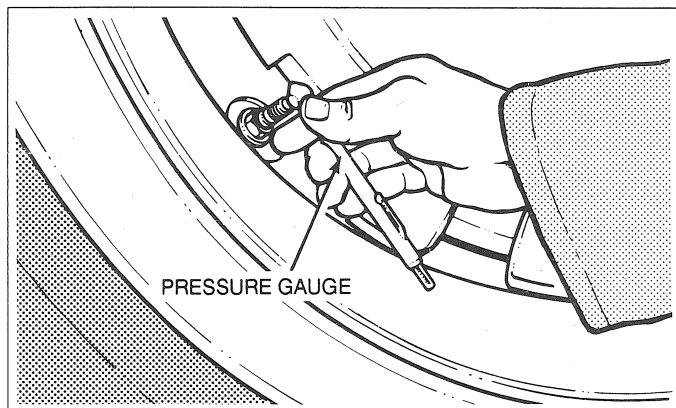
Tire repair or replacement must be performed by qualified personnel only. Refer to the section - **Safety Precautions - Tire Maintenance Precautions** page 4-19.

### ⚠ WARNING

Do not weld on the rim. The flame and heat can cause an explosion. The weld can cause premature rim failure. Severe personal injury or death could result.

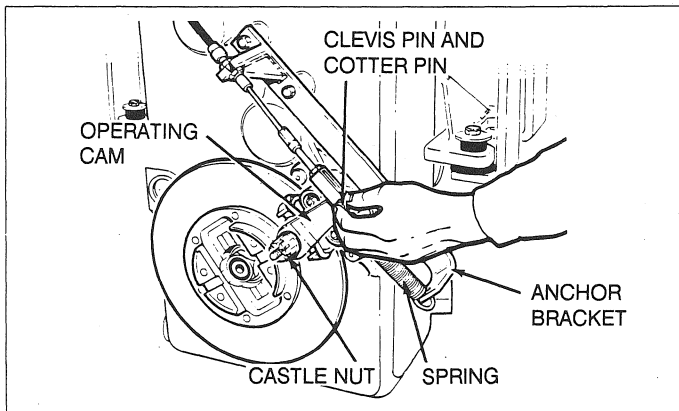
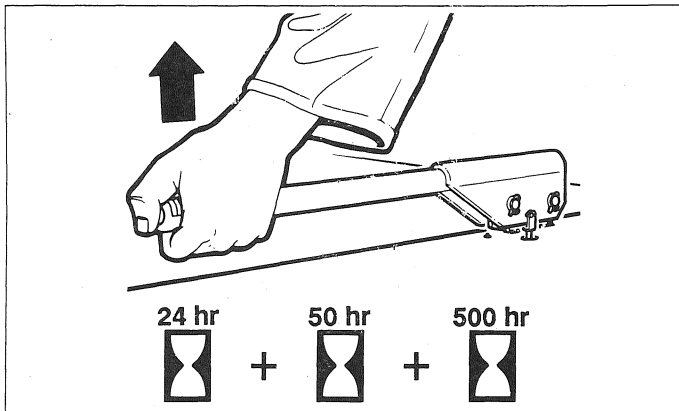
## Tire Inflation continued

- Check the tire pressure with an accurate pressure gauge when the tires are cold. See this page - **Tire Pressures Chart** for recommended maximum pressures. Also refer to the section - **Pre-start Checks - Tire Inflation** page 7-11.
- If wear or other problems related to pressure occur, consult the tire manufacturer.
- To reduce 'gallop', vary the pressures of adjacent tires plus or minus 5 psi (35 kPa).
- Do not stand in front of the tire while you are inflating it.
- Ensure you use a self-attaching air chuck with a remote shutoff and stand behind the tire tread with a safety cage covering the tire while inflating it.
- If 'gallop' persists, make sure your rims are properly installed on the wheel castings and refer to your **700 Series Shop Manual P/N L-2005**.
- Tighten rim clamps in a diagonal pattern. Do not tighten rim clamps in series around the wheel.
- Rim clamp nut torque is 150 lb.ft (203,4 N.m), (20,7 kgf.m).



## Tire Pressures Chart

Tire Size	Ply	Maximum Pressure	
		kPa	psi
13.00 x 24	12	241	35
14.00 x 24	12	241	35
14.00 x 24	16	241	35
16.00 x 24	12	206	30
16.00 x 24	16	206	30
17.50 x 25	12	206	30
20.50 x 25	12	206	30



### Hand Brake Adjustment Frequency - All Models

- Check the hand brake operation daily. Check that the caliper floating parts move freely and all other parts are secure. Tighten hardware. Refer to the section - **Pre-Start Checks - Hand Brake** page 7-16.
- After 50 hours and at every 500 hours, check for cable stretch and friction pad clearance.
- After using the hand brake for an emergency stop, it must be inspected and adjusted by qualified service personnel.
- Models 750 through 780A have self-adjusting calipers.

### Hand Brake Cable Adjustment

#### - Models 710 through 740A

- Remove and discard the cotter pins securing the cable clevis pin and castle nut.
- Secure the castle nut to finger tightness only.
- Move the operating cam back and forth to determine the lowest point on the cam. Only the slightest amount of play should exist.
- Pull the cable at its free end to remove any slack or lost motion. Move the cam toward the cable to cancel any lost motion between the cam and the push pins.
- Adjust the cable clevis to coincide with the outer hole of the cam. Fully tighten all cable nuts. Install the clevis pin and secure with a new cotter pin.
- Check that the handle locks in all positions. This verifies that the mechanism does not bind.

## Hand Brake Caliper Adjustment

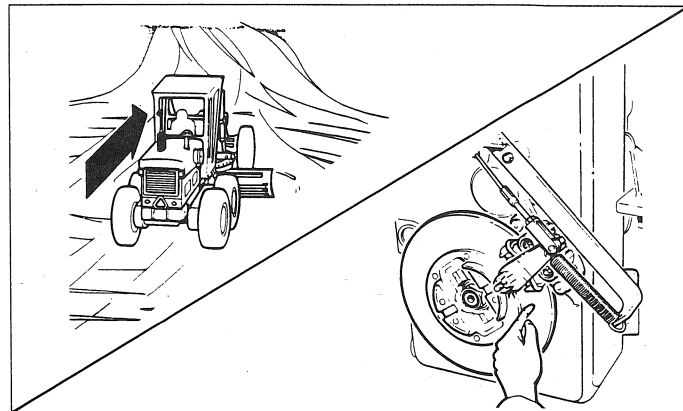
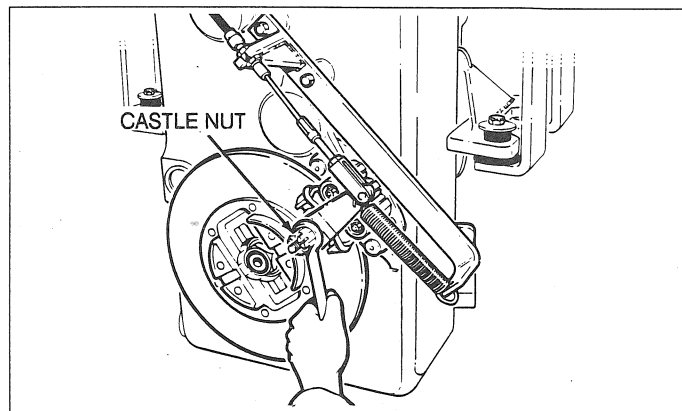
### - Models 710 through 740A

- Adjust brake cable before adjusting the caliper assembly.
- Loosen the castle nut approximately 1-1/2 to 2-1/2 flats.
- Align one of the castle nut slots with the hole in the caliper assembly threaded rod. The hand brake lever should move five to six ratchet teeth when the brake is properly adjusted. Secure the castle nut with a new cotter pin.

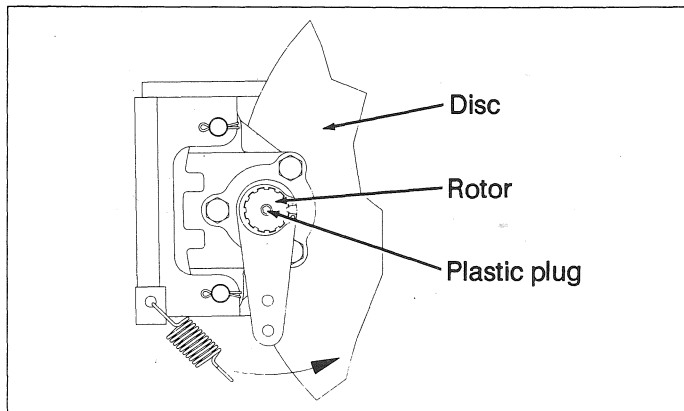
## Hand Brake Function Test

### - Models 710 through 740A

- After adjusting the hand brake cable or caliper, prepare the grader for a brake function test and engine stall test.
- Make a visual check around the machine. Ensure all personnel are clearly away from the area of the caliper assembly and drive shafts. Signal your intention to start the engine. Start the engine when it is safe to do so.
- Move the grader to an appropriate test area and drive the machine forward in eighth gear at full engine rpm for one minute. Stop the grader and shut down the engine. Remove and retain the ignition key.
- Check the hand brake disc for signs of friction pad drag by carefully determining if the disc is hot.
- If the friction pads are dragging, remove the castle nut cotter pin. Loosen the castle nut by one flat. Replace and secure the cotter pin.

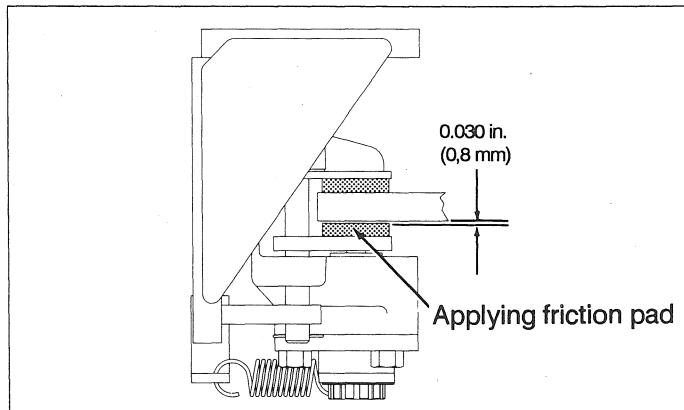






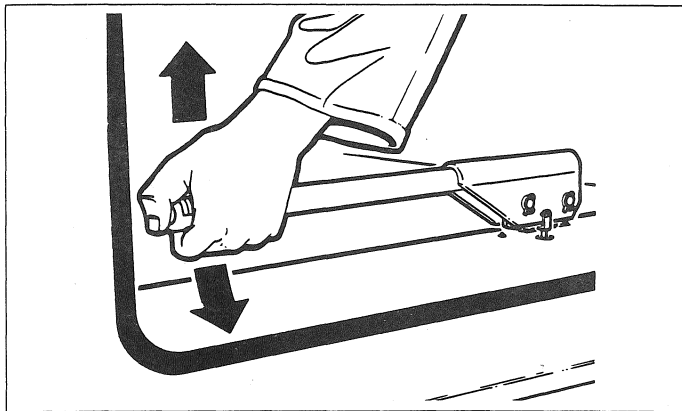
### Hand Brake Function Test - Models 750 through 780A

- After any adjustment to the hand brake, prepare the grader for a brake function test and engine stall test.
- Make a visual check around the machine. Ensure all personnel are clearly away from the area of the caliper assembly and drive shafts. Signal your intention to start the engine. Start the engine when it is safe to do so.
- Move the grader to an appropriate test area and drive the machine forward in eighth gear at full engine rpm for one minute. Stop the grader and shut down the engine. Remove and retain the ignition key.
- Check the hand brake disc for signs of friction pad drag by carefully determining if the disc is hot.
- If the friction pads are dragging, remove the plastic plug on the rotor. Insert a 1/4 in. Allen wrench into the shaft and turn counter-clockwise until there is a 0.030 inch (0,8 mm) gap between the applying friction pad and disc. Install the plastic plug.



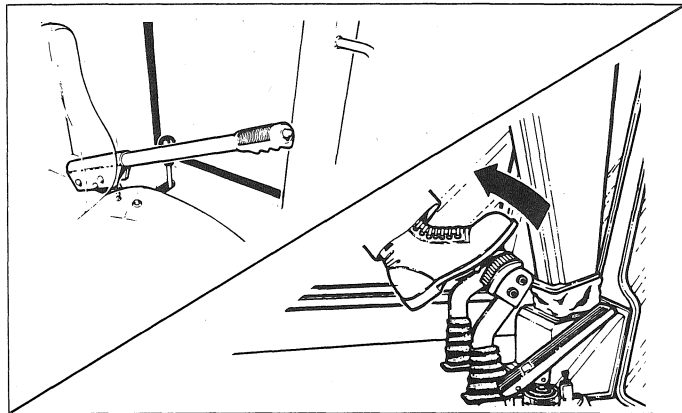
## Hand Brake - Burnishing Friction Pads - All Models

- New friction pads, or pads showing signs of high temperature wear (as in an emergency stop), should be properly burnished as follows.
- Start the engine when it is safe to do so. Drive the machine forward in third gear and lightly apply the hand brake a few seconds at a time to reduce the engine speed.
- Repeat this procedure four or five times until the braking action becomes more aggressive. Stop the grader and shut down the engine.



## Hand Brake Adjustment - Engine Stall Test - All Models

- Apply the hand brake until the pawl engages the sixth ratchet tooth.
- Start the engine when it is safe to do so.
- Adjust the engine speed to low idle.
- Depress the clutch pedal. Select third speed forward.
- Slowly release the clutch pedal - taking approximately two seconds to do so. The engine must stall. If the engine does not stall, either re-burnish the friction pads or re-adjust the caliper assembly (710 through 740A). Check 0.030 in. (0,8 mm) gap (750 through 780A).
- Repeat this procedure until the engine can be made to stall, but without the hand brake being adjusted too tight.



### Service Brakes Master Cylinder Fluid

- Graders equipped with drum brakes - use DOT 3 brake fluid in the master cylinder reservoir.
- Graders equipped with oil disc brakes - use petroleum base fluid in the master cylinder reservoir.

Refer to the section - **Maintenance and Lubrication - Lubrication Specifications** pages 14-25 & 14-27, for alternative fluid specifications.

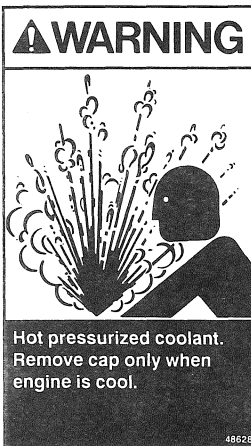
#### **⚠ WARNING**

Use only petroleum base fluid in the brake reservoir. Other liquids may cause brake failure. Severe personal injury or death could result. See Operator's Manual for fluid options.

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This warning only applies to graders equipped with OIL DISC BRAKES.

### Engine Cooling System



- The engine cooling system is filled at the factory with an antifreeze coolant solution of 60% antifreeze and 40% water. This ensures protection against freezing down to -62°F (-52°C).
- Check the coolant level daily. It should be 2 in. (5 cm) from the top of the filler neck.

## Engine Cooling System continued

- Use antifreeze during all seasons to protect against corrosion as well as freezing.
- Use supplemental coolant additives at recommended dosage to control deposits, corrosion and pitting. Over-concentration can result in plugged radiators, heater cores, after coolers and can also cause water pump seal leaks. Refer to Engine Manual.
- Use water that does not contain excess hardness, chloride or sulfate.
- Drain and flush the cooling system as recommended by the Engine Manual.
- Use accurate, reliable equipment to measure coolant antifreeze levels.
- Refer to Engine Manual for testing coolant DCA-4 concentration.
- Follow the Engine Manufacturers' recommendations for precharging the cooling system after draining and flushing.
- Don't add undiluted antifreeze as make up coolant.
- Don't add plain water as make up coolant.
- Don't substitute precharge coolant filters for service filters.
- Don't exceed 68% antifreeze. More than 68% antifreeze reduces freeze protection. The maximum recommended antifreeze level is 60 % which provides freeze protection to  $-62^{\circ}\text{F}$  ( $-52^{\circ}\text{C}$ ). Coolant containing 50% antifreeze provides freeze protection to  $-34^{\circ}\text{F}$  ( $-37^{\circ}\text{C}$ ).
- Don't reuse drained coolant with overconcentrated antifreeze or supplemental coolant additives.
- Don't precharge the cooling system if the coolant is drained and reused.

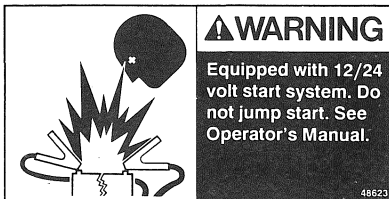
## Cooling System Capacities

Model	U.S. Gallons	Imperial Gallons	Liters
710/710A	10.7	8.9	40,5
720/720A	11.2	9.3	42,5
730/730A	11.2	9.3	42,5
740/740A	10.8	9.0	40,8
750/750A	10.8	9.0	40,8
780/780A	10.8	9.0	40,8

## Battery Problems

<b>Shorted Cell</b>	When an electrical load is placed on the battery the cell starts to bubble.
<b>Dead Cell</b>	A 50 point spread in the specific gravity reading between the high and low cell readings indicates that the battery has a bad cell. A voltage reading below 10V also indicates that a battery has a bad cell.
<b>Discharged</b>	When all cells read below a specific gravity reading of 1230, the battery is discharged. The battery should be recharged before an accurate test can be conducted.
<b>Overcharged</b>	A voltage reading above 12.6V and a specific gravity reading above 1265 signifies an overcharged battery.
<b>Open Circuit</b>	When an electrical load test is done on the battery and the needle slowly drops off to zero, check for an open circuit.
<b>Sulfated</b>	An acid filled battery that has been left to sit, without recharging over a long period of time. The end result is that the battery loses capacity and is difficult to reverse the process.

To prevent these problems, you must check the battery acid level, inspect the battery casing for leaks and ensure the specific gravity readings are to specification. Check the specific gravity of the battery when you have received your grader. Recheck it every 3 months. In hot climates recheck it every 2 months.



- Allow the battery to warm to 16°C (60°F) before jump starting or charging.

**⚠ WARNING**

Do not charge or jump start a frozen battery. Gas pressure build-up can cause an explosion. Severe personal injury or death could result.

**⚠ WARNING**

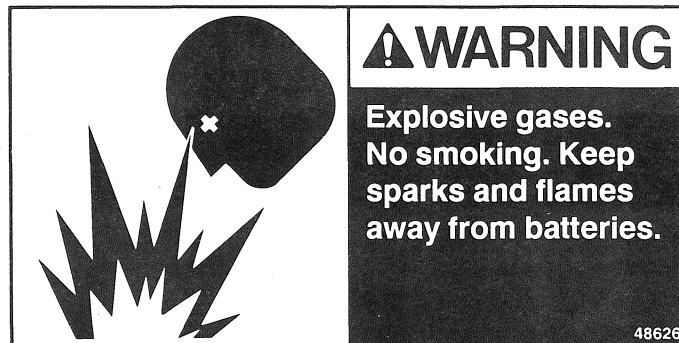
Handle batteries carefully. Battery acid is extremely corrosive and poisonous. Contact with the eyes, skin, or clothing can result in severe burns or other serious personal injury.

- If contact with battery acid occurs, seek medical attention immediately.
- Wear a face shield when working with batteries.

- Do not charge or jump start a frozen battery. It may explode due to gas trapped in the frozen battery.

## Batteries - Jumper Cable Procedure

- Before jump starting the grader, determine why the engine will not crank.
- Do not jump start a 12/24 volt start system. Improper connections may cause the batteries to explode resulting in severe personal injury or death. Damage to the booster vehicle's electrical system may also result. Remove the batteries and recharge them separately.
- Batteries produce explosive gases. Keep sparks, flames, smoking materials, or other ignition sources away from batteries. Use a flashlight to check the electrolyte level.



- Do not let metal objects contact the battery terminals.
- Do not lean over batteries during jump starting procedures.

**Batteries - Jumper Cable Procedure** continued

Jumper cables can be used to start a 12 volt start system as follows.

- The booster battery and the discharged battery must be of the same voltage. If they are not, electrical arcing could occur and cause an explosion.
- Ensure the moldboard and all the attachments are lowered to the ground.
- Position the vehicle with the booster battery next to the grader's discharged battery without touching the grader. Ensure the batteries are close enough to easily connect the jumper cables.
- Apply the hand brake or emergency brake of both vehicles and move the transmission mode lever of the grader to NEUTRAL. If the other vehicle has an automatic transmission move the lever to PARK, or if the vehicle has a manual transmission move the shift lever to NEUTRAL. Shut down engine. Switch off all unnecessary electrical systems such as lights, heaters, air conditioners in the grader and the vehicle.

- Some batteries have removable vent caps. Remove and clean them. Ensure the vent holes are free of contamination and the caps are installed tightly. Place a wet cloth over the vent caps of each battery. Ensure the cloth is away from any fan blades, belts or any other moving parts.

- Connect the jumper cables from the booster vehicle to the grader in the following order:

- a) Connect positive (+) cable to positive post of discharged battery. Positive post is wired to the starter. Connect other end to positive (+) post of booster battery.

- b) Connect negative (-) cable to negative post of booster battery and other end to body ground or frame. Do not connect to battery.

A wrong connection will cause arcing. Ensure the jumper cables do not contact any moving parts, or other metals.

- Warn all personnel who may be around the vehicle or the grader prior to starting the engines. Do not start the engines until all personnel are clearly away from vehicles.

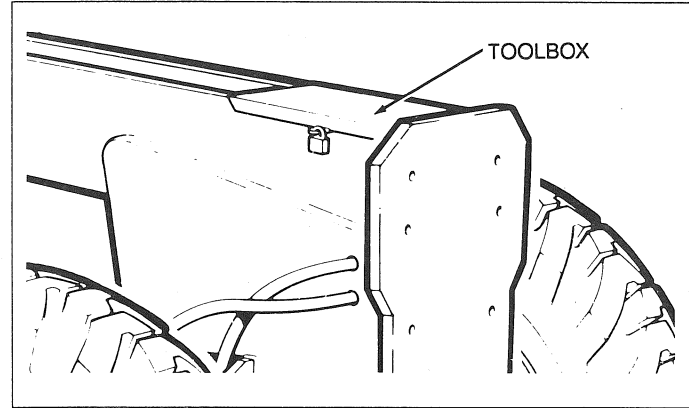
- Turn the grader's isolation switch(es) to the ON position.

### Batteries - Jumper Cable Procedure continued

- Start the engine of the booster vehicle. Allow the engine to run for a few minutes.
  
- Start the engine of the grader from the operator's seat. Fasten the seat belt. If the engine does not start within thirty seconds, release the ignition key and wait two minutes before trying again. This allows the starter motor to cool. If the engine does not start on the second or third attempt, stop this procedure. Report the problem and have it repaired.
  
- Do not dismount from the grader with the engine running. Have a qualified service technician disconnect the jumper cables in the reverse order of connection.
  
- Discard the wet cloth covering the vent caps. Handle the cloth carefully. It may have been contaminated with acid.
  
- Allow the grader's engine to run for a few minutes and ensure all controls and instruments are working properly before driving or operating the grader.

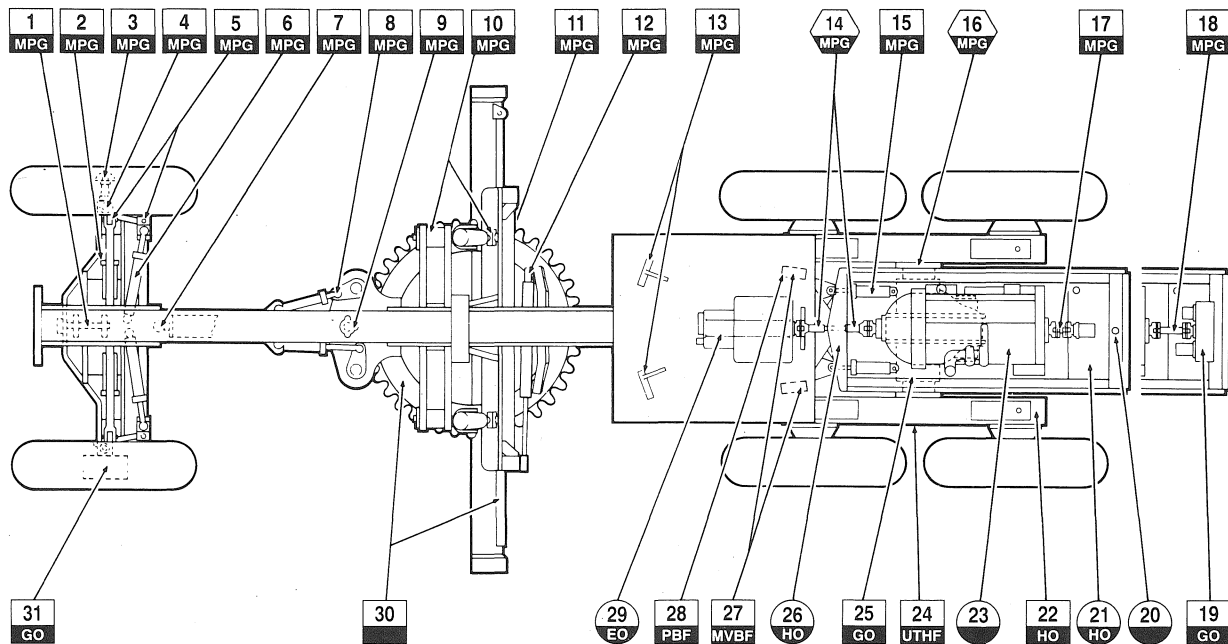
### Toolbox

The toolbox is located in the top of the frame at the front of the machine. The toolbox for graders equipped with All Wheel Drive is mounted on one of the tandem cases.






## Lubrication Points



MPG - Multi Purpose Grease  
 GO - Gear Oil  
 HO - Hydraulic Oil  
 PBF - Petroleum Base Fluid

MVBF - Motor Vehicle Brake Fluid  
 UTHF - Universal Tractor Hydraulic Fluid  
 EO - Engine Oil

 Check Daily

 Check Weekly

 Check Monthly

Champion recommends increasing the greasing frequency in extremely dusty or wet conditions, or if dry joints are apparent.

## Key to Lubrication Points - (See next page for Lubrication specifications)

### GREASE POINTS - MPG

1. **Pivot Pin** - Two fittings, weekly
2. **Leaning Wheel Cylinder** - Two fittings each side, weekly
3. **Wheel Bearings** - One fitting each side with EP2 grade only, weekly
4. **Knuckle Pivot Pin and King Pin** - Four fittings each side, weekly
5. **Drag Link/Pivot Block/Tie Bar - Standard** - Five fittings, weekly  
**Heavy Duty** - Nine fittings, weekly
6. **Steering Cylinder** - Two fittings each side, weekly
7. **Drawbar Ball Stud** - One fitting, weekly
8. **Circle Turn Cylinder and Crank** - Three fittings each side, weekly
9. **Circle Turn Valve** - One fitting, weekly
10. **Blade Lift System - Fixed Point** - Two fittings each side, weekly  
**Moveable Point** - Nine fittings, weekly
11. **Blade Tilt Cylinder/Tilt Quadrant or Manual Link - Standard** - Two fittings each side, weekly  
**Heavy Duty** - Three fittings each side, weekly
12. **Circle Shift Cylinder** - One fitting each end, weekly

13. **Brake and Clutch Pedal Shafts**  
One fitting each, weekly
14. **Upper and Lower Drive Shafts**  
Three fittings each shaft, monthly
15. **Articulation Cylinder** - Two fittings each side, weekly
16. **Tandem Sleeve Thrust Plate** - One fitting each side, monthly
17. **Hydraulic Pump Drive Shaft** - Two fittings, weekly
18. **A.W.D. Pump Drive Shaft**  
Three fittings, weekly

### FLUID LEVELS & LUBRICANTS

19. **A.W.D. Pump Drive Gearbox** GO - check level weekly
20. **Coolant** - See appropriate Engine Operation and Maintenance Manual - check level daily
21. **Hydraulic Oil Reservoir** - HO - check level daily
22. **Tandems** - HO - All models with drum brakes - check level weekly
23. **Engine** - See appropriate Engine Operation and Maintenance Manual - check level daily
24. **Tandems** - UTHF - All models with oil disc brakes (wet brakes) - check level weekly

25. **Final Drives** - GO - check level weekly
26. **A.W.D. Hydraulic Reservoir** - HO check level daily

27. **Drum Brake and Clutch Reservoirs**  
MVBF - check level weekly
28. **Oil Disc Brake Reservoir**  
PBF - check level weekly

### **▲WARNING**

**INCORRECT FLUID WILL CAUSE BRAKE FAILURE. SEVERE PERSONAL INJURY OR DEATH COULD RESULT.**

29. **Transmission** - EO - check level daily - warm oil at idle and transmission in neutral
30. **Circle Top; Clamp and Guide Bearing Surfaces; Moldboard Upper and Lower Slide Rails**  
Every week or more often as required, wash with diesel fuel - lubricate with:
  - 1) Diesel fuel, or
  - 2) A light coating of Champion graphite spray, P/N 300CL moistened with diesel fuel, or
  - 3) A light coating of MPG
 Keep these bearing surfaces clean.
31. **A.W.D. Planetary Hub** - GO - check level weekly



## Lubrication Specifications continued

Application/ Fluid Code	Capacity	Lubricant Change Interval (see note)	Filter Change Interval	Fluid Type	Air Temperature Range During Fill Period														
					°C -40	-30	-20	-10	0	10	20	30	40	50	°F -40	-22	-4	14	32
All Wheel Drive pump drive gearbox - GO	0.3 US gal 1,0 L	First 100 hr then 1000 hr	-	Hypoid Gear Oil - API GL-5 MIL-L-2105C	SAE 85W-140														
					SAE 80W-90														
					SAE 75W-90														
All Wheel Drive planetary reduction unit - GO	0.4 US gal 1,5 L (each side)	First 100 hr then 1000 hr	-	Hypoid Gear Oil - API GL-5 MIL-L-2105C	SAE 85W-140														
					SAE 80W-90														
					SAE 75W-90														
Final drive - single reduction lock/ unlock differential - GO	6 US gal 23 L	First 100 hr then 1000 hr	-	Hypoid Gear Oil - API GL-5 MIL-L-2105C	SAE 85W-90														
					SAE 80W-90														
					SAE 75W-90														
Final drive - double reduction lock/ unlock differential - GO	9 US gal 34 L	First 100 hr then 2000 hr	-	Hypoid Gear Oil - API GL-5 MIL-L-2105C	SAE 85W-90														
					SAE 80W-90														
					SAE 75W-90														
Drum brake/clutch fluid - MVBF	-	1 year	-	Motor Vehicle Brake Fluid	SAE J 1703, DOT 3, ISO 4925														
Oil disc brake fluid - PBF	-	1 year	-	Petroleum Base Fluid	Shell Aeroshell Fluid 4			Shell Tellus T15			Esso Univis N Arctic								

○ Standard factory fill

API = American Petroleum Institute  
Consult your Champion Distributor for alternative lubricants  
Refer to engine manual for engine lubricants

**NOTE:** Service intervals are based on: 250 hours or 1 month, whichever comes first  
500 hours or 3 months, whichever comes first  
1000 hours or 6 months, whichever comes first  
2000 hours or 12 months, whichever comes first



## **Cold Weather Operation**

### **Lubricant Requirements for Transmission and Hydraulic Systems**

When operating in temperatures below  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ), you can use the recommended oils provided the following conditions are met:

- a) Before start up, the oil is preheated to a temperature above the minimum value for the indicated oil and viscosity range.
- b) The operating temperature stays above the minimum value in the applicable range.

Failure to comply with these requirements may result in a malfunction or reduced life of the transmission or hydraulic components.

### **Cold Weather Start Up Procedure**

If oil in the hydraulic circuit is cold, hydraulic functions may move slowly. Do not attempt grader operations until the hydraulic oil is warmed up. If you do not follow the proper warm up procedure, hydraulic pump damage may result.

1. Run the engine at approximately 1000 rpm for five minutes. Do not put load on the hydraulic system.
2. Cycle all hydraulic cylinders through their working range several times until the hydraulic functions operate normally.
3. The grader is now ready to operate under load.









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## Champion Technical Manuals

Additional technical publications available from your Champion distributor are:

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Champion ALL WHEEL DRIVE Service Guide .....	L-2010
Cummins B Series Engine Operation and Maintenance Manual .....	L-14004
Cummins C Series Engine Operation and Maintenance Manual .....	L-14008
Cummins L-10 Engine Operation and Maintenance Manual .....	L-14005
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