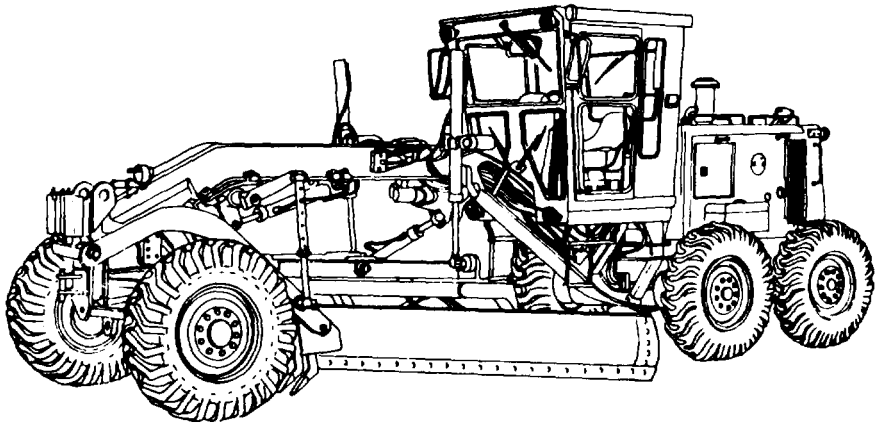
OPERATOR'S MANUAL



GRADER, HEAVY, ROAD,

MOTORIZED,

CATERPILLAR MODEL 130G

(NSN 3805-01-150-4795)

This copy is a reprint which includes current pages from Changes 1 and 2.

Approved for public release; Distribution is unlimited.

Headquarters, Department of the Army

MARCH 1989

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *29 October 1992*

OPERATOR' S MANUAL

GRADER, HEAVY ROAD, MOTORIZED
CATERPILLAR MODEL 130G
(NSN 3805-01-150-4795)

TM 5-3850-261-10, 30 MARCH 1989, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
a and b	a and b

3. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
03043

Distribution:

To be distributed in accordance with DA Form 12-25-E, Block 4840, Requirements for TM5-3805-261-10.

Approved for public release; distribution is unlimited.

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *26 July 1991*

OPERATOR' S MANUAL

GRADER, HEAVY ROAD, MOTORIZED
CATERPILLAR MODEL 130G
(NSN 3805-01-150-4795)

TM 5-3805-261-10, 30 March 1989 is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
c and d	c and d
i and 1-0	I and 1-0
1-19 thru 1-22	1-19 thru 1-22
2-1 and 2-2	2-1 and 2-2
None	2-2.1/(2-2.2 blank)
2-13 thru 2-16	2-13 thru 2-16
2-27 and 2-28	2-27 and 2-28
2-57 and 2-58	2-57 and 2-58
None	2-67 thru 2-101/(2-102 blank)
C-1 and C-2	C-1 and C-2
INDEX 3/(INDEX 4 blank)	INDEX 3/(INDEX 4 blank)

File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

PATRICIA P. HICKERSON
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25-E, Block 4840, Operator Maintenance Requirements for TM 5-3805-261-10.

WARNING

FIRE HAZARD

Diesel fuel and combustible materials are used in operation and maintenance of this equipment. Do not smoke or allow open flames or sparks in areas where diesel fuel and combustible materials are used or stored. DEATH or SEVERE INJURY may result if personnel fail to observe this precaution. If you are burned, seek medical aid immediately.

WARNING

OIL UNDER 2500 PSI PRESSURE

High pressure hydraulics operate this equipment. NEVER disconnect any hydraulic lines or fittings without checking manual to see how to drop the pressure to zero. Failure to follow this procedure could cause SEVERE INJURY. If you are struck by a high pressure oil stream, seek medical help immediately.

WARNING

ELECTRICAL SHOCK HAZARD

With disconnect switch in OFF position, always disconnect right battery positive cable before working on electrical components of this equipment. DEATH or SEVERE INJURY may result if you fail to observe this procedure. If you receive an electrical shock, seek medical help.

WARNING

FALLING EQUIPMENT HAZARD

Never crawl under equipment when performing maintenance unless equipment is securely blocked. Keep clear of equipment when it is being raised or lowered. Do not allow heavy components to swing while suspended by lifting device. Exercise extreme caution when working near a cable or chain under tension.

WARNING

BURN HAZARD

Allow engine to cool off before you perform maintenance on the muffler, exhaust pipe, exhaust manifold or turbocharger. If necessary, seek medical aid immediately.

WARNING

TIRE INFLATION

Observe caution when inflating tires. Make sure tires are properly seated on rims before inflating. Improperly seated tires can burst with explosive force. DEATH or SERIOUS INJURY may result if you do not observe this procedure. If you are injured while inflating the tire, seek medical help immediately.

WARNING

TOXIC/FLAMMABLE

Dry cleaning solvent (P-D-680) used to clean parts, is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes. Do not breathe vapors. Do not use near open flame or excessive heat. Do not smoke when using solvent. Failure to do so could cause SERIOUS INJURY. If you become dizzy while using cleaning solvent, get fresh air immediately, and if necessary, get medical attention. If contact with skin or clothes is made, flush thoroughly with water. If the solvent contacts your eyes, wash with water immediately and obtain medical aid.

WARNING

EXHAUST CASES CAN BE DEADLY

Exhaust gases can produce symptoms of headache, dizziness, loss of muscular control or coma. Permanent brain damage or death can result from severe exposure. You can insure your safety by following these rules:

- A Do not operate the engine in an enclosed area unless properly ventilated.
- Do not drive with any inspection plates, cover plates or hoods off unless necessary for maintenance.
- If you notice exhaust odors or exposure symptoms, IMMEDIATELY VENTILATE the area. If symptoms persist, remove and treat the affected personnel.
    - Expose them to fresh air
    - If necessary, give artificial respiration
    - Keep them warm
    - Do not permit physical exercise

Refer to FM 21-11, First Aid for Soldiers, for first aid treatment of injured personnel.

WARNING

NOISE HAZARD

Excessive noise levels are present any time the equipment is operating. Wear hearing protection while operating or working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical aid should you suspect a hearing problem.

WARNING

STEAM UNDER PRESSURE

Remove radiator cap slowly to relieve pressure before completely removing it when the engine is hot. Failure to follow this procedure could cause SEVERE INJURY. If you are scalded by steam, seek medical aid immediately.

WARNING

OIL UNDER PRESSURE

Keep hands and feet clear of steering cylinder assemblies while checking for hydraulic leakage when engine is running. SEVERE INJURY may result if you fail to follow this procedure.

WARNING

BURN HAZARD

Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing. Wear safety goggles and gloves and remove jewelry. If battery electrolyte is spilled, take immediate action to stop its burning effects:

- EXTERNAL: Flush with cold water to remove all acid.
- EYES: Flush with cold water for 15 minutes. Seek medical aid immediately.
- INTERNAL: Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical immediately.
- CLOTHING OR VEHICLE: Wash at once with cold water. Neutralize with baking soda or house-hold ammonia solution.

WARNING

If the grader is exposed to chemical or biological agents, servicing personnel shall wear a protective mask, hood, protective overgarments, and chemical protective gloves and boots. All decontamination procedures as detailed in local SOP will be performed.

WARNING

FLAMMABLE

Battery gases can explode. Do not smoke, have an open flame or create sparks around a battery, especially if the caps are off. SEVERE INJURY may result if you fail to follow this procedure.

WARNING

TOXIC/FLAMMABLE

Starting fluid is toxic and highly flammable. Container is pressurized to act as an expellant. Do not heat container or discharge starting fluid in confined areas or near an open flame. SEVERE INJURY may result if you fail to follow this procedure.

WARNING

FALLING EQUIPMENT HAZARD

Unless otherwise specified, perform all maintenance procedures with all equipment lowered to the ground, transmission in neutral, parking/emergency brake applied, and the engine stopped.

WARNING

SEAT BELT

Be sure your seat belt is fastened before operating the vehicle. Avoid sudden stops and operate at a safe speed.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

TECHNICAL MANUAL

No. 5-3805-261-10

HEADQUARTERS
Department of the Army
Washington, D.C., *30 March 1989*

OPERATOR'S MANUAL

GRADER, HEAVY, ROAD, MOTORIZED, DED, CATERPILLAR MODEL 130G (NSN 3805-01-150-4795)

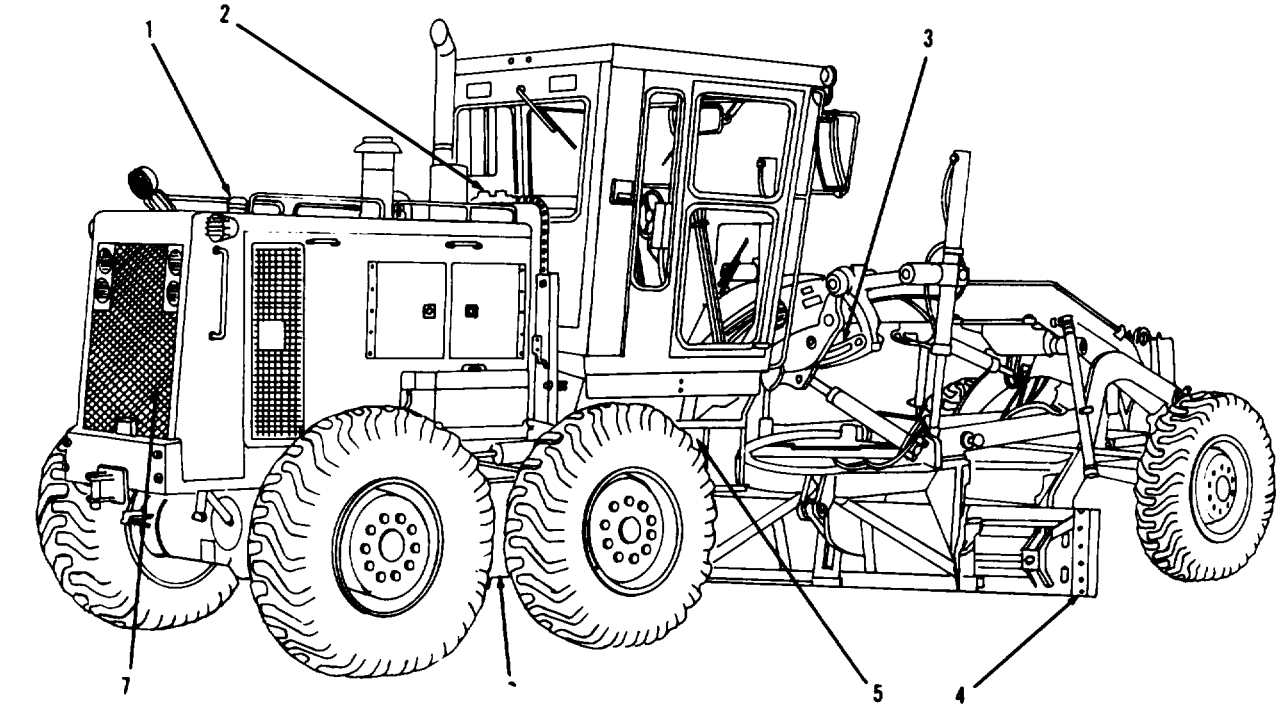
REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

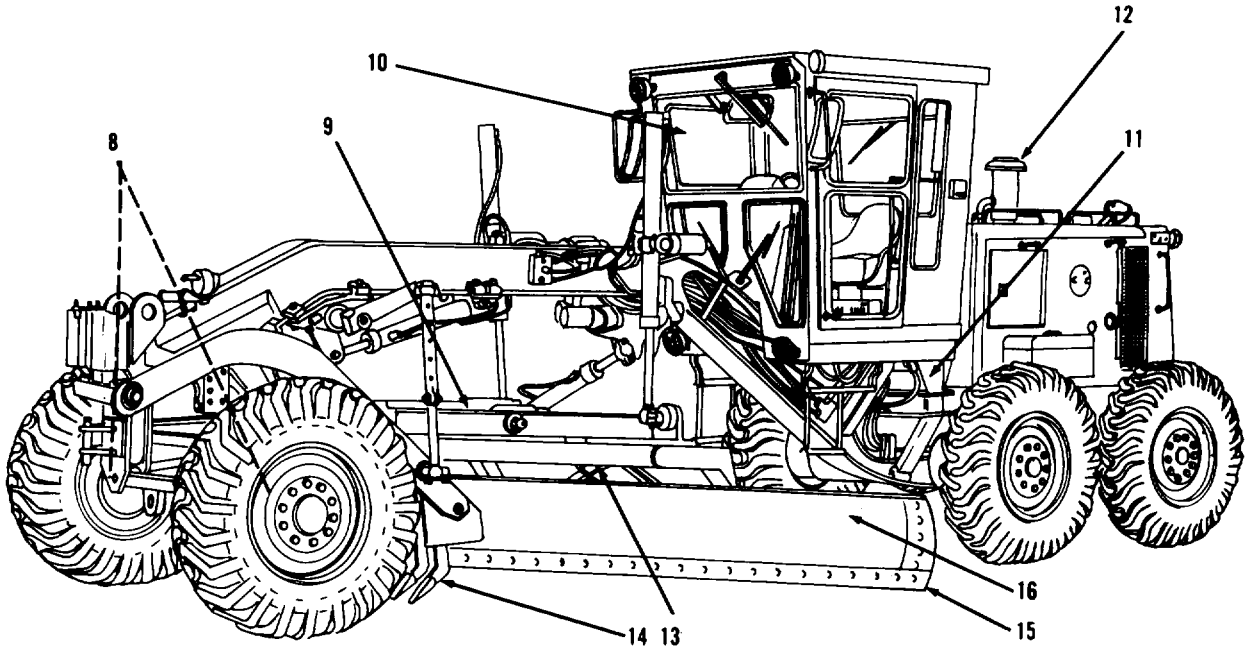
You can help improve the manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Tank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

Approved for public release; Distribution is unlimited.

TABLE OF CONTENTS

*TM 5-3805-261-10 supersedes TM 5-3805-261-14&P-1 dated 29 July 1985.





Legend

1. Fuel tank
2. Hydraulic tank
3. Centershift
4. End bit
5. Fuse box
6. Tandem housings
7. Radiator
8. Wheel lean lock pin
9. Tool box
10. Operator’s compartment
11. Antipivot pin
12. Air cleaner
13. Circle
14. Scarifier
15. Cutting edge
16. Moldboard

CHAPTER 1

INTRODUCTION

CHAPTER OVERVIEW

This chapter will familiarize you with the 130G Grader and its major operating systems.

INDEX

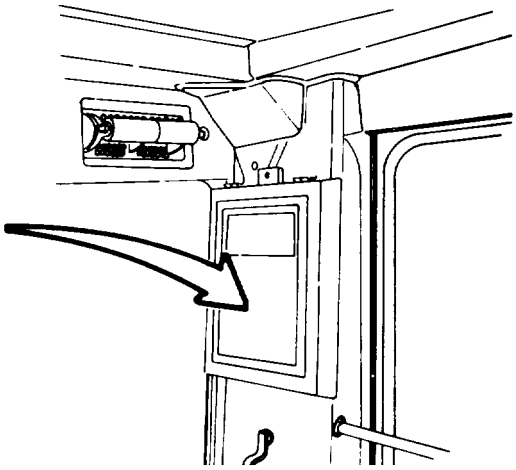
Section I. GENERAL INFORMATION

1-1. SCOPE. This manual presents the information you need for safe, efficient operation of the grader including authorized operation, preventive maintenance and service.

a. Type of Manual. Operator's training manual. Includes operational maintenance and troubleshooting instructions.

NOTE

Storage container in left rear of cab holds the operator's manual. The manual remains with the vehicle at all times.



b. Model No. Caterpillar Model 13OG (NSN 3805-01-150-4795).

c. Equipment Name. Grader, Heavy, Motorized, DED (NSN 3805-01-150-4795).

d. Purpose of Equipment. The grader is designed for rough and finished grading, low and high bank sloping, flat and V-ditching, scarifying bituminous road mixes and snow removed. Mission support role includes construction and maintenance of roads, airfields, hardstands, drainage, site preparation for pipeline and river crossing.

1-2. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. HAND RECEIPT (10 HR) MANUALS. This manual has a companion document with a TM number followed by -HR (which stands for Hand Receipt). The TM 5-3805-261-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e. COEI, BII and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2:

The US Army Adjutant General Publications Center
ATTN: AGLD-OD
1655 Woodson Road
St. Louis, MO 63114

1-4. REPORT EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your grader needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, U.S. Army Tank-Automotive Command, ATTN: 1-2AMSTA-MB, Warren, MI 48397-5000. We'll send you a reply.

1-5. WARRANTY INFORMATION. The Caterpillar 130C Grader is warranted by Caterpillar Inc. for 15 months or 1500 hours of operation, whichever occurs first. The warranty starts on the date found on DA Form 2408-9 in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance shop.

1-6. LIST OF ABBREVIATIONS.

A	after
AAL	Additional Authorization List
B	before
BII	Basic Issue Item
B.O.	blackout
oC	degrees Celsius
CAT.	Caterpillar
COE	Commercial Construction Equipment
COEI	Components of End Item
D	during
DA	Department of Army
D.C.	District of Columbia
EIR	Equipment Improvement Recommendations
EMS	Electronic Monitoring System
F	full
of	degrees Fahrenheit
FOPS	Falling object protective structure
FSCM	Federal Supply Code for Manufacturer
ft	feet
gal	gallons
H	high
-HR	Hand Receipts Manual
ICOEI	Integral Components of End Item
in	inch
kg	kilogram
km/h	kilometer per hour
1	liter
L	low
lb	pound
mm	millimeters
N	medium
mph	miles per hour
N2	neutral
N	dry nitrogen
NBC	Nuclear Biological Chemical
No.	number
PHICS	Preventive Maintenance Checks and Services
psi	pounds per square inch
Qty	quantity
R	reverse
Rec'd.	received
ROPS	Roll over protective structure
rpm	revolutions per minute
SER.	service
TANES	The Army Maintenance Management System
U/N	unit of measure

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

a. Characteristics.

- Excellent maneuverability
- Sound-suppressed ROPS cab
- Fast, precise blade control without drift
- Superior visibility, convenience and safety with true sit-down operation

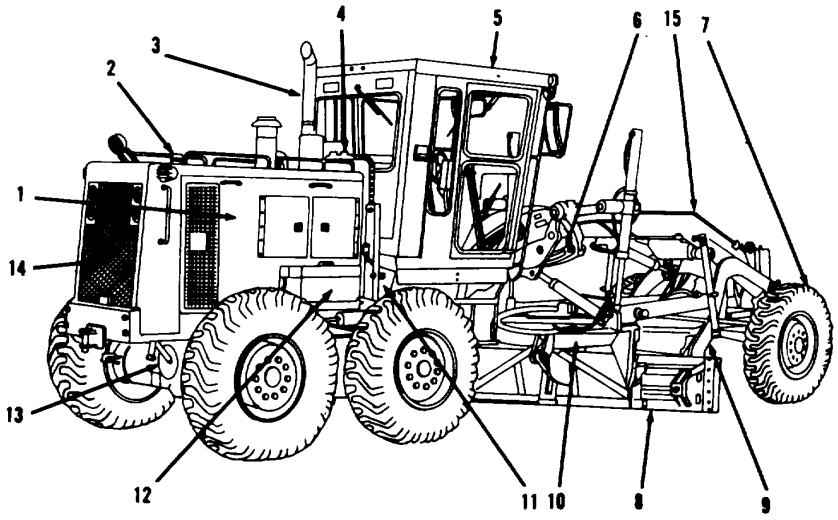
b. Capabilities and Features.

- Articulated frame and front wheel, lean steering
- Single-lever, full power-shift transmission with six forward and six reverse speeds
- Twelve foot blade with manual and hydraulic sideshift
- V-type, front mounted scarifier
- Supplemental power steering
- Ether starting aid
- Differential lock
- (EMS) electronic monitoring system
- Inching capability

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

Legend

1. Engine
2. Fuel tank
3. Muffler and exhaust pipe
4. Hydraulic tank
5. ROPS
6. Centershift
7. Wheels and tires
8. Blade
9. Scarifier
10. Circle
11. Articulation hitch
12. Batteries
13. Transmission
14. Radiator
15. Tool box



1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. Engine (1). Four cylinder, turbocharged diesel.

b. Fuel Tank (2). 75 gallon (280 liters) capacity. Dipstick in filler neck. Drain valve in side of tank for sediment and moisture removal.

c. Muffler and Exhaust Pipe (3). Muffler reduces noise. Exhaust pipe directs exhaust gases into air.

d. Hydraulic Tank (4). 18 gallon (68.4 liters) capacity. Sight gage on side of tank.

e. ROPS (5). Rollover protective structure. Also serves FOPS (Falling object protective structure).

f. Centershift (6). Provides five different blade positions for high and low bank work and other operations needing extending side reach.

g. Wheels and Tires (7). Interchangeable rim and wheel assemblies. Tubeless tires, 1300 x 24 size. Operating pressure, 35 psi (240 kPa).

h. Blade (8). Hydraulically controlled from cab, 12 ft (3658 mm) wide. Manual and hydraulic side shift. Front to rear tip.

i. Scarifier (9). Front mounted V-type. Removable shanks. Replaceable tips. Shank storage in front of vehicle.

j. Circle (10). Hydraulically driven from control in cab. Rotates blade.

k. Articulation Hitch (11). Provides 20 degree frame articulation, right or left. Hydraulically controlled from cab.

l. Batteries (12). Two 12 volt batteries, one on each side, connected in series providing a 24 volt system.

m. Transmission (13). Direct drive power shift transmission. Transmits power to differential.

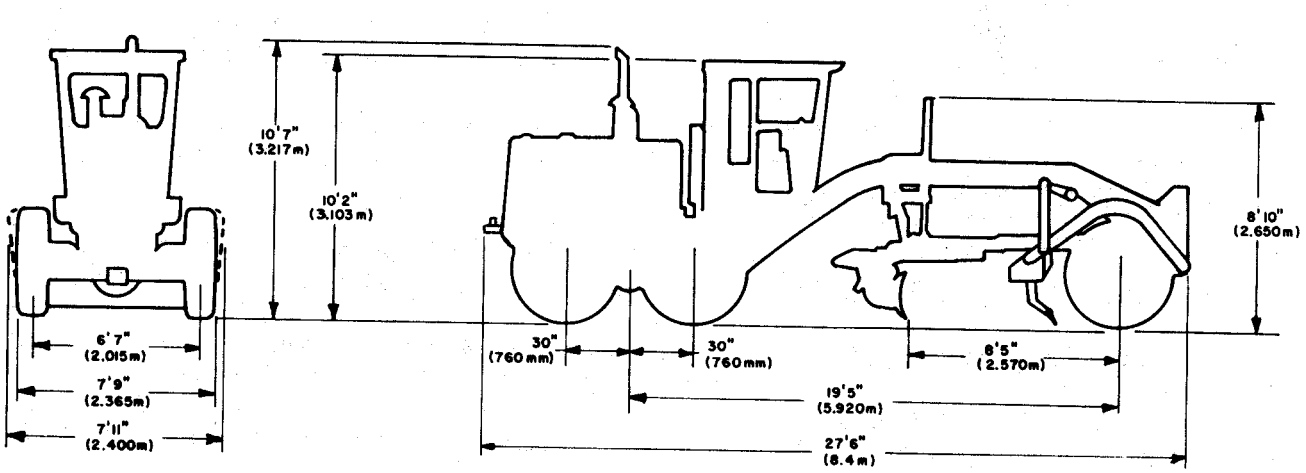
n. Radiator (14). 10 gallon (38 liter) capacity. Low and full marks in filler neck indicate proper coolant level.

1-9. EQUIPMENT DATA.

a. Manufacturer. Caterpillar Inc.

b. Model. R038 130 G

c. Dimensions.



d. Weight (Ready to work).

Weight on front wheels	9, 820 lb (4, 330 kg)
Weight on rear wheels	21, 360 lb (9, 445 kg)
Total weight	31, 180 lb. (13, 775 kg)

e. Speeds.

1st Forward and Reverse	2.3 mph (3.7 km/h)
2nd Forward and Reverse	3.7 mph (6.0 km/h)
3rd Forward and Reverse	5.9 mph (9.5 km/h)
4th Forward and Reverse	9.7 mph (15.6 km/h)
5th Forward and Reverse	15.5 mph (25.0 km/h)
6th Forward and Reverse	24.5 mph (39.4 km/h)

f. Circle Range.

g. Blade Range.

Circle centershift,	
Right	20.5 in (520 mm)
Left	25.5 in (650 mm)

h. Blade Sideshift.

Manual,	
Right	15 in (380 mm)
Left	None
Hydraulic,	
Right	26.5 in (670 mm)
Left	20.5 in (520 mm)

1-9. EQUIPMENT DATA.

i. Maximum Shoulder Reach Outside of Tires.*

Manual sideshift,	
Right	5 ft, 1 in (1.549 mm)
Left	4 ft, 3 in (1.295 mm)
Hydraulic.	
Right	6 ft, 1.5 in (1.867 mm)
Left	5 ft, 11 in (1.803 mm)

* With frame in crab position, add 3 ft, 11 in (940 mm) right or left.

j. Maximum Blade Position Angle, Right and Left. 90 degrees

k. Maximum Lift Above Ground. 17.25 in (440 mm)

l. Maximum Depth of Cut. 17.75 in (450 mm)

m. Hydraulic Blade Tip. 40 degrees forward; 5 degrees rear

n. Steering.

- Front wheels - Full hydraulic power. Supplemental power steering (electric)

- Steering range 50 degrees left or right
  Frame - Hydraulically - actuated steering 20 degrees left or right
  Minimum turning radius outside front tires) 24 ft (7, 315 mm)**

** Using front wheel steering, frame articulation and differential unlock.

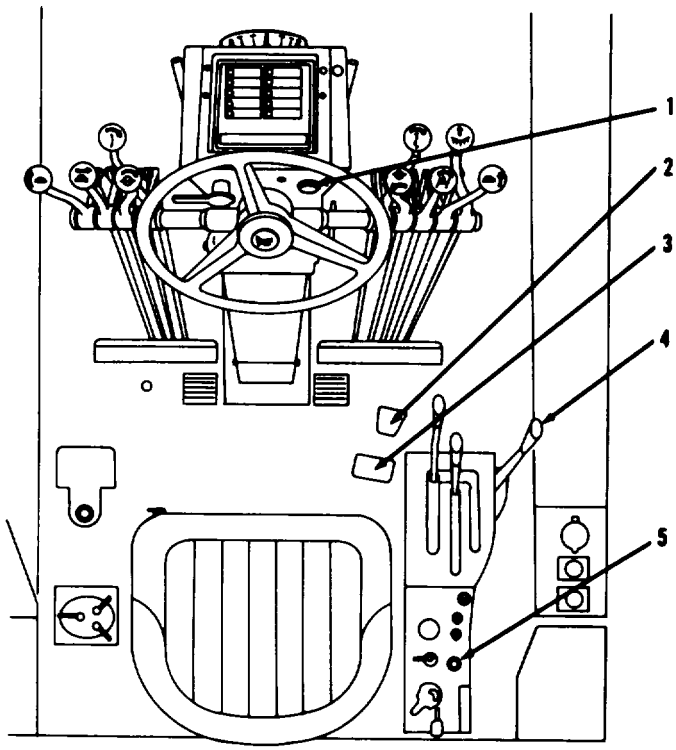
o. Capacities.

Fuel tank	75 gal (284 1)
Radiator	10 gal (38 1)
Crankcase	5.5 gal (21 1)
Transmission and final drive	21 gal (79 1)
Tandem housing (each)	17 gal (64 1)
Hydraulic system	18 gal (68 1)

Section III. TECHNICAL PRINCIPLES OF OPERATION

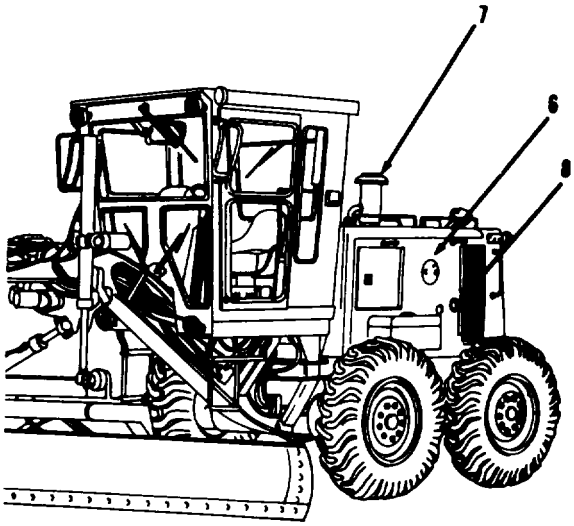
1-10. ENGINE. Model Number 3304. Four cylinder turbocharged diesel.

1-11. FUEL SYSTEM.



Legend

1. EMS-Fault light
2. Accelerator
3. Decelerator
4. Governor
5. Ether starting aid
6. Fuel tank
7. Air cleaner
8. Fuel tank drain valve



a. Accelerator (2). Increases engine speed above governor control setting. Also used in starting and stopping the engine.

b. Governor (4). Controls the amount of fuel needed to maintain desired engine rpm.

c. Decelerator (3). Decreases engine speed below governor control setting.

1-11. FUEL SYSTEM.

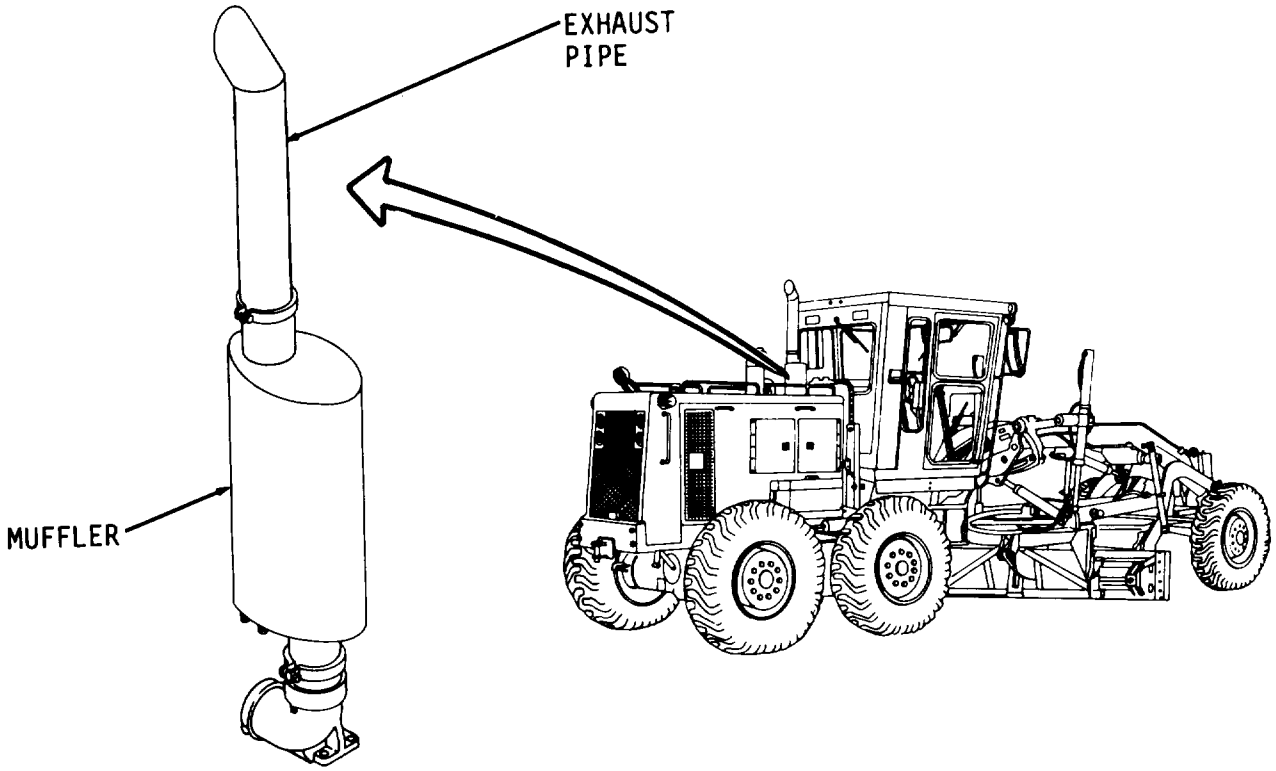
d. Fuel Tank (6). The fuel tank, 75 gal (284 liter) capacity, contains a dipstick in the filler neck for checking the fuel level. A shut-off valve is located in the lower right front of the tank. A drain valve (8) is located on the left side of the tank and is used to drain sediment and moisture from the tank.

e. Air Cleaner (7). Removes dust and dirt from air before it enters the engine. An air cleaner indicator is located on air cleaner elbow. It indicates when air flow is blocked by dirty filters.

f. Fault Light (1) and Alarm. The fault light will blink on and off and the fault alarm will sound if the fuel pressure drops.

g. Ether Start Aid (5). Injects a metered amount of ether into the engine fuel system to aid in cold weather starting.

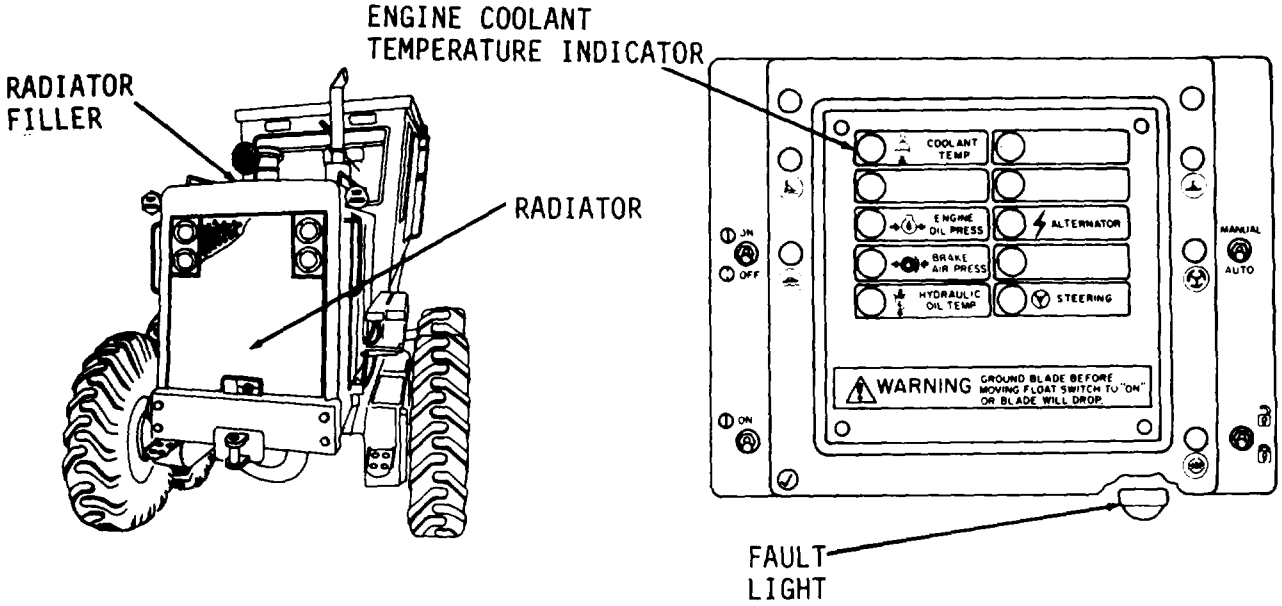
1-12. EXHAUST SYSTEM.



a. Muffler. Muffles engine noise.

b. Exhaust Pipe. Discharges engine smoke into the atmosphere.

1-13. COOLING SYSTEM.



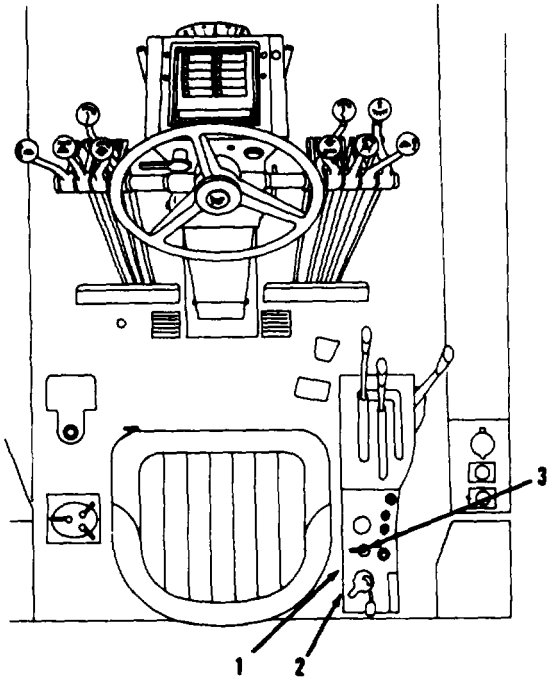
a. Radiator. Rear mounted (with fan). Acts as coolant reservoir and heat exchanger to cool engine fluid. Low coolant and full coolant marks inside radiator filler neck.

b. Engine Coolant Temperature Indicator. Flashes on and off when temperature is too high. Fault light also blinks on and off.

1-14. ELECTRICAL SYSTEM.

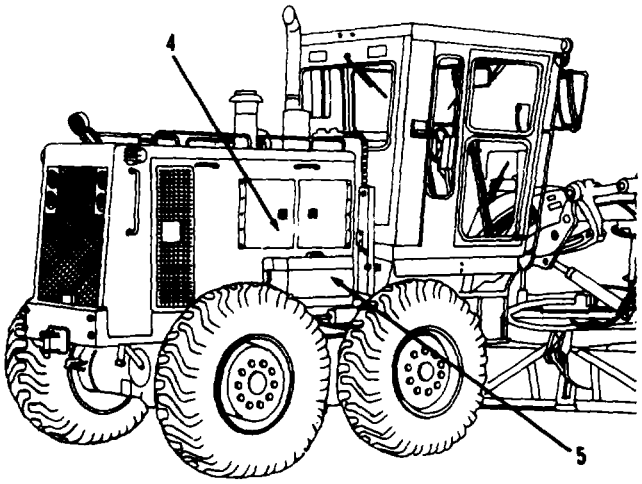
a. Starting Circuit.

a. Starting Circuit.



Legend

1. Circuit breaker
2. Disconnect switch
3. Start switch
4. Starter motor
5. Batteries



1-14. ELECTRICAL SYSTEM.

a. Starting Circuit.

(1) Circuit breaker (1). Automatically turns electrical system off in case of a fault.

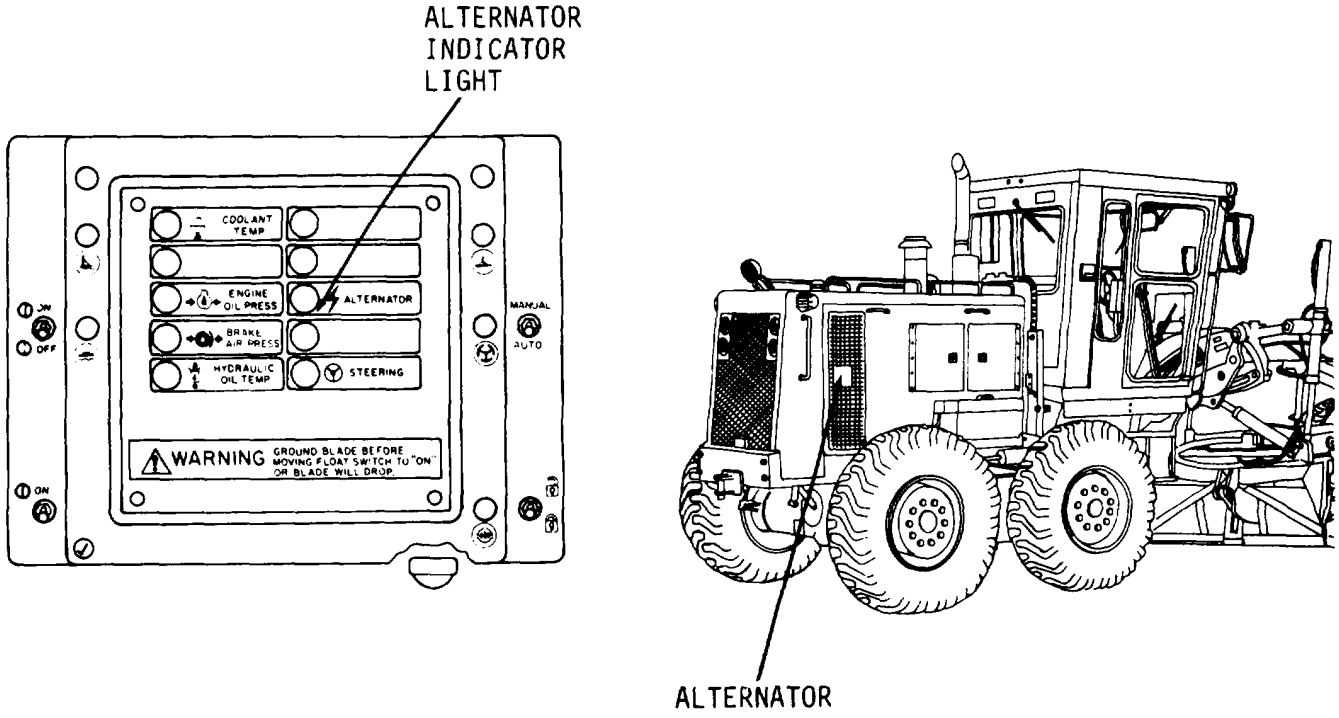
(2) Disconnect switch (2). Turns vehicle's electrical system on and off.

(3) Start switch (3). Engages starter motor.

(4) Starter motor (4). Inside engine compartment right side, cranks engine when engaged by start switch.

(5) Batteries (5). Two 12 volt batteries connected in series providing a 24 volt system.

b. Charging Circuit.



(1) Alternator. 24 volts/50 amps.

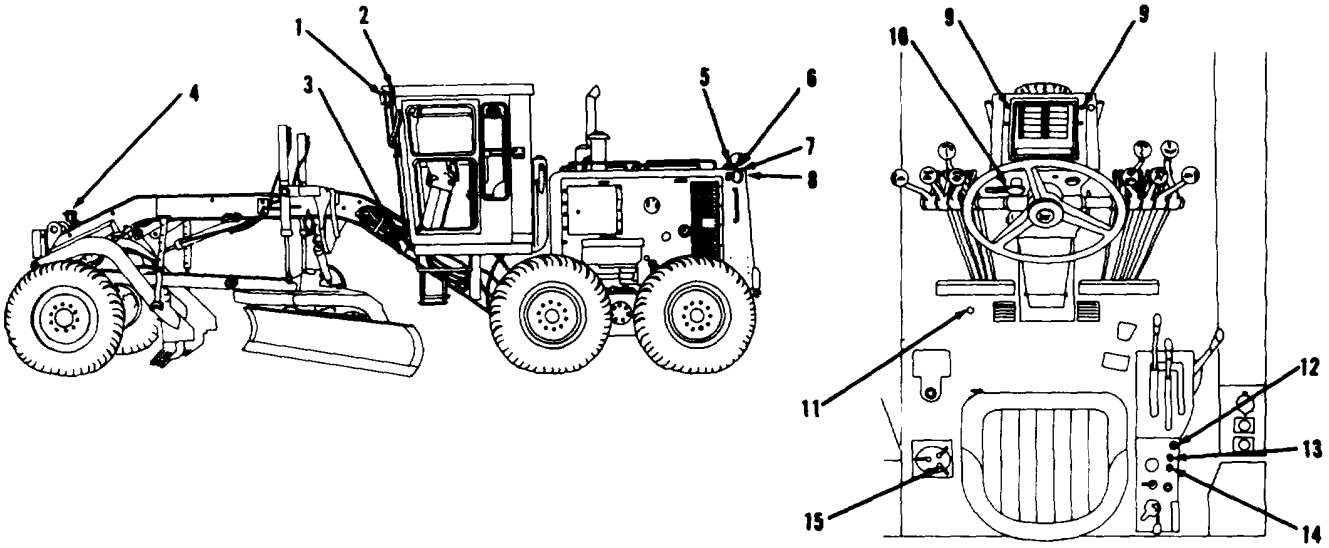
(2) Alternator fault indicator. Flashes on and off when there is a fault in the charging circuit.

1-14. ELECTRICAL SYSTEM.-Continued

c. Lighting Circuit.

Legend

1. Headlights
2. Cab turn signals
3. Front floodlights
4. Blackout driving light
5. Rear floodlight
6. Blackout stop and taillights
8. Rear turn signals
9. Turn signal indicators
10. Turn signal lever
11. Dimmer switch
12. Panel light
13. Front floodlight switch
14. Rear floodlight switch
15. Vehicle light switch



(1) Headlights (1). Provide light for roading and operating at night.

(2) Cab turn signals (2). Indicate left or right turn. Flash on and off for emergency stopping.

(3) Front floodlights (3). Provide light around blade area for night operation.

(4) Blackout driving light (4). Provides forward blackout illumination during tactical operations.

(5) Rear floodlight (5). Provides light to the rear for night operations.

1-14. ELECTRICAL SYSTEM.

c. Lighting Circuit.

(6) Blackout stop and tail lights (6). Provide stop light and tail light illumination during tactical operations.

(7) Tail/stop lights (7). Provide stop lights and tail light illumination during normal operation.

(8) Front and rear turn signals (8). Indicate left or right turn. Flash on and off for emergency stopping.

(9) Turn signal indicators (9). Flash on and off for left or right turns.

(10) Turn signal lever (10). Activates front and rear turn signals for left and right hand turns, and for emergency on and off flashing.

(11) Dimmer switch (11). Changes headlights from low to high beam.

(12) Panel Light (12). Lights operator's panel.

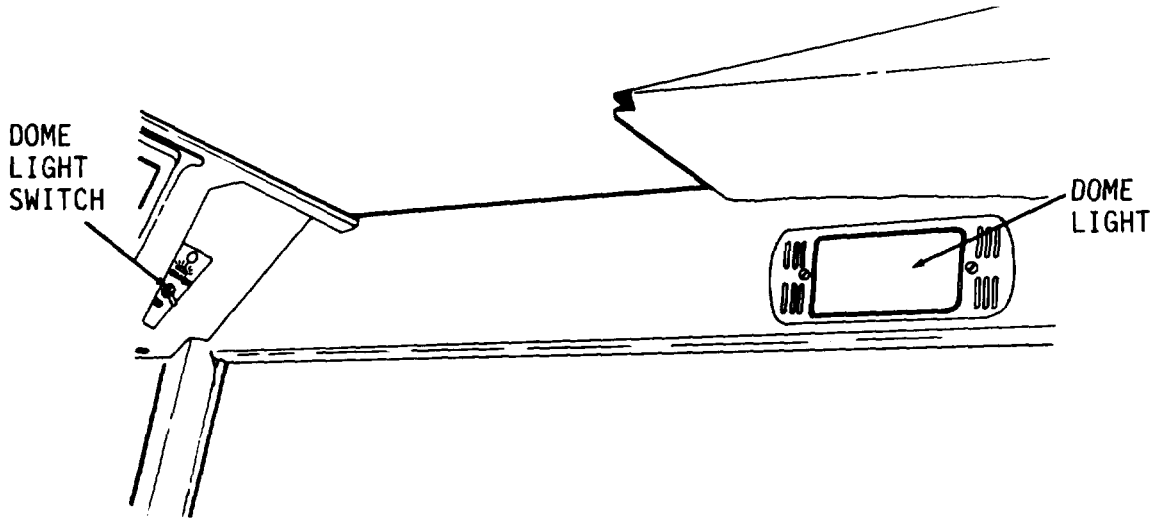
(13) Other panel lights (Not Shown). One for front windshield wiper/washer controls (to right of operator in cab); two for instrument panel (outside cab on right front of engine compartment).

(14) Front floodlight switch (13). Turns front floodlights on and off.

(15) Rear floodlight switch (14). Turns rear floodlight on and off.

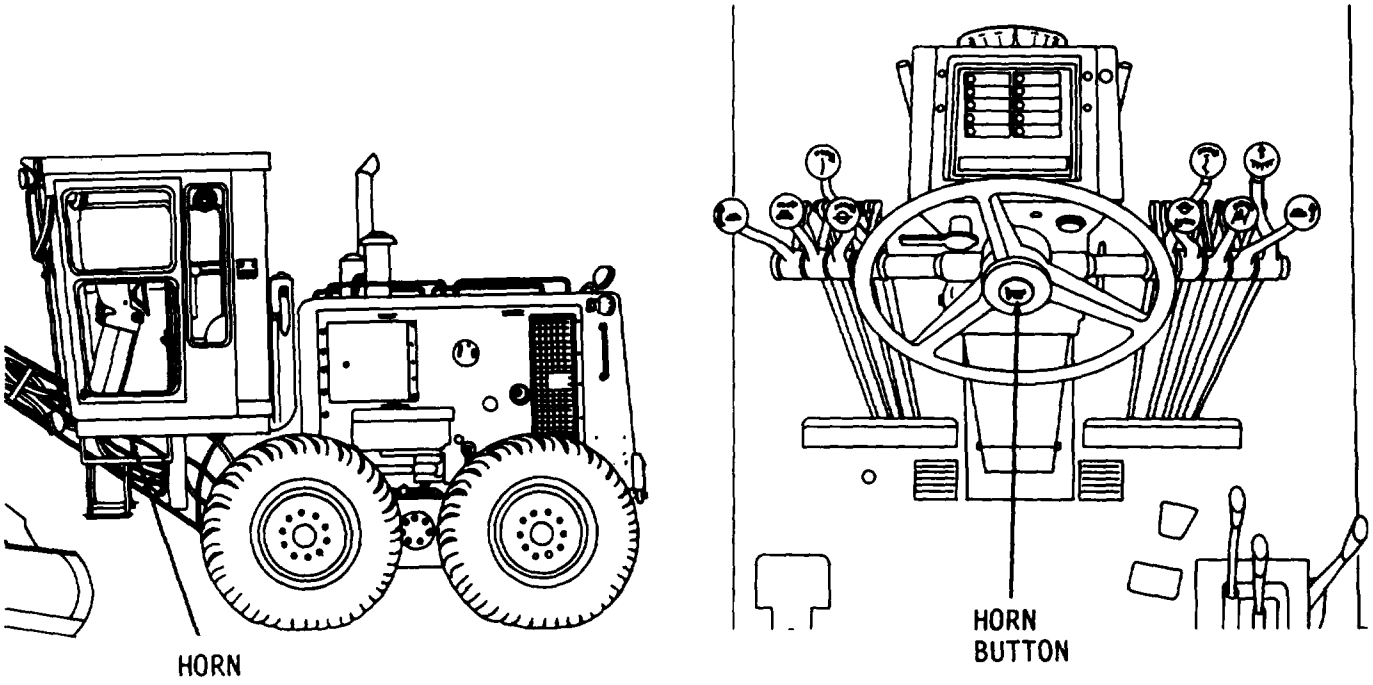
(16) Vehicle light switch assembly (15). Consists of three switches; lock, main and auxiliary switch. Activates and deactivates vehicle lights and switches, except dome light and switch.

(17) Dome light and switch. Provides dim and bright cab illumination. Switch has BRIGHT, OFF and DIM position.



1-14. ELECTRICAL SYSTEM.-Continued

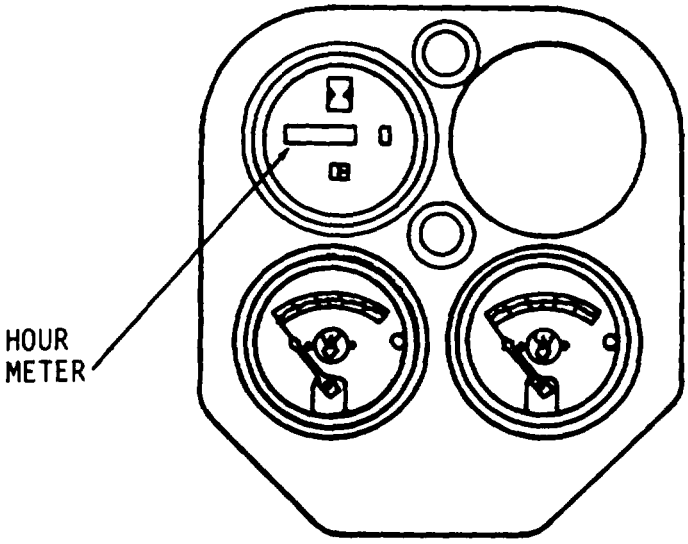
d. Horn.



(1) Horn button. Located on steering wheel. Used to sound horn.

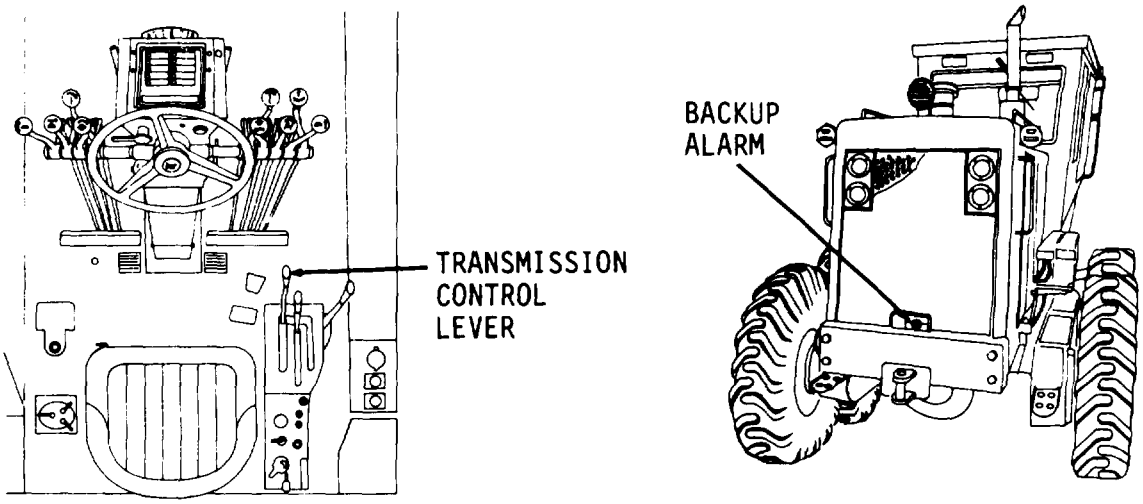
(2) Horn. Electric horn on left side of vehicle beneath operator's compartment.

e. Hour Meter. Located on right front of engine compartment. Registers the total number of hours the engine runs.



1-14. ELECTRICAL SYSTEM.

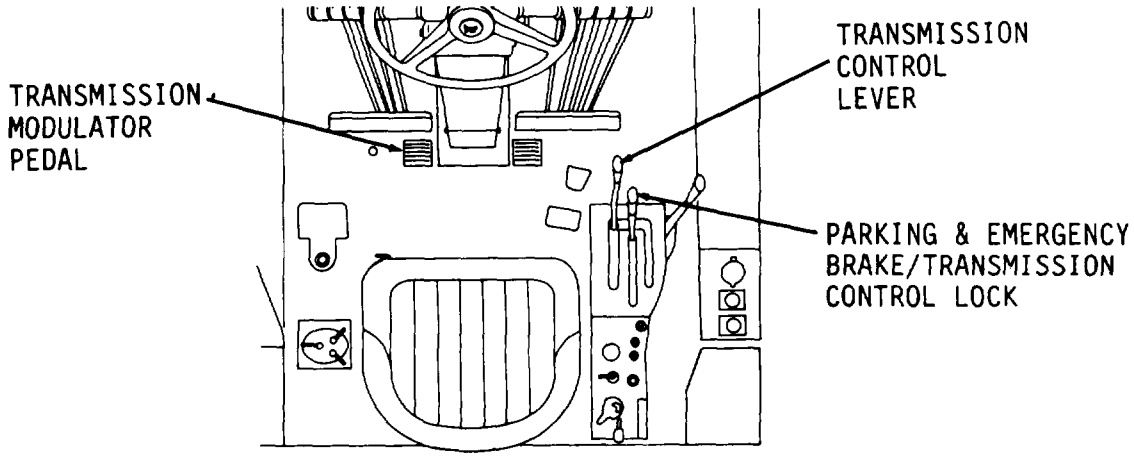
f. Backup alarm.



(1) Transmission control lever. When the lever is moved to reverse, the backup alarm will sound.

(2) Backup alarm. Sounds to warn personnel that the vehicle is backing up. Loudness control switch on back of alarm has three positions; high, low and medium.

1-15. TRANSMISSION AND CONTROLS.

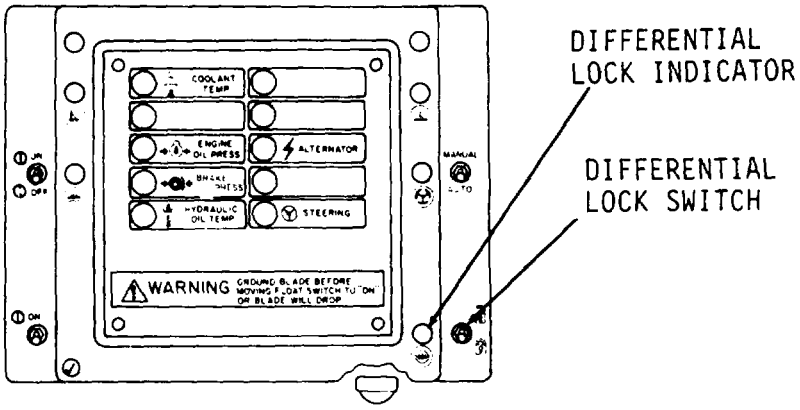


a. Transmission Control Lever. Used to select direction and speed.

b. Transmission Modulator Pedal. Disengages power to wheels. Provides inching control for moving slowly around objects and maneuvering in tight situations.

c. Parking and Emergency Brake/Transmission Control Lock. Forces transmission into neutral and engages the parking brake.

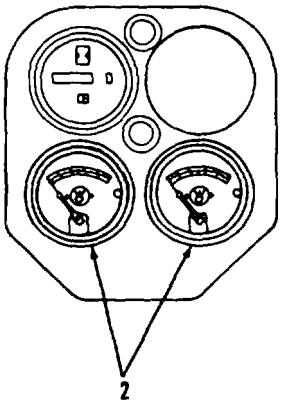
1-16. REAR AXLE AND DIFFERENTIAL LOCK SWITCH AND INDICATOR. Full-floating, forged, heat-treated steel rear axle houses differential. Differential lock indicator and switch on EMS panel permits locking and unlocking of differential.

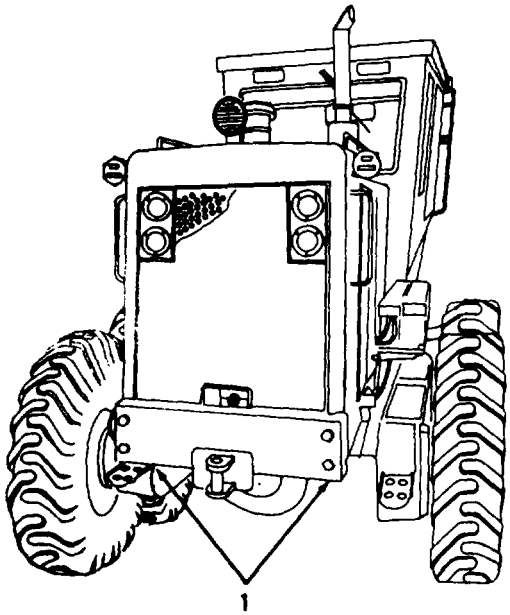


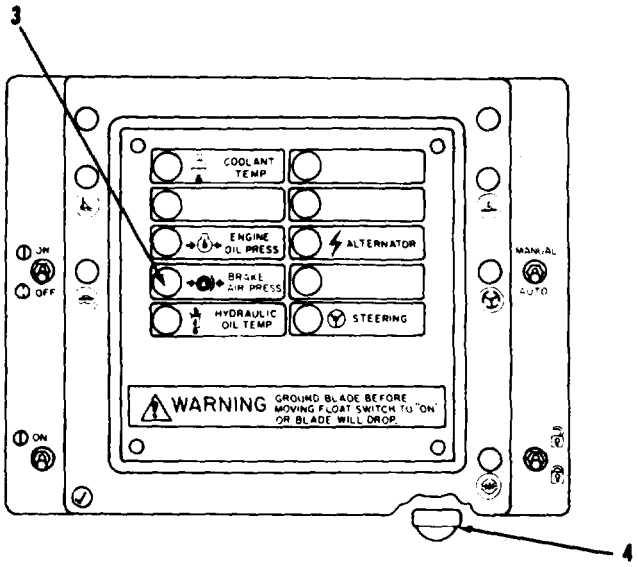
1-17. AIR SYSTEM.

Legend

1. Tank drain valves
2. Air pressure gage
3. EMS brake air pressure fault indicator
4. EMS fault light







a. Compressor (Not Shown). A single-stage, reciprocating piston type with two cylinders, builds and maintains air pressure required to operate air brakes and other systems.

1-17. AIR SYSTEM.

b. Tank With Drain Valves (1). Two section air tank with drain valve for each section, located at rear of vehicle.

c. Air Pressure Gages (2). Two gages, one for each air circuit, indicate, air pressure.

d. EMS Brake Air Pressure Fault Indicator (3). Flashes on and off when air pressure falls below 65 psi (449 kPa).

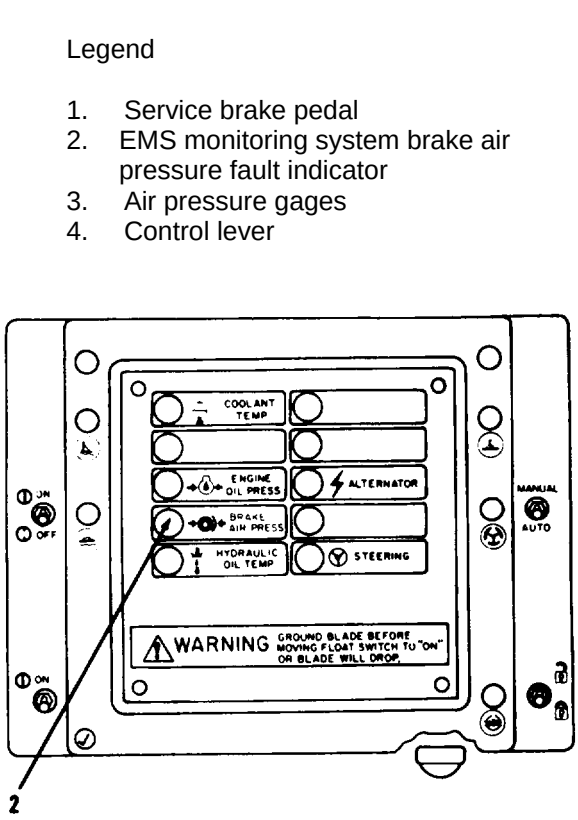
e. EMS Fault Light (4). On steering console below EMS panel. Flashes on and off when air pressure falls below 65 psi (449 kPa).

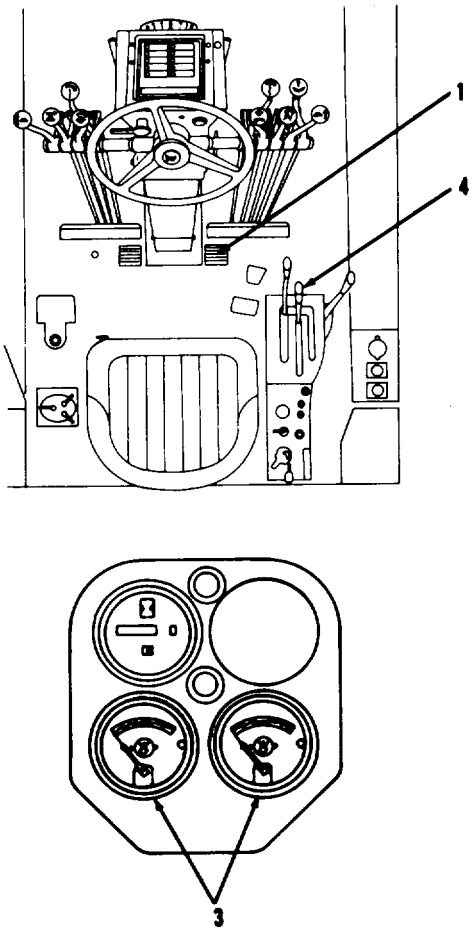
f. EMS Fault Alarm (Not Shown). Located in operator's panel console. Sounds when air pressure, in either circuit, falls below 65 psi (449 kPa).

1-18. BRAKES.

Legend

1. Service brake pedal
2. EMS monitoring system brake air pressure fault indicator
3. Air pressure gages
4. Control lever





a. Service Brakes. Four-wheel, air-actuated, oil disc brakes. Completely sealed. Adjustment free. Separate air circuits for each set of tandems.

(1) Service brake pedal (1). Used for slowing and/or stopping vehicle.

1-18. BRAKES.-Continued

a. Service Brakes.-Continued

(2) EMS brake air pressure fault indicator (2). Flashes on and off when brake air pressure falls below 65 psi (448 kPa). (Fault light and fault alarm are also activated.)

(3) Air pressure gages (3). Located on instrument panel on right front of engine compartment. One gage for each brake air circuit.

b. Parking/Emergency Brake.

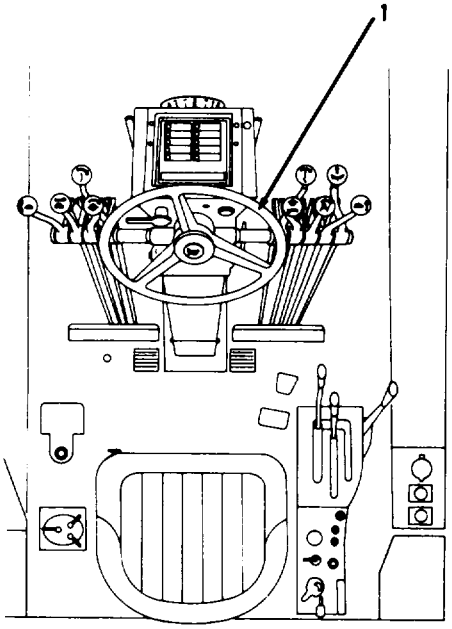
(1) Control lever (4). Activates parking/emergency brake. Also locks transmission control lever in neutral.

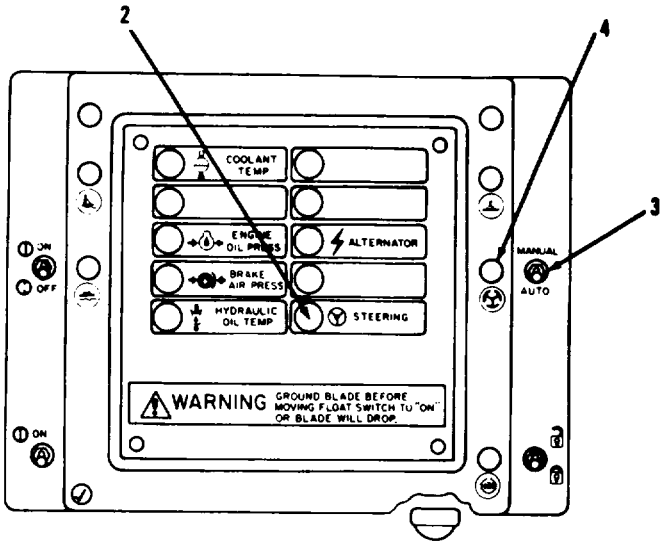
(2) Brake (Not Shown). Located in transmission. Spring engaged when control lever is moved to the PARK position. Air pressure disengaged.

1-19. STEERING. Full hydraulic power, front wheel steering.

Legend

1. Steering wheel
2. EMS steering fault indicator
3. Supplemental steering function switch
4. Supplemental steering function indicator





1-19. STEERING.

a. Steering Wheel (1). Turns front wheels 50 degrees right or left.

b. Cylinders (Not Shown). Turns front wheels when steering wheel is turned.

c. EMS Steering Fault Indicator (2). Flashes on and off when there is a breakdown in main or supplemental steering system. Fault light and fault alarm are also activated.

d. Supplemental Steering. Electric motor driven. Operates automatically or manually.

Sensor in main steering system automatically activates supplemental steering in case of a main steering malfunction.

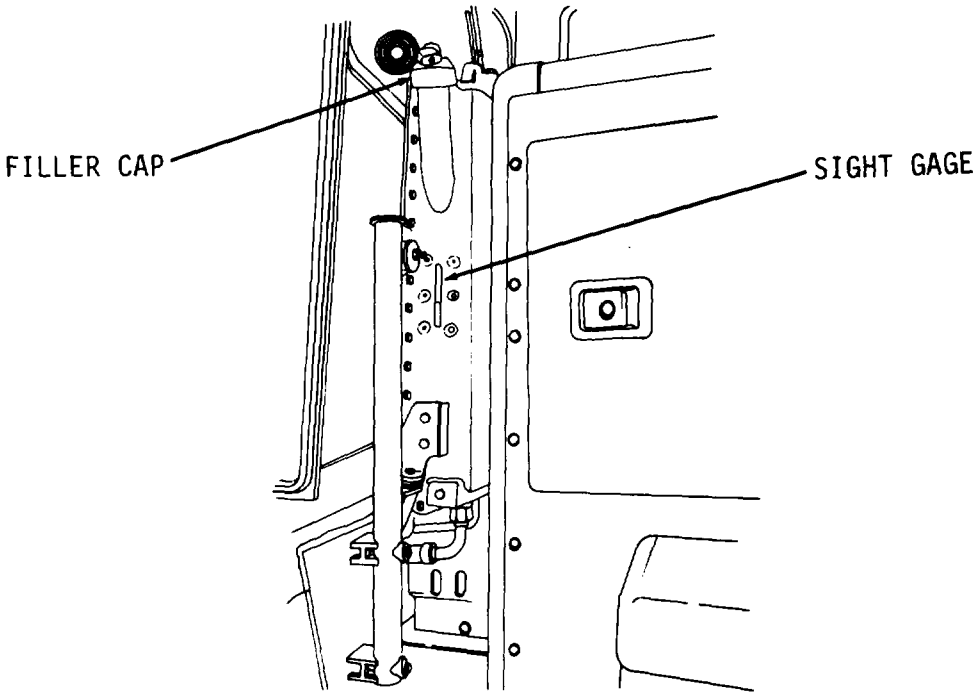
(1) Supplemental steering function switch (3). For manual operation of system.

(2) Supplemental steering function indicator (4). Lights when system is turned on manually or automatically.

e. Frame Steering. Articulates 20 degrees right or left. Refer to paragraph 1-20.

1-20. EARTH MOVING EQUIPMENT.

a. Reservoir and Sight Gage. Holds fluid for vehicle hydraulic system, which activates earth moving equipment.

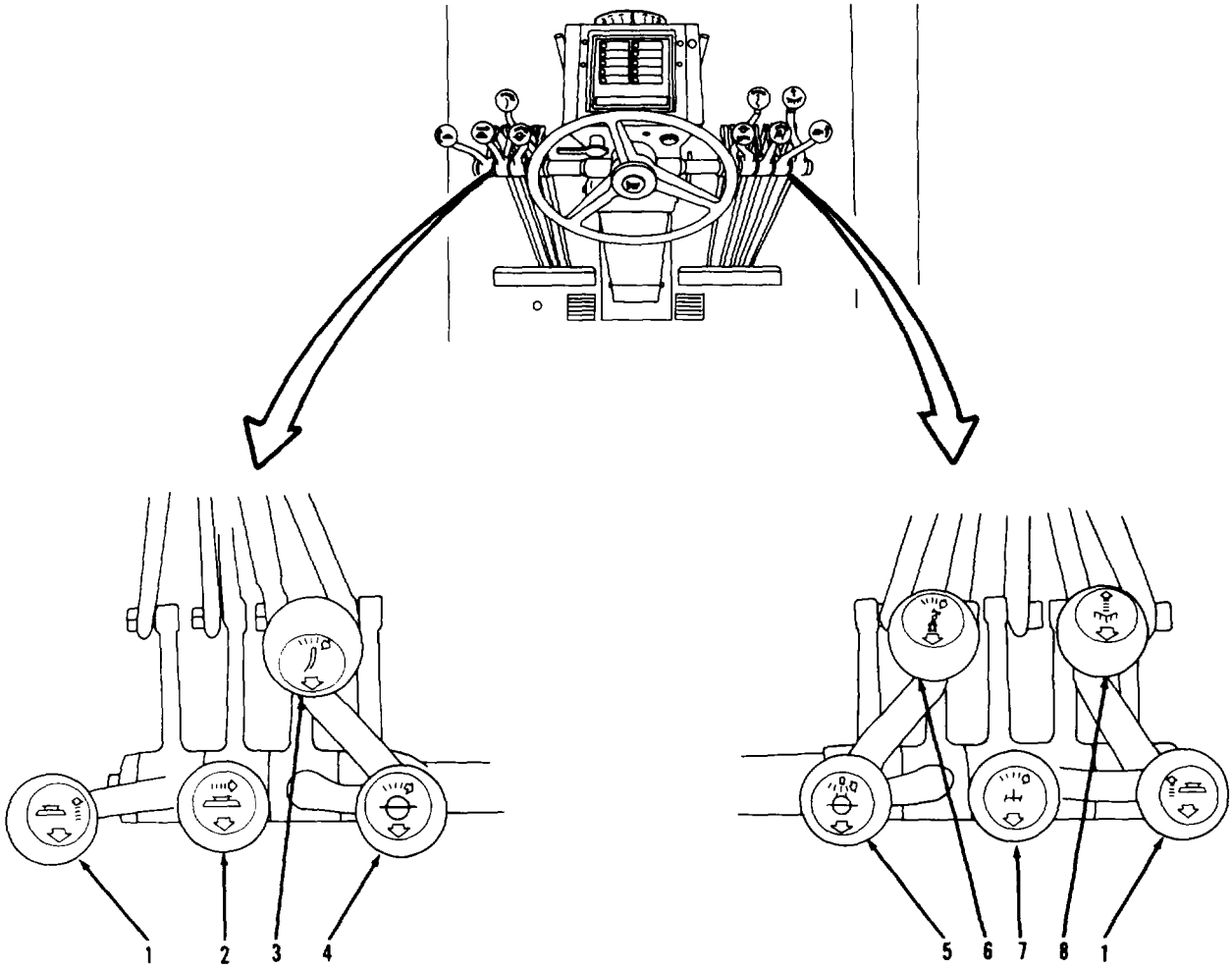


1-20. EARTH MOVING EQUIPMENT.-Continued

b. Control Levers.

Legend

1. Blade lift controls
2. Blade side shift control
3. Blade tip control
4. Circle drive control
5. Circle centershift control
6. Articulation control
7. Wheel lean control
8. Scarifier control



(1) Left side and right side blade lift controls (1). Levers activate blade lift cylinders which raise and lower blade. Levers also used, with centershift lock pin control, to change position of centershift pin.

(2) Blade side shift control (2). Lever activates cylinder to side shift blade to right or left.

1-20. EARTH MOVING EQUIPMENT.

(3) Blade control (3). Lever activates blade cylinder which moves blade to front or rear for best rolling action.

(4) Circle drive control (4). Lever activates circle drive motors which rotate circle and blade clockwise or counterclockwise.

(5) Circle centershift control (5). Lever activates centershift cylinder to move circle and blade to left or right.

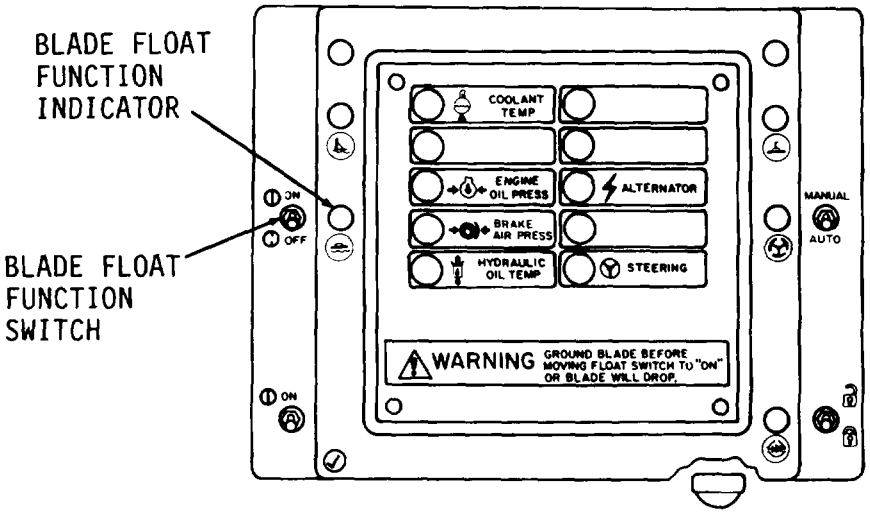
(6) Articulation control (6). Lever activates articulation cylinders which articulate (bend) frame at articulation hitch area 20 degrees to the left or right.

Articulation indicator above EMS panel indicates degree of articulation to right or left.

(7) Wheel lean control (7). Lever activates cylinder to lean front wheels 18 degrees to right or left to overcome side drift and change depth of cut in sloping and banking operations; also aids in steering.

(8) Scarifier control (8). Lever activates cylinders to raise and lower scarifier.

c. Blade Float.

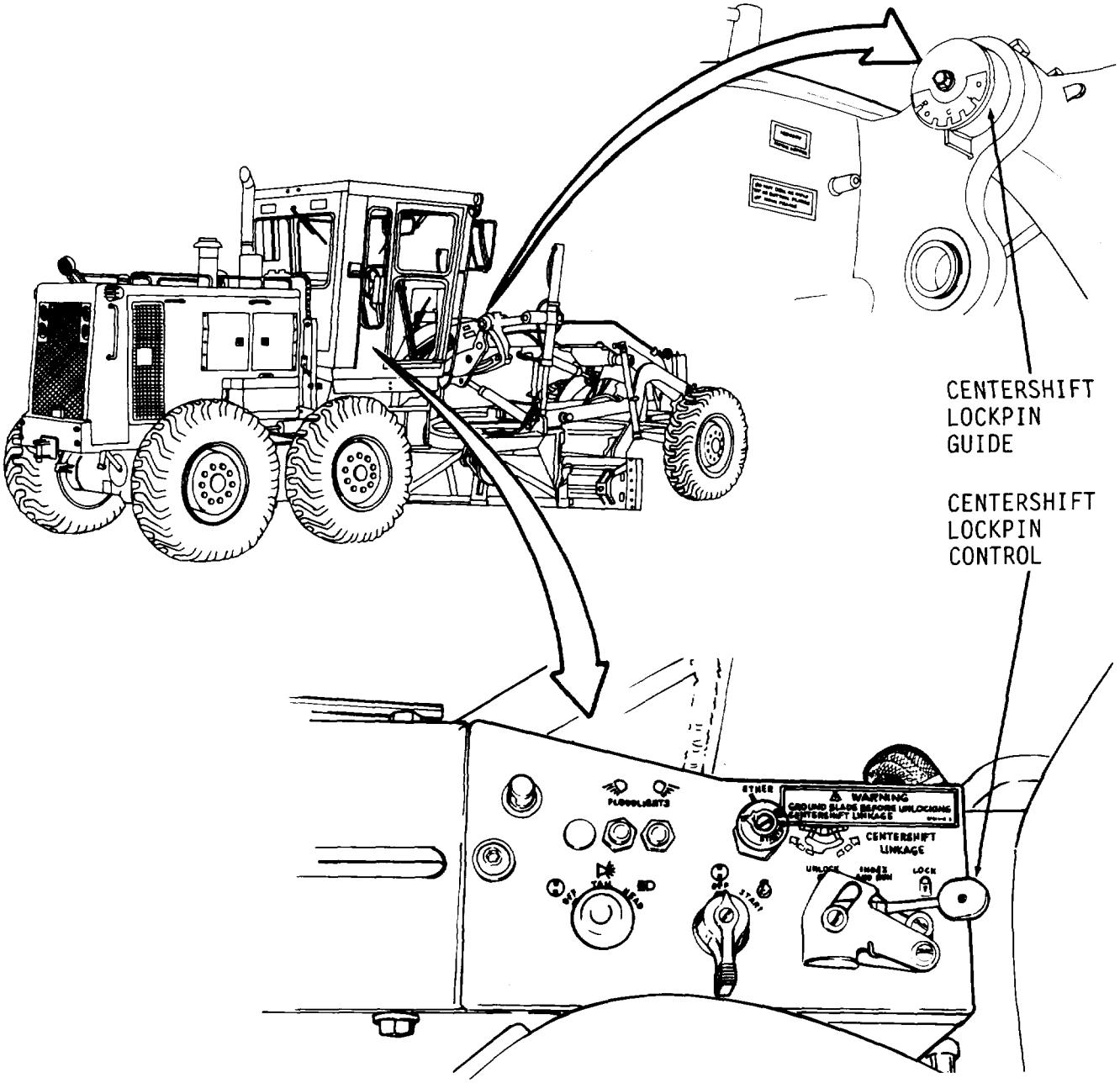


(1) Blade float function switch. Turns on blade float system so blade will move up and down following ground contour.

(2) Blade float function indicator. Lights when blade float system is activated.

1-20. EARTH MOVING EQUIPMENT.-Continued

d. Centershift Lockpin.



(1) Centershift lockpin control. Located on operator's panel console. Three position switch. Locks and unlocks centershift lockpin using air pressure and spring action. Used with left and right side blade lift controls to reposition centershift pin for different operations.

(2) Centershift lockpin guide. Guides operator in moving centershift lockpin to new position. Five top marks on guide indicate five centershift positions. Bottom mark indicates position of centershift pin.

CHAPTER 2

OPERATING INSTRUCTIONS

CHAPTER OVERVIEW

This chapter describes the operation of vehicle controls, switches and indicators. It includes Preventive Maintenance Checks and Services (PMCS) and step-by-step vehicle operating procedures.

INDEX

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

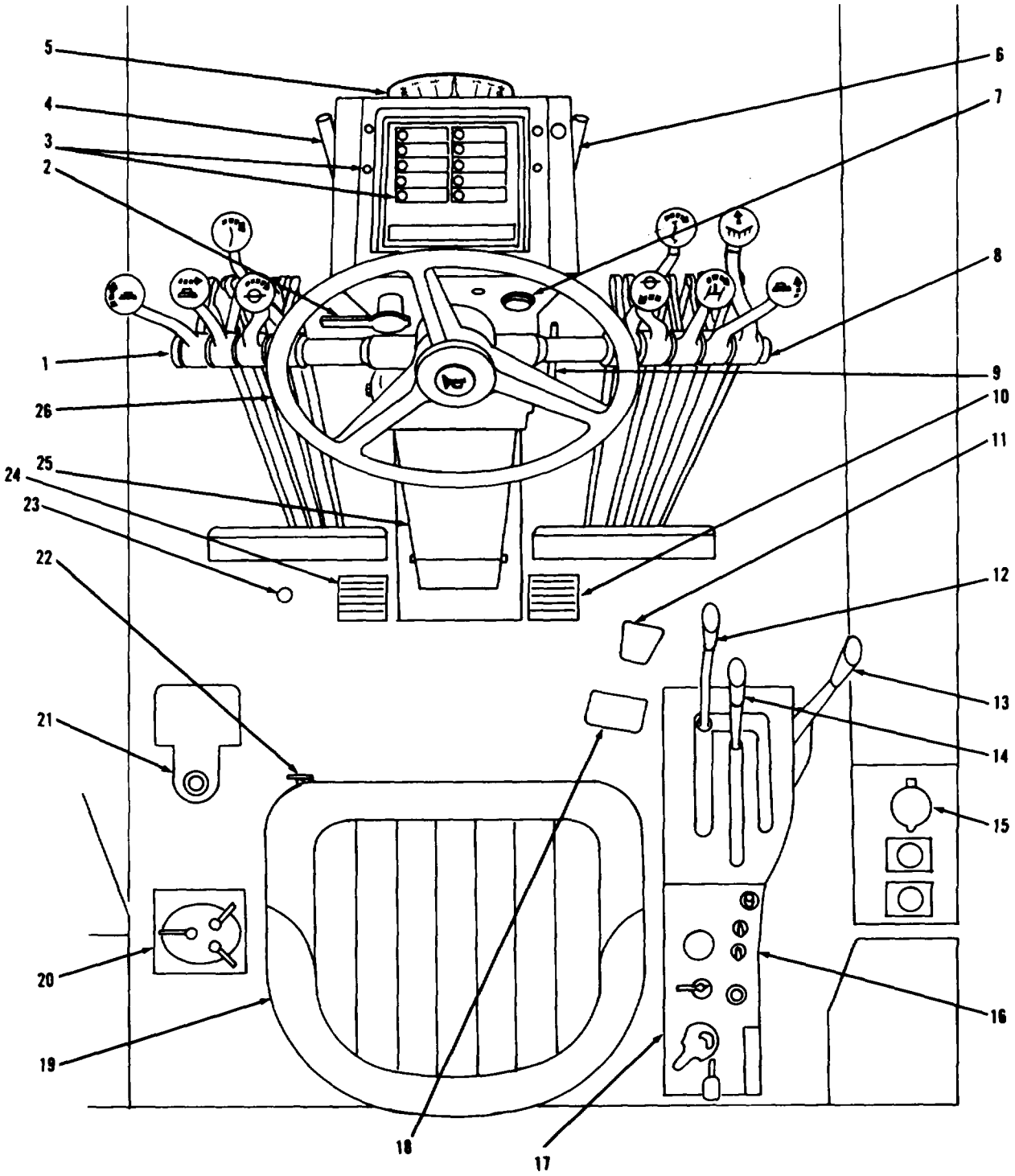
2-1. OPERATOR'S COMPARTMENT.

The illustrations shows the location of the major operator controls and indicators.

Legend

1. Left side, earth moving controls
2. Turn signal lever
3. EMS panel
4. Steering console adjustment lever
5. Articulation indicator
6. Steering console adjustment lever
7. Fault light
8. Right side, earth moving controls
9. Steering wheel tilt lock
10. Service brake
11. Accelerator
12. Transmission control
13. Governor control
14. Parking/emergency brake and transmission lock control
15. Windshield washer reservoir and fill
16. Operator's panel
17. Main disconnect switch and circuit breaker
18. Decelerator
19. Seat
20. Vehicle light switch assembly
21. Hydraulic unloading valve
22. Heater and controls (under seat)
23. Dimmer switch
24. Transmission modulator pedal
25. Steering console
26. Steering wheel

2-1. OPERATOR'S COMPARTMENT.



2-2. STEERING CONSOLE.

a. Electronic Monitoring System (EMS).

NOTE

The EMS system provides three levels of warning. The first requires awareness. The second requires you to take the indicated action. The third level requires immediate shutdown of the vehicle.

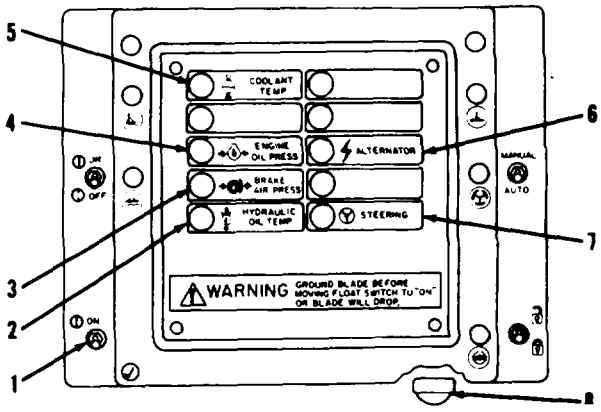
Level One: Only the EMS panel alternator fault indicator flashes for low alternator output. Continue to operate until repairs can be made. Use electrical equipment sparingly so you won't drain the batteries.

Level Two: Fault indicator(s) flash and fault light blinks. This is for high coolant and high hydraulic temperatures. You must reduce workload to three-fourths. Maintain full engine RPM to help reduce temperature. If indicator(s) remains on after ten minutes of operation at three-fourths workload, notify your supervisor or organizational maintenance.

Level Three: Fault indicator(s) flash, fault light blinks and the fault alarm sounds. This is for low engine oil pressure, low brake air pressure and lose of primary and/or supplemental steering. Stop the vehicle and engine immediately. Turn off the disconnect switch.

Legend

1. EMS panel test switch
2. Hydraulic oil temperature
3. Brake air pressure fault Indicator
4. Engine oil pressure fault indicator
5. Coolant temperature fault indicator
6. Alternator fault indicator
7. Steering fault indicator
8. Fault light



2-2. STEERING CONSOLE.

a. Electronic Monitoring System (EMS).

NOTE

EMS fault alarm is located under operator's console (not visible).

(1) EMS panel test switch (1). With disconnect switch on, hold test switch in ON position. Ms panel indicators flash, fault light blinks. If any panel indicators or the fault light do not work, notify organizational maintenance.

(2) Hydraulic oil temperature fault indicator (2). LEVEL TWO WARNING. Flashes on and off, fault light blinks on and off indicating hydraulic oil temperature is too high (above 190 degrees F (88 degrees C)).

(3) Brake air pressure fault indicator (3). LEVEL THREE WARNING. Flashes on and off it pressure in either air circuit falls below 65 psi (449 kPa). The fault light and fault alarm also are activated.

(4) Engine oil pressure fault indicator (4). LEVEL THREE WARNING. Flashes on and off to indicate low oil pressure, below 9 psi (62 kPa). The fault light and fault alarm also are activated.

(5) Coolant temperature fault indicator (5). LEVEL TWO WARNING. Flashes on and off when engine coolant temperature is too high, above 225 degrees F (107 degrees C). Fault light blinks on and off.

(6) Alternator fault indicator (6). LEVEL TWO WARNING. Flashes on and off indicating malfunction in charging circuit. Fault light also blinks on and off.

(7) Steering fault indicator (7). LEVEL THREE WARNING. Flashes on and off to indicate loss of primary and/or supplementary steering. Fault light blinks on and off, fault alarm sounds.

(8) Low fuel pressure warning (Not Shown). LEVEL THREE WARNING. Fault light blinks on and off and fault alarm sounds when fuel pressure drops.

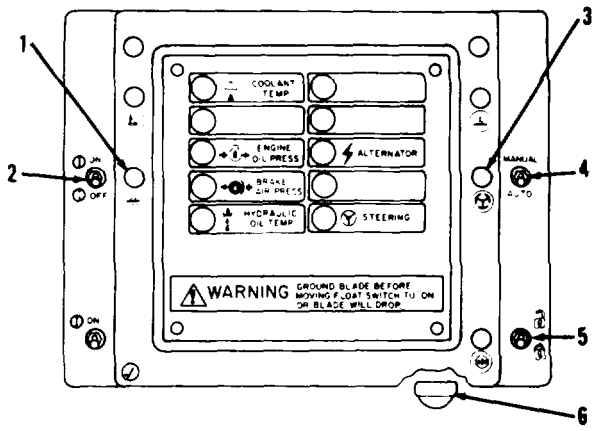
(9) Fault light (8). Blinks on and off as indicated above.

2-2. STEERING CONSOLE.-Continued

b. Function Indicators/Switches.

Legend

1. Blade float indicator
2. Blade float switch
3. Supplemental steering indicator
4. Supplemental steering switch
5. Differential lock switch
6. Differential lock indicator



WARNING

Blade will drop when float switch is moved to ON, with engine running.

(1) Blade float indicator/switch (1), (2). Move switch to ON position. The indicator will light showing the system is working and the blade will move up and down, following the ground contour. Move the switch to OFF position to turn the system off.

(2) Supplemental steering indicator/switch (3), (4). Hold and move switch to the MANUAL position. Indicator lights show if system is working. Release and switch returns to AUTO position.

Switch must be in AUTO position while operating vehicle.

In this position, supplemental steering provides steering control if engine stalls.

NOTE

Electronic motor drive has high battery drain and limited time duration.

(3) Differential lock indicator/switch (5), (6). Move switch to the lock position and the differential is locked. If the tandem wheels on one side of the vehicle spin, the tandem wheels on the other side can move the vehicle if they are on a firm surface.

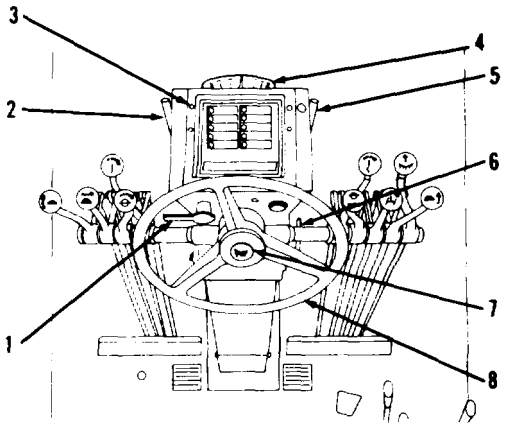
Move the switch to the unlock position. Now, the speed of the wheels can be different. The indicator light shows that the differential is unlocked.

2-2. STEERING CONSOLE.

c. Other Controls and Indicators.

Legend

1. Turn signal lever
2. Steering console lock levers
3. Left turn signal indicator
4. Articulation indicator
5. Right turn signal indicator
6. Steering wheel tilt lock
7. Horn
8. Steering wheel



(2) Turn signal indicators (3), (5). Flash on and off indicating left or right turn.

(3) Steering console lock levers (2). Console adjusts forward and backward to suit individual operator.

Levers on each side of console. Push forward or backward to unlock.

Adjust console.

Move levers to center. Console locks in adjusted position.

(4) Articulation indicator (4). Graduated at half and maximum articulation right and left. Lets operator know degree of articulation.

(5) Steering wheel tilt lock (6). Steering wheel tilts up or down to suit individual operator.

Turn lock lever counterclockwise to unlock steering wheel.

Adjust.

Turn lock lever clockwise to lock steering wheel in selected position.

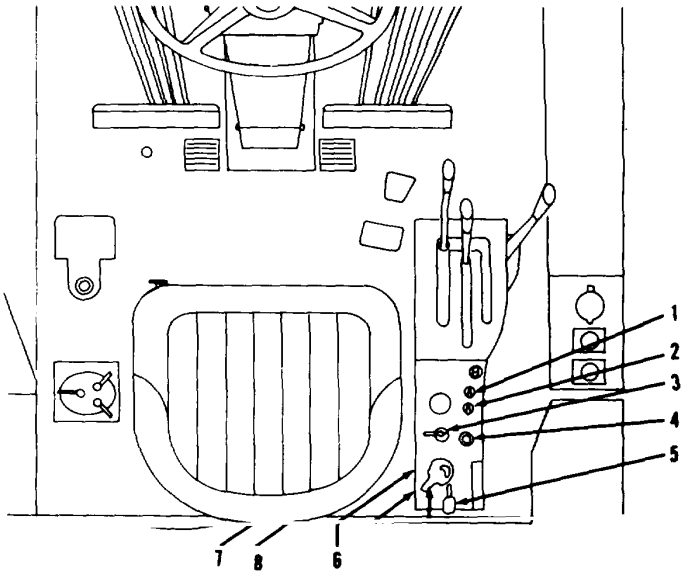
(6) Horn (7). Press to blow horn. Main switch on vehicle light switch assembly must be in SER. DRIVE position for horn to operate. (Refer to paragraph 2-6.)

(7) Steering wheel (8). Steers vehicle by turning front wheels. Turn clockwise for right hand turn. Turn counterclockwise for left hand turn.

2-3. OPERATOR'S PANEL.

Legend

1. Front floodlight switch
2. Rear floodlight switch
3. Engine start switch
4. Ether starting aid
5. Centershift lock pin switch
6. Safety lock
7. Circuit breaker
8. Disconnect switch



a. Front Floodlight Switch (1). Turns front floodlights off and on.

b. Rear Floodlight Switch (2). Turns rear floodlights off and on.

c. Engine Start Switch (3). Push down and turn clockwise to START position. This engages starter motor. Release and switch returns to OFF position.

d. Ether Starting Aid (4).

CAUTION

Inject ether starting aid only while cranking the engine. Use sparingly. Excessive ether can cause piston and ring damage. Use ether for cold weather starting only. Push knob to inject a metered amount of ether.

e. Centershift Lock Pin Switch (5).

WARNING

Ground blade before retracting centershift pin.

2-3. OPERATOR'S PANEL.

CAUTION

When operating vehicle, centershift linkage lock must be in INDEX AND RUN position.

Move centershift pin in and out of centershift holes to:

UNLOCK position: Air pressure moves the pin out of the centershift hole.

INDEX AND RUN position: Spring force locates the pin in the base.

LOCK position: The pin is moved fully into the centershift hole under air pressure.

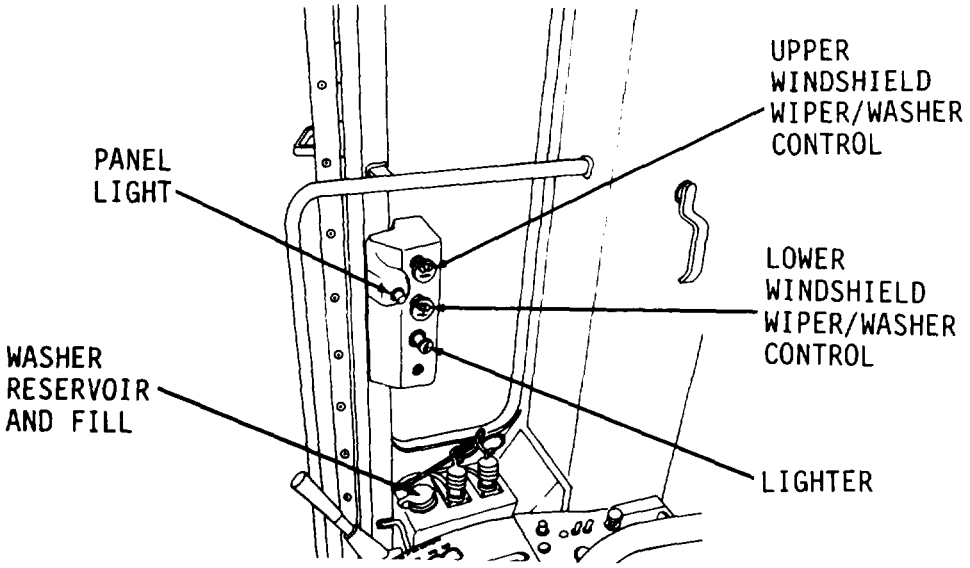
f. Safety Lock (6). Spring-loaded. Locks centershift lock pin switch. Move left to release.

g. Circuit Breaker (7). Located above the disconnect switch on the panel. Press in to reset. Button will remain depressed if electrical system is in order. If it does not remain depressed, turn disconnect switch to the OFF position. Notify your supervisor or organizational maintenance.

h. Disconnect Switch (8). On the left side of panel facing the right side of operator's seat. Insert key, turn clockwise to turn electric system on. Counterclockwise for off.

2-4. WINDSHIELD WASHER/WIPER CONTROLS.

On right side of operator's compartment.



2-4. WINDSHIELD WASHER/WIPER CONTROLS.-Continued

a. Upper Front Wiper. Two-speed control. Turn clockwise. First notch for slow, second notch for fast. Push in to operate windshield washer. Turn counterclockwise for off.

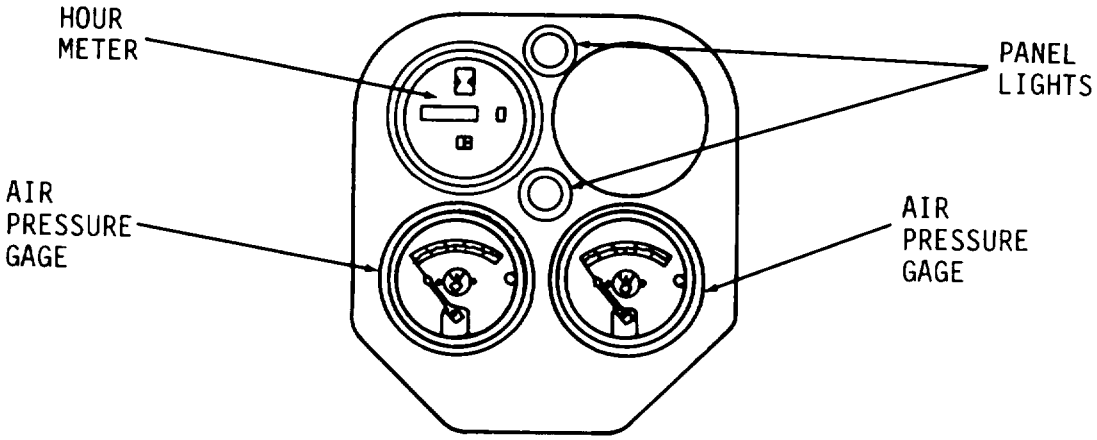
b. Lower Front Wiper. Two-speed control. Turn clockwise. First notch for slow, second for notch fast. Push in to operate windshield washer. Turn counterclockwise for off.

c. Lighter. Push in. Lighter pops out when hot.

d. Windshield Washer Reservoir and Fill. Located directly below windshield wiper/washer panel.

e. Rear Wiper (Not Shown). Two-speed control. Turn clockwise. First notch for slow, second notch for fast. Located on wiper motor in rear window.

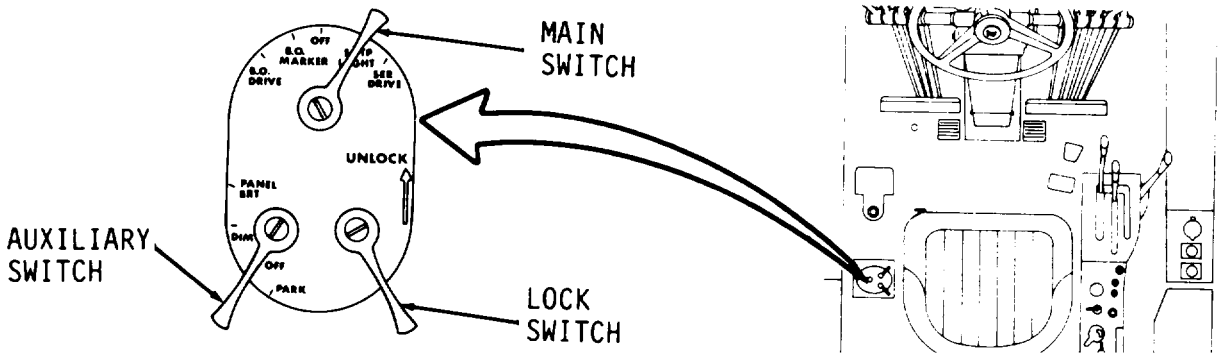
2-5. INSTRUMENT PANEL. Located on right front of engine compartment. Visible through the rear cab window.



a. Hour Meter. Indicates total hours engine has operated. Meter is activated by pressure switch. Operates only when engine is running.

b. Brake Air Pressure Gages. Separate gages for each air brake circuit. Normal operation is indicated in the green range.

2-6. VEHICLE LIGHT SWITCH ASSEMBLY.



2-6. VEHICLE LIGHT SWITCH ASSEMBLY.

a. Main Switch. Five position switch. Mechanical lock lever must be held in the UNLOCK position before moving the main switch. No lights will work when main switch is in off position.

(1) B.O. MARKER position. Blackout tail lamps lit. Blackout stop lamps will light when brakes are applied.

(2) B.O. DRIVE position. Blackout tail lamps and blackout driving lamp lit. Blackout stop lamp will light when brakes are applied.

(3) OFF position. All lamps off. Auxiliary switch (5) disabled. Horn and backup alarm will not sound.

(4) STOP LIGHT position. Service stop lamps light when brake is applied.

(5) SER. DRIVE position. Service tail lamp lit. Service stop lamp will light when brakes are applied. Floodlights will light when floodlight switches are activated. Horn and backup alarm will sound.

NOTE

Disconnect switch must be in the ON position for the vehicle light switch assembly to operate.

b. Auxiliary Switch. Four position switch.

(1) PANEL BRT position. Instrument panel lamps brightly lit.

(2) DIM position. Instrument panel lamps dimly lit.

(3) OFF position. Instrument panel lamps off. Service or blackout tail lamps off.

(4) PARK position. Instrument panel lamps dimly lit. Service tail lamps lit (main switch in SER. DRIVE position). Blackout tail lamps lit (main switch in B.O. DRIVE position or B.O. MARKER position).

NOTE

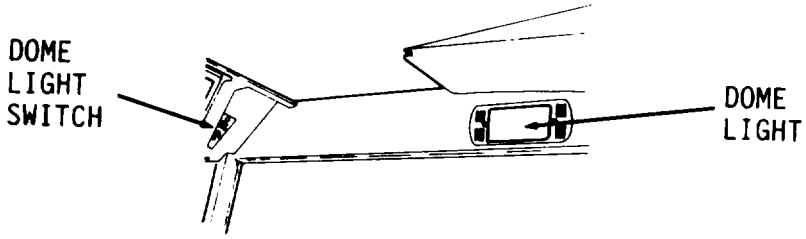
Main switch (a) must be in any position other than OFF for auxiliary switch to operate.

c. Mechanical Lock. Spring loaded, two position switch.

(1) Lock position (unmarked). Prevents movement of main switch.

(2) UNLOCK position. Enables movement of main switch. Hold lever in UNLOCK position and move main switch (a) to desired position.

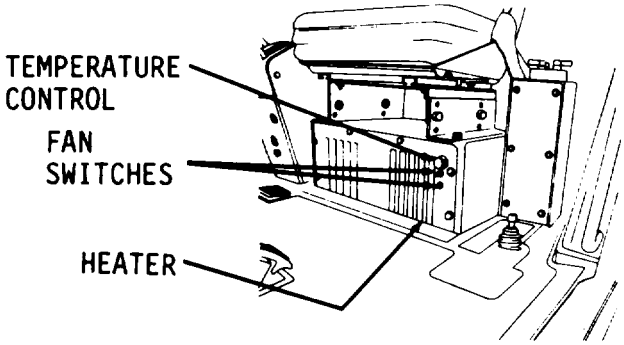
2-7. DOME LIGHT AND SWITCH.



a. Dome light is located above right cab door.

b. The dome light switch is located in the upper right front corner of cab. Switch has BRIGHT, OFF and DIM positions.

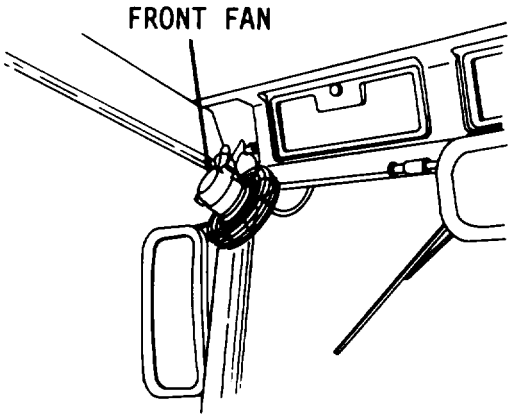
2-8. HEATER.

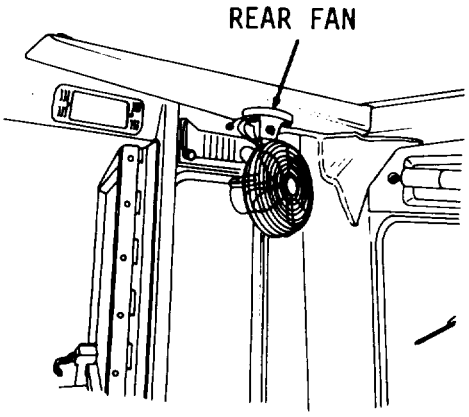


a. Temperature Control. Pull out knob to increase temperature. Push in to reduce temperature.

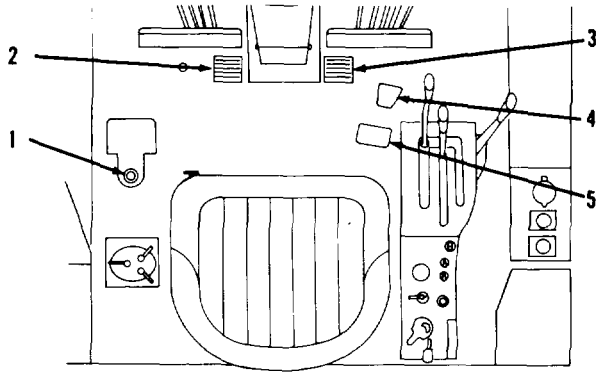
b. Fan Switches. The two toggle switches control high and low speed for the two blower motors giving desired rate of air flow.

2-9. DEFROSTER FANS. Located front and rear. Aid for clearing front windshield and rear window of frost. Individually controlled. Switch mounted on each fan.





2-10. FOOT CONTROLS.



Legend

1. Hydraulic unloading valve
2. Transmission modulator pedal
3. Service brake pedal
4. Accelerator
5. Decelerator

a. Hydraulic Unloading Valve (1). Reduces load on engine starter. Use when air temperature is below 60 degrees F (16 degrees C). Depress and hold down while starting engine. Release gradually after engine starts.

Do not use during normal operations.

b. Transmission Modulator Pedal (2). Disengages power to wheels. Push down. Release to engage power. Use to move slowly (inch) around obstacles, tight corners, etc.

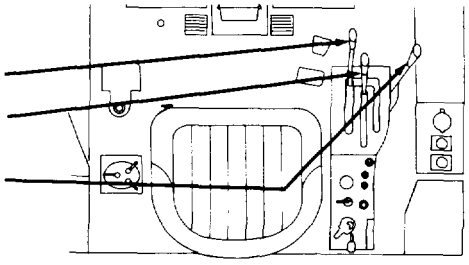
c. Service Brake Pedal (3). Push pedal down to slow or stop vehicle or to keep from overspeeding on a downgrade.

d. Accelerator (4). Push down to temporarily increase engine speed above governor control setting. Release to resume governed speed.

e. Decelerator (5). Push down to temporarily decrease engine below the governor control setting. Release to resume governed speed.

2-11. TRANSMISSION AND GOVERNOR CONTROLS.

TRANSMISSION CONTROL LEVER
PARKING/EMERGENCY BRAKE
GOVERNOR CONTROL LEVER



a. Transmission Control Lever. Provides control of six forward and six reverse speeds.

Position lever to the left to travel forward; to the right to travel in reverse.

Pull lever back to select desired speed.

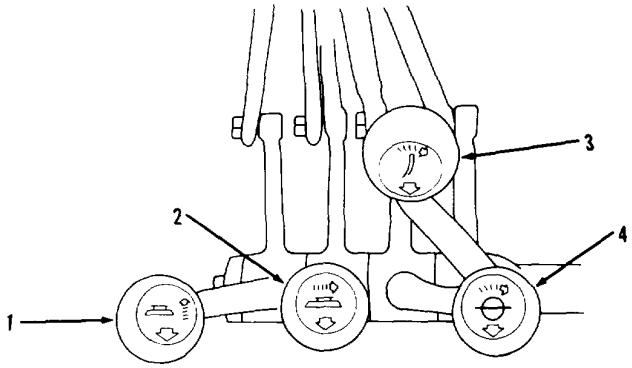
b. Governor Control Lever. Sets engine speed. Move forward to decrease engine speed; move backward to increase engine speed.

c. Parking/Emergency Brake. Move forward to PARK position to apply parking brake. Automatically locks transmission control lever in neutral. Move lever back to release brake.

2-12. LEFT SIDE EARTH MOVING EQUIPMENT CONTROLS.

Legend

1. Left side blade control
2. Blade sideshift control
3. Blade tip control
4. Blade circle drive control



a. Left Side Blade Lift Control (1). The left side blade lift control has three positions.

(1) Raise: Pull lever back to raise left side of blade.

(2) Hold: Center position. Blade will not move.

(3) Lower: Move lever forward to lower left side of blade.

NOTE

Left and right side blade lift controls override blade float system.

b. Blade Sideshift Control (2). The blade sideshift control has three positions.

(1) Right: Pull lever back. Blade moves to right.

(2) Hold: Center position. Blade will not move.

(3) Left: Move lever forward. Blade moves to left.

c. Blade Tip Control (3). The blade tip control has three positions.

(1) Back: Pull lever back. Top edge of blade tips toward rear of vehicle.

(2) Hold: Center position holds blade in set position.

(3) Forward: Move lever forward. Top edge of blade tilts toward front of vehicle.

d. Blade Circle Drive Control (4) The blade circle drive control has three positions.

CAUTION

Do not rotate moldboard when it is raised. The blade could cause serious damage to tires, cab steps, or scarifier.

(1) Clockwise: Pull lever back. Circle rotates clockwise.

(2) Hold: Center position holds. Circle will not move.

(3) Counterclockwise: Move lever forward. Circle rotates counterclockwise.

2-12. LEFT SIDE EARTH MOVING EQUIPMENT CONTROLS.

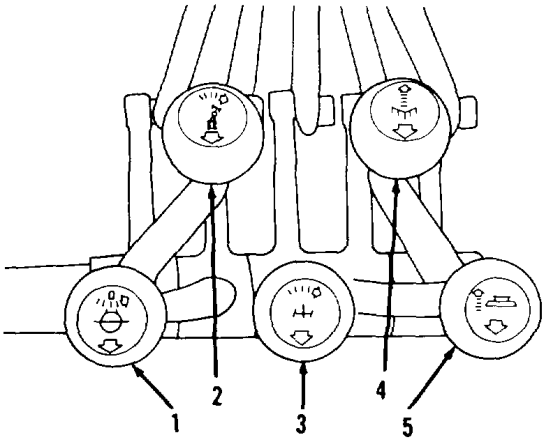
D. Blade Centershift Control (4).

(3) Left: Move lever forward. Drawbar, blade and circle move to left.

2-13. RIGHT SIDE EARTH MOVING EQUIPMENT CONTROLS,

Legend

1. Blade centershift control.
2. Articulation control
3. Wheel lean control
4. Scarifier control
5. Right side blade lift control



a. Blade Circle Drive Control (1). The blade circle drive control has three positions.

CAUTION

To prevent tire damage, do not allow blade to contact tires when rotating the circle.

a. Blade Centershift Control (1). The blade centershift control has three positions.

(1) Right.: Pull lever back. Drawbar, blade and circle move to right.

(2) Hold: Center position. Drawbar, blade and circle will not move.

(3) Left: Move lever forward. Drawbar, blade and circle move to left.

b. Articulation Control (2). The articulation control has three positions.

CAUTION

When articulating, do not allow the blade to contact the tires.

NOTE

Articulation indicator above EMS panel on steering console shows how far the vehicle has articulated right and left.

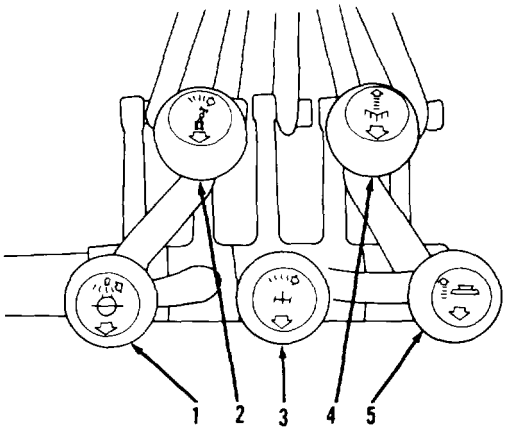
(1) Right: Pull lever backward. Rear of vehicle articulates to right.

(2) Left: Move lever forward. Rear of vehicle articulates to left.2-15

(3) Hold: When vehicle articulates as far as you want (up to 20 degrees right or left), release lever and it will return to hold (center) position. Vehicle stays in articulated position.

2-13. RIGHT SIDE EARTH MOVING EQUIPMENT CONTROLS.-Continued

c. Wheel Lean Control (3).



NOTE

Store wheel lean lock pin in machine tool box when not in use.

(1) Right: Pull lever back. Front wheels lean right.

(2) Hold: Center position. Front wheels stay in desired position.

(3) Left: Move lever forward. Front wheels lean left.

d. Scarifier Control (4). The scarifier control has three positions.

(1) Raise: Pull lever back to raise scarifier.

(2) Hold: Center position. Scarifier will not move.

(3) Lower: Move lever forward to lower scarifier to ground.

e. Right Side Blade Lift Control (5). The right side blade lift control has three positions.

(1) Raise: Pull lever back to raise right side of blade.

(2) Hold: Center position. Blade will not move.

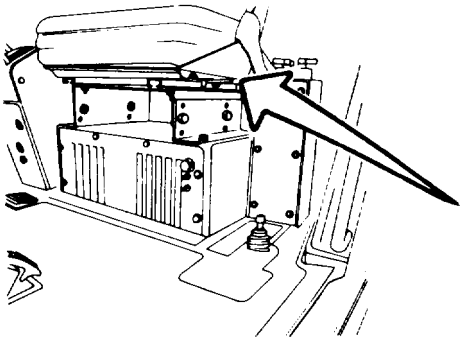
(3) Lower: Move lever forward to lower right side of blade.

NOTE

Left and right side blade lift controls override blade float system.

2-14. OPERATOR'S SEAT ADJUSTMENT.

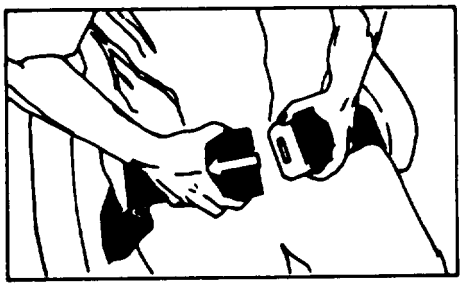
a. Front and Back. Move lever forward to release lock. Slide seat forward or backward as desired. Release the lever to lock the seat in place.



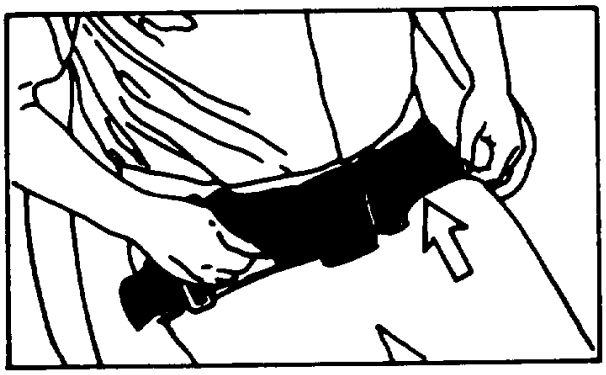
b. Height. Two inch height adjustment available. To make adjustment, remove four bolts in support assembly. (Two at front and two at rear of assembly.)

2-15. SEAT BELT.

a. Lengthen Belt. With belt unfastened, move the anti-creep slide toward the buckle.



b. Tighten Belt. With belt fastened, pull the outer loop.

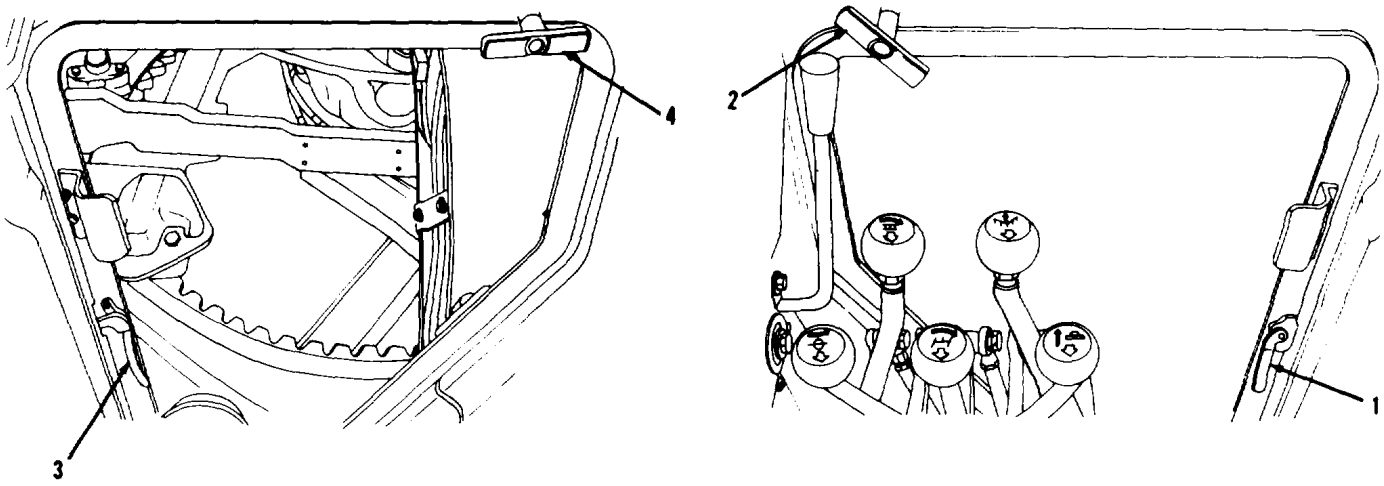


Remove any slack in the outer loop. Rotate buckle to free lock bar. Belt will now move freely through the buckle.

2-16. LOWER WINDSHIELD CONTROLS.

Legend

1. Left front windshield latch
2. Left front windshield release
3. Right front windshield latch
4. Right front windshield release



a. Left Front Windshield Latch (1).

(1) Unlock: Move handle to right. Open window.

(2) Lock: Close window. Move handle to left.

b. Left Front Windshield Release (2).

(1) Unlock: Turn release counterclockwise to unlock. Take out lower windshield.

(2) Lock: Put lower windshield back in place. Turn release clockwise to lock.

c. Right Front Windshield Latch (3).

(1) Unlock: Move handle to left. Open window.

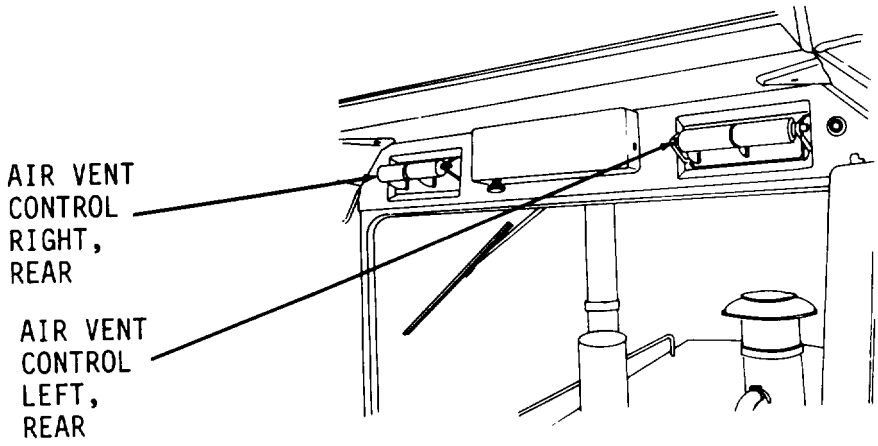
(2) Lock: Close window. Move handle to right.

d. Right Front Windshield Release (4).

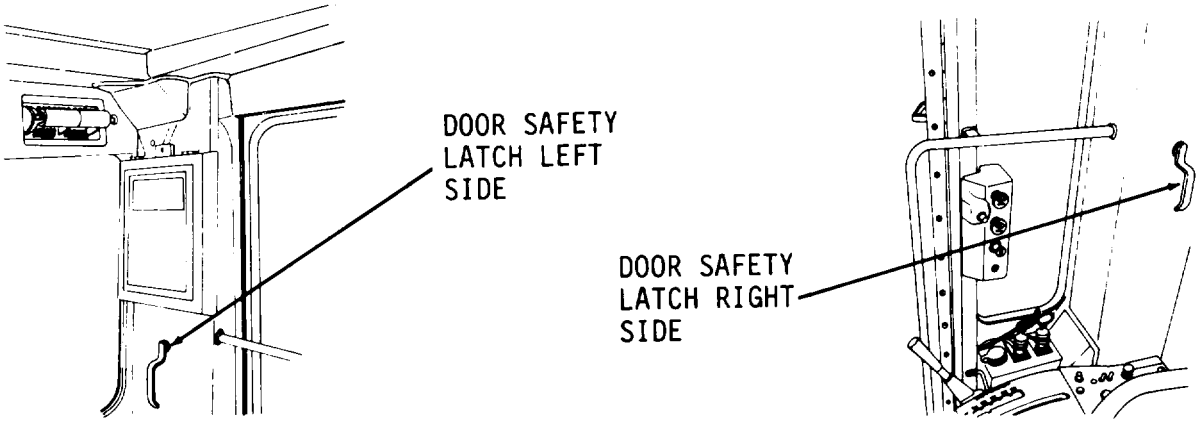
(1) Unlock: Turn release counterclockwise to unlock. Take out lower windshield.

(2) Lock: Put lower windshield back in place. Turn release clockwise to lock.

2-17. CAB VENT CONTROLS. Left and right vents at rear of cab. Push down to open. Pull up to close.

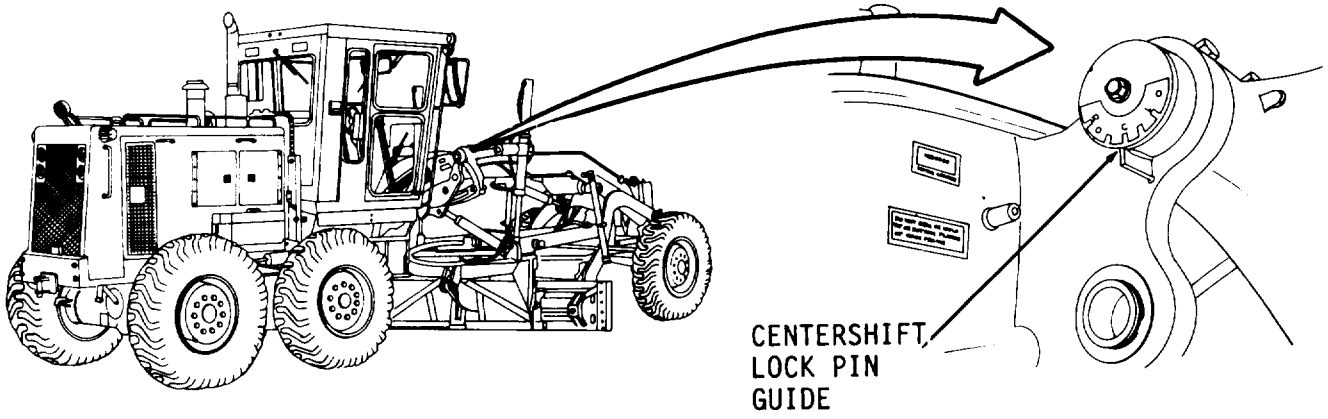


2-18. DOOR SAFETY CATCHES. Left and right side catches hold door in open position. Pull forward to release door.

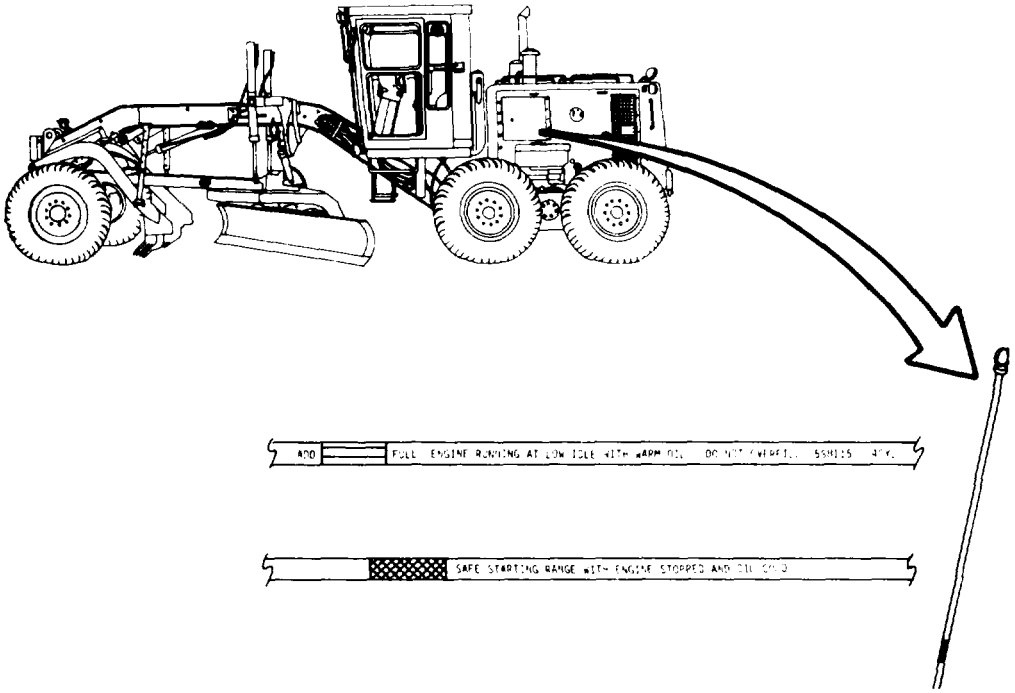


2-19. AIR CLEANER INDICATOR. Located in engine compartment, right side. Indicates blocked air filters. When red appears in indicator window or when arrow is at 30 inches H20, notify organizational maintenance.

2-20. CENTERSHIFT LOCK PIN GUIDE. Indicates position of pin when changing location. Top five marks indicate the five centershift holes. Bottom mark indicates position of pin.



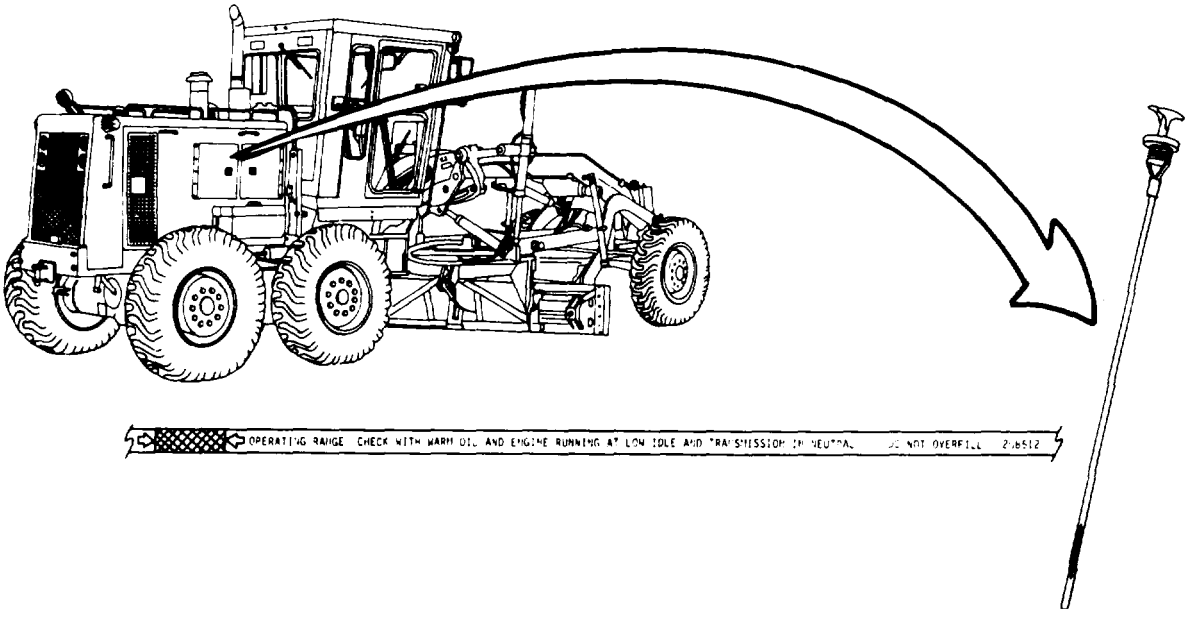
2-21. ENGINE OIL DIPSTICK.



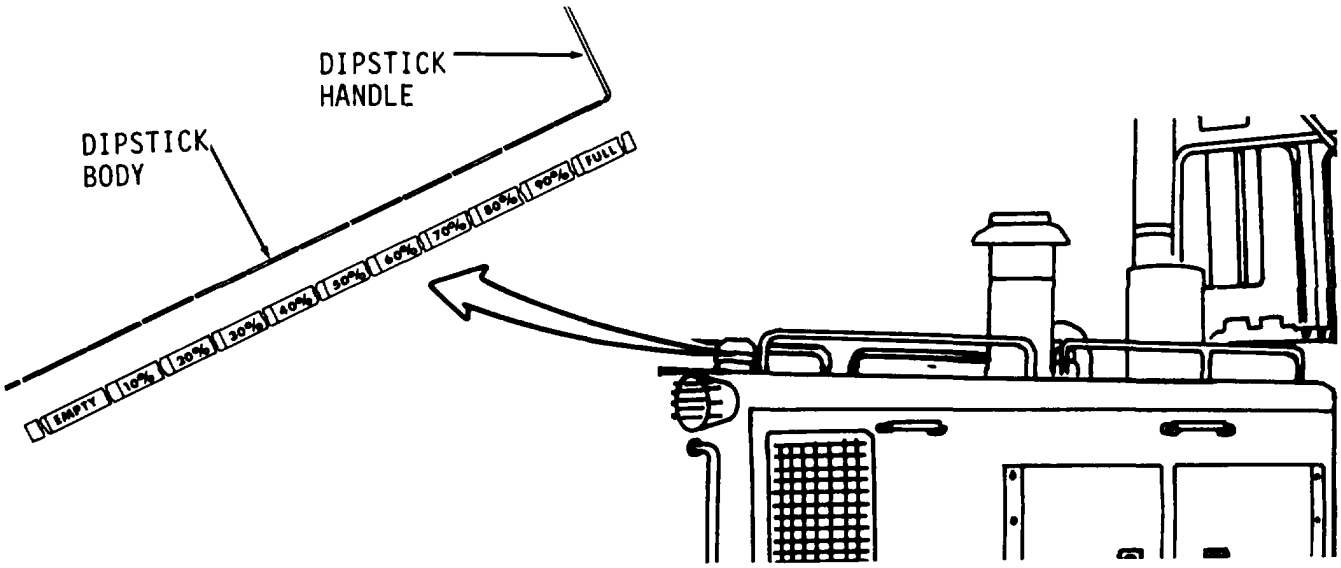
a. ENGINE STOPPED AND OIL COLD side of dipstick. Maintain in SAFE RANGE area.

b. ENGINE RUNNING AT LOW IDLE WITH WARM OIL side of dipstick. Maintain oil level between ADD and FULL marks. Do not overfill.

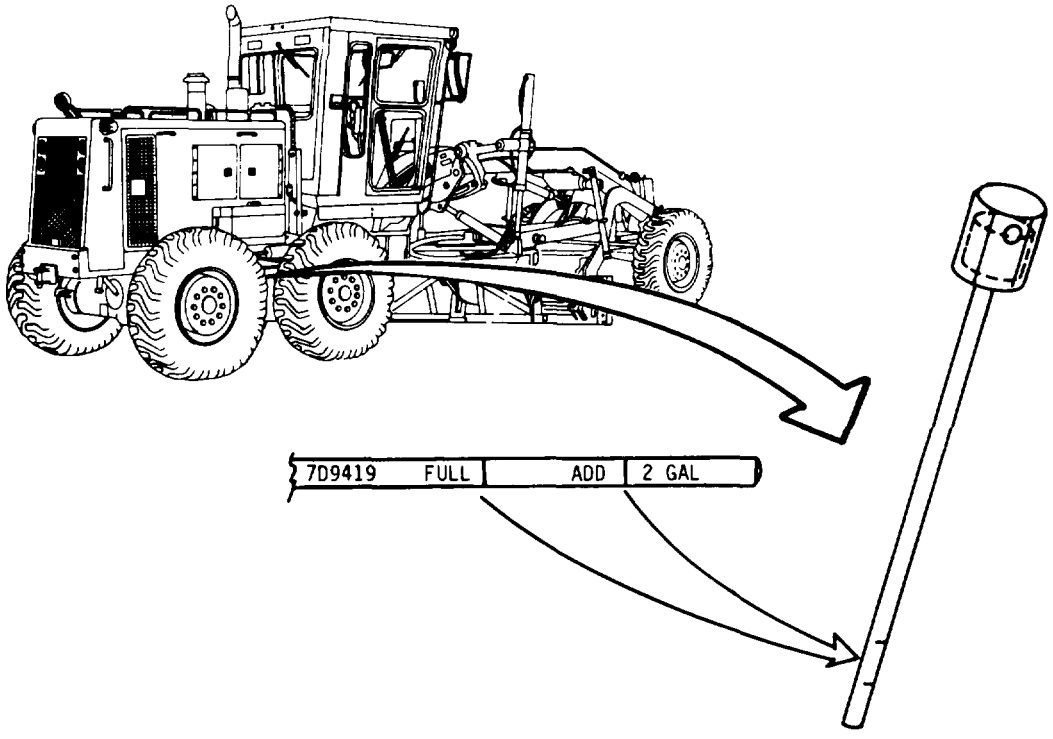
2-22. TRANSMISSION/DIFFERENTIAL OIL DIPSTICK. Measure oil level. Check with engine running at low idle, transmission in neutral and oil warm. Maintain in OPERATING RANGE on dipstick. Do not overfill.



2-23. FUEL TANK DIPSTICK. Located in top of fuel tank. Remove fuel filter cap to gain access.



2-24. TANDEM HOUSING DIPSTICKS. One in each tandem to measure oil level. Screw dipstick assembly down finger tight, unscrew and remove to check oil level. Maintain between ADD and FULL marks on dipstick.



2-25. ENGINE COOLANT LEVEL MARKS.

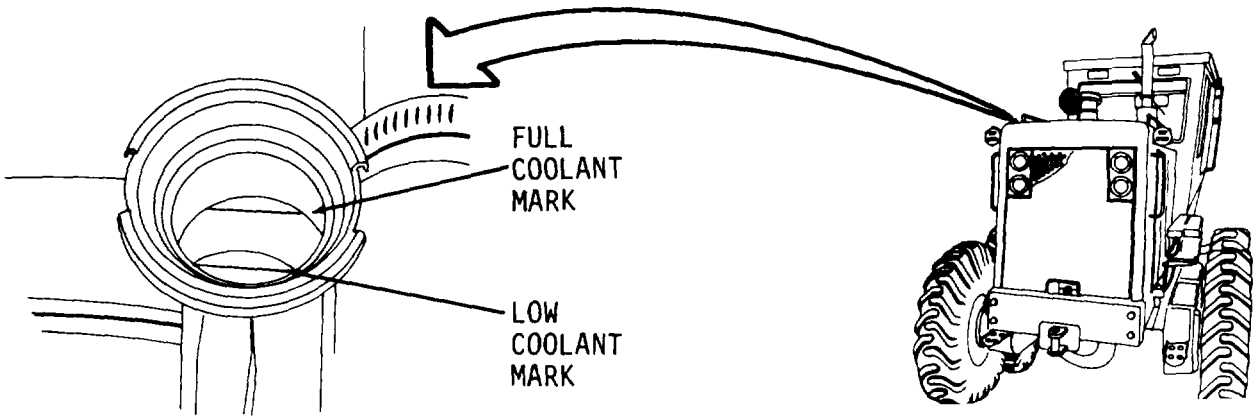
WARNING

Engine coolant is hot and under pressure at operating temperatures. Any contact can cause severe burns.

Check the coolant level only after the engine has been stopped and the radiator cap is cool enough to touch.

Remove the cap slowly to relieve pressure.

Check before operation when engine is cool. Maintain between the low and full marks in filler neck.

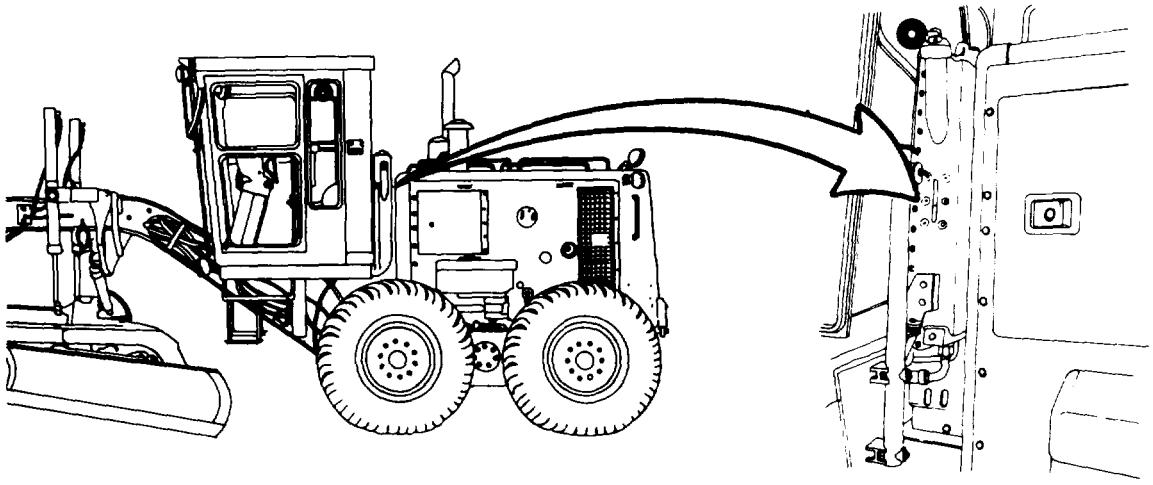


2-26. HYDRAULIC RESERVOIR SIGHT GAGE.

WARNING

The hydraulic tank is hot and can be under pressure at operating temperature. Remove the filler cap only after the engine is stopped and the cap is cool enough to touch.

Check with vehicle on level ground, blade and scarifier lowered and engine stopped and cool. Maintain level between ADD and FULL marks on sight gage.



Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-27. PMCS INTRODUCTORY MATERIAL.

a. General.

Every mission begins and ends with the paperwork. There isn't much of it, but you have to keep it up. The forms and records you fill out have several uses. They are a permanent record of the services, repairs and modifications made on your vehicle. They are reports to organizational maintenance and to your commander. They are also a checklist for you when you want to know what is wrong with the vehicle after its last use and whether those faults have been fixed. For the information you need on forms and records, see DA PAM 738-750.

b. Operator Crew Preventive Maintenance Checks and Services.

(1) Do your before (B) PREVENTIVE MAINTENANCE just before you operate the vehicle. Pay attention to the CAUTIONS and WARNINGS.

(2) During (D) checks and services of PREVENTIVE MAINTENANCE will be performed while the equipment and/or its component systems are in operation. Pay attention to the CAUTIONS and WARNINGS.

(3) Do your after (A) PREVENTIVE MAINTENANCE right after operating the vehicle. Pay attention to the CAUTIONS and WARNINGS.

(4) Do your weekly (W) PREVENTIVE MAINTENANCE weekly.

(5) Do your monthly (M) PREVENTIVE MAINTENANCE once a month.

(6) If something doesn't work, troubleshoot it with the instructions in this manual or notify your supervisor.

(7) Always do your PREVENTIVE MAINTENANCE in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

(8) When you do your PREVENTIVE MAINTENANCE, take along a rag or two.

(9) While performing PMCS observe caution, notes and warning paragraphs preceding those operations which could endanger your safety or result in damage to the equipment.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with skin or clothing is made, flush with water. If contact with eyes is made, wash your eyes with water and get medical help immediately.

2-27. PMCS INTRODUCTORY MATERIAL.-Continued

(10) If anything looks wrong and you can't fix it, write it on your DA Form 2404. The number column is the source for the numbers used on the TM Number Column on DA Form 2404. If you find something seriously wrong, report it to organizational maintenance IMMEDIATELY.

(a) Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (DS-2) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

(b) Bolts, nuts and screws: Check that they are not loose, missing, bent or broken. You can't try them all with a tool, of course, but look for chipped paint, bar metal or rust around bolt heads. Tighten any that you find loose. Report it to organizational maintenance if you can't tighten it.

(c) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to organizational maintenance.

(d) Electric wires and connectors: Look for cracked or broken insulation, bare wires and loose or broken connectors. Report damaged or loose wiring to organizational maintenance.

(e) Hoses and fluid lines: Look for wear, damage and leaks. Make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to organizational maintenance.

(11) It is necessary for you to under stand how fluid leaks affect the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them.

Leakage Definitions for Crew/Operator PMCS:

Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

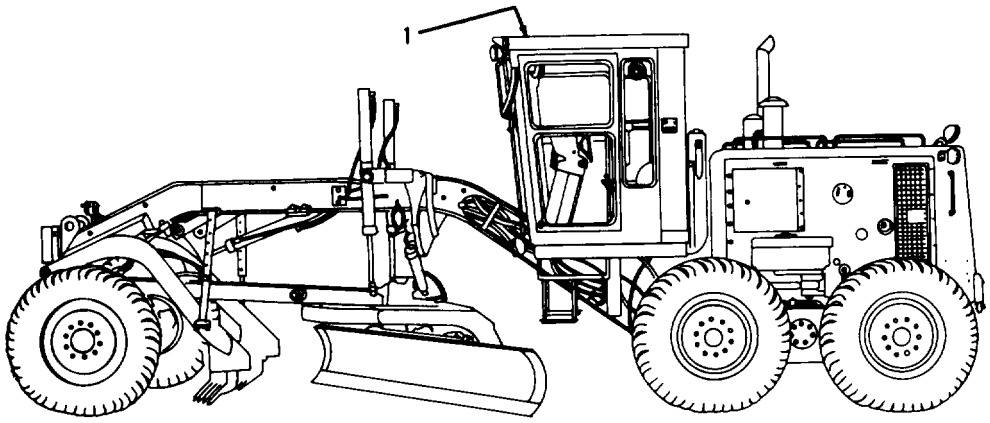
Class II Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being inspected.

Class III Leakage of fluid great enough to form drops that fall from the items being checked/inspected.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consideration must be given to the fluid capacity in the item/system being checked/inspected. When operating with Class I or II leaks, continue to check fluid levels as required on your PMCS. Class III leaks should be reported to your supervisor or organizational maintenance.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Service Table.

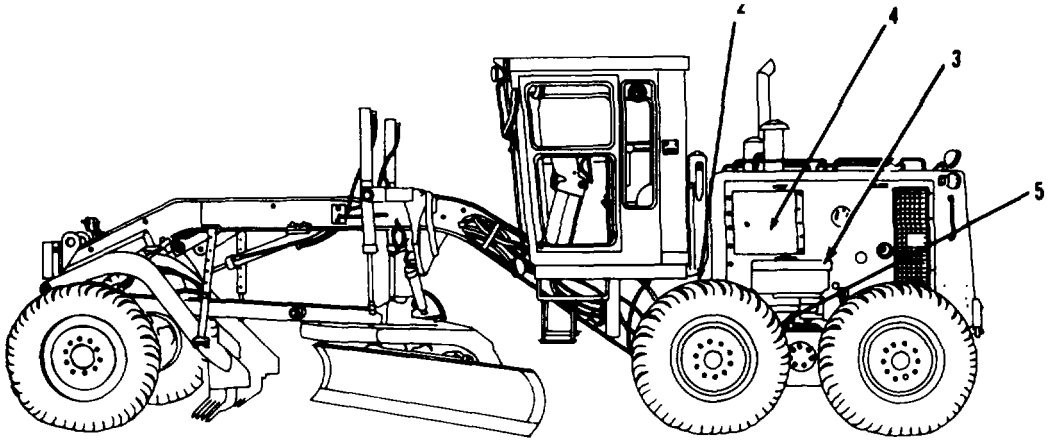


PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
						IMPORTANT Perform daily PMCS if: 1. You are the assigned operator. 2. You are the assistant operator. WARNING For personal safety before PMCS, insure the machine is on level ground. Insure that all hydraulic implements are lowered to the ground. Move the transmission control to neutral and engage the lock. Engage the parking/emergency brake. Exterior walk around checks.	
1						ROLLOVER PROTECTION STRUCTURE (ROPS)	
	X					a. Check for bent, cracked or damaged structure.	Cracked or damaged structure.
	X					b. Check for loose bolts.	Loose bolts.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table - Continued.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

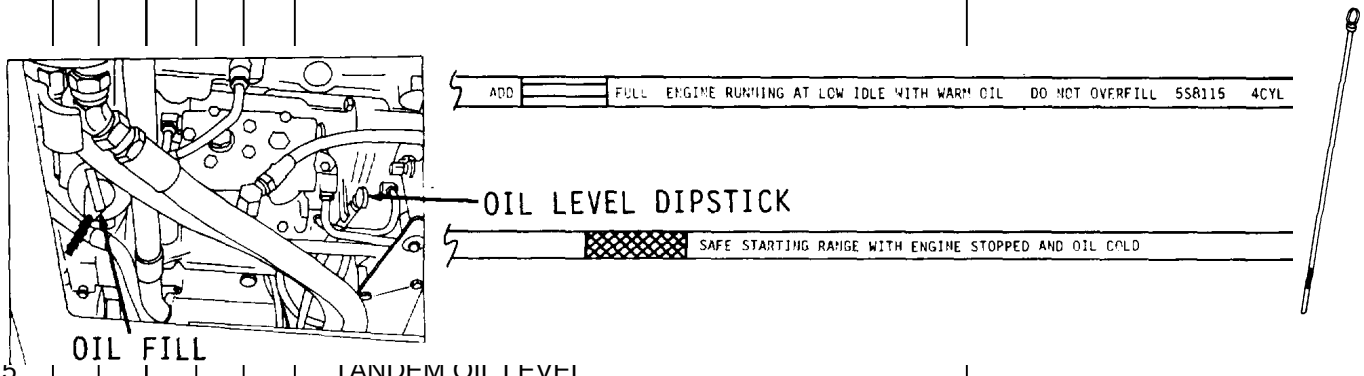
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
2						ARTICULATION HITCH	
	X					Check for castings and stops for damage.	Damaged castings or stops.
3						BATTERIES (one on each side)	
				X		a. Maintain electrolyte levels to full ring.	Batteries missing or unserviceable.
				X		b. Check for secure terminal connections.	
				X		c. Check battery hold downs for security.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before D - During A - After W - Weekly M - Monthly

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
4	X					ENGINE OIL LEVEL a. The level should be in the area indicated on the ENGINE STOPPED AND OIL COLD side of the dipstick. Maintain the level in the SAFE RANGE on the dipstick.	
		X				b. The level should be in the area indicated on engine “low idle” side of the dipstick. Maintain oil level between ADD and FULL mark.	



5				W		TANDEM OIL LEVEL Maintain the level between the ADD and FULL marks on the dipstick (one on each side)	

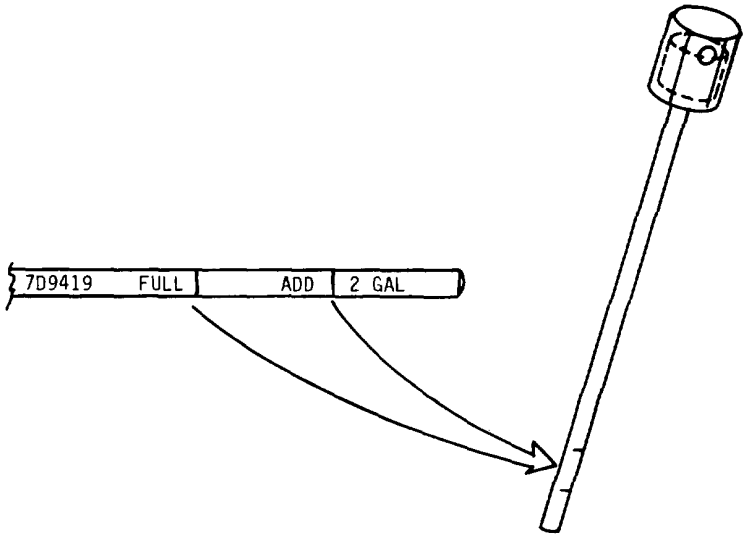
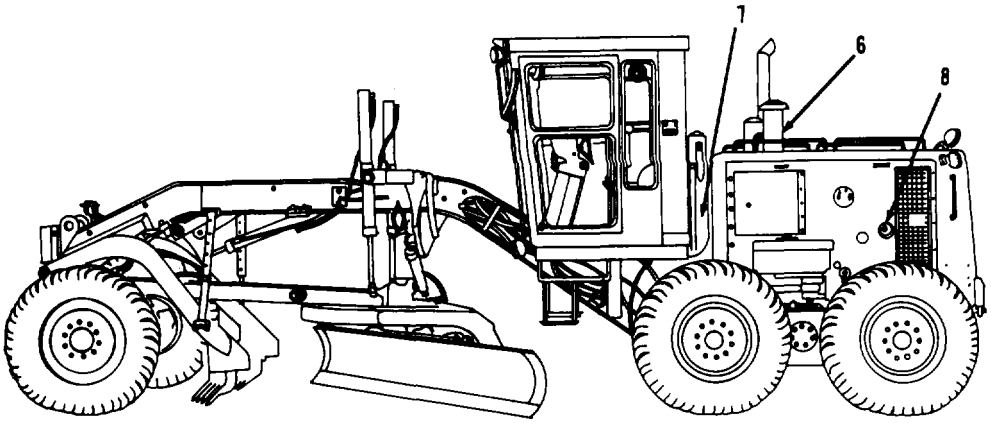


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
6						AIR PRECLEANER FILLER	
	X					Check and clean precleaner screen. **WARNING** **If NBC exposure is suspected, all air, filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.**	
7	X					HYDRAULIC TANK Maintain oil level between the ADD and FULL marks on the sight gage.	
8						FUEL TANK SEDIMENT VALVE	
	X					OPEN valve. Drain all moisture and sediment from fuel tank. Close valve securely.	

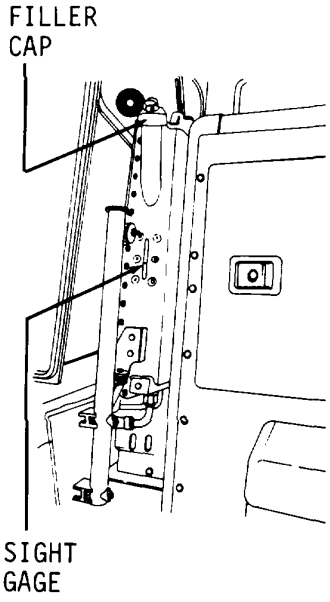
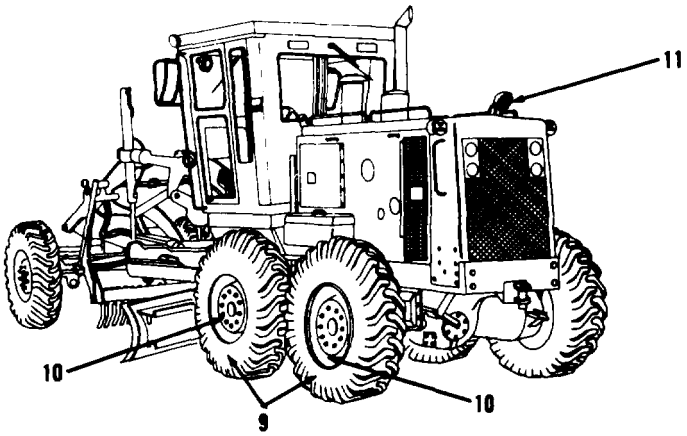


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

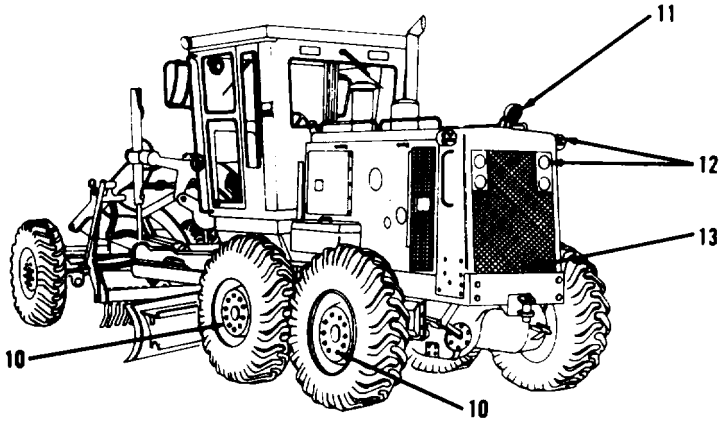


PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
						WARNING Improperly inflated tires can cause excessive heat buildup resulting in blowouts causing personal injury or death.	
						CAUTION Over inflated or under inflated tires can cause excessive or uneven tire wear or rim damage.	
9						TIRES	
	X					a. Check tires for cuts, gouges, nails or other foreign objects.	Damage which could cause tire failure during operation.
	X					b. Check for missing valve caps.	
	X					c. Check for proper inflation pressure. Tire pressure should be 35 psi.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table. - Continued.

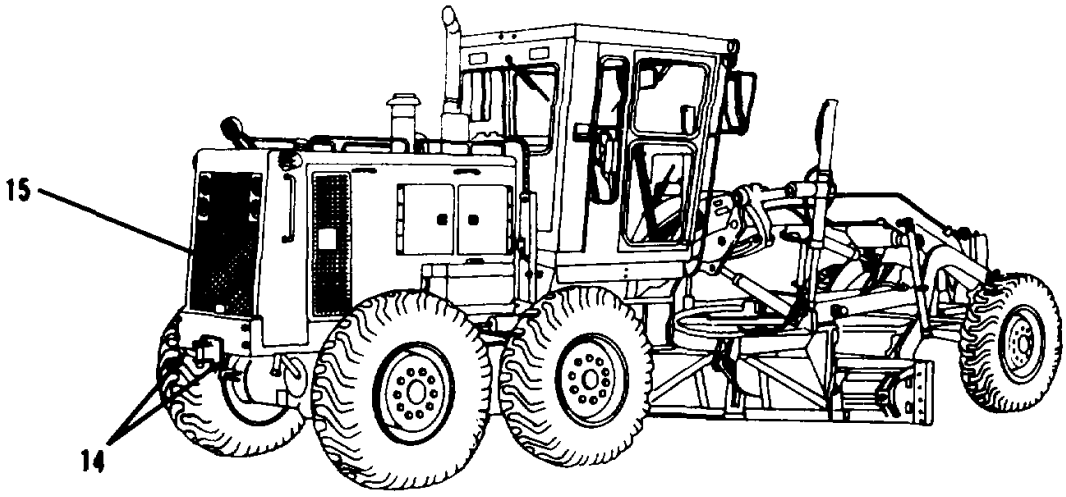


PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

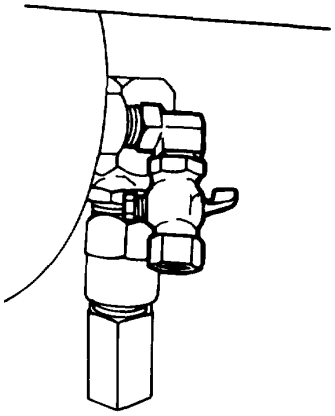
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
10						WHEELS	
	X					a. Check wheel flanges for bends or other irregularities.	
	X					b. Check for loose or missing lug nuts.	Lug nuts loose or missing.
11						REAR FLOODLIGHT	
	X					Check for damage (broken lens).	
12						TAIL AND BLACKOUT LIGHTS REAR	
	X					Check for damaged tail and blackout lights.	
13						BACKUP ALARM	
	X					Check to be sure that the alarm sound level is set on high.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
14						AIR RESERVOIR	
	X					a. Check reservoir valves to insure they are closed.	
	X					b. Open air reservoir valves.	
						WARNING The cooling system is pressurized Personalized injury may result when removing the radiator cap after operating temperature is reached. If it becomes necessary to check the coolant level during operation, use proper protection when removing the radiator cap.	
15						RADIATOR	
	X	X				a. Check radiator for leaks and any visible damage.	Damaged or Class III leaks.
				X		b. Check hoses and clamps for security.	Loose hoses or clamps or Class III leaks.
				X		c. Maintain coolant level between the low and full marks.	

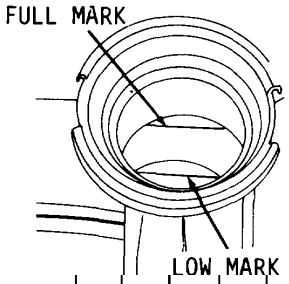
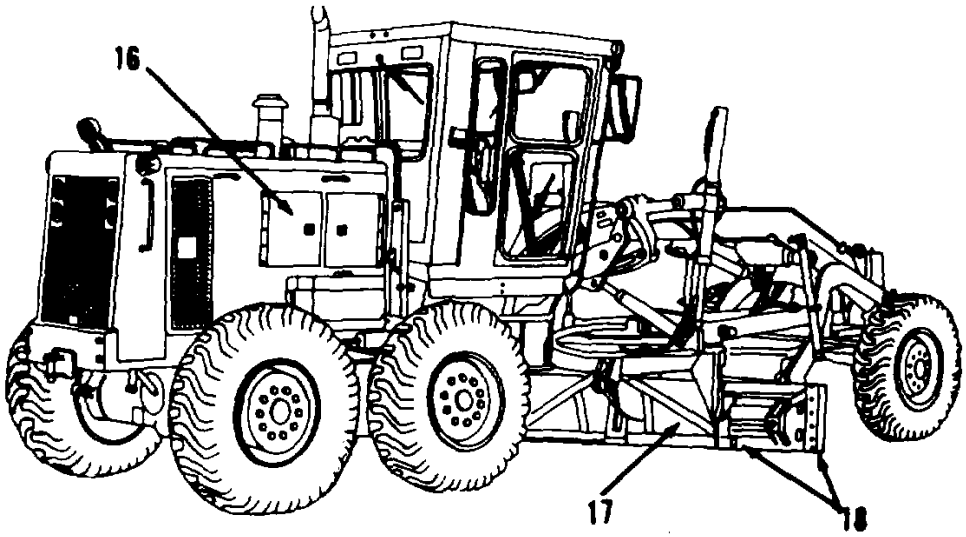


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table. -Continued



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
16						AIR CLEANER INDICATOR	
	X	X				Check air indictor for red indication.	Red is visible
17						MOLDBOARD	
	X					Check for damage or distortion.	Damaged or distorted.
18						CUTTING EDGES AND END BITS	
	X					a. Check for broken or damaged cutting edges and loose bolts.	Edges broken.
	X					b. Check for excessive wear.	Cutting edge is worn to within 3/4" of moldboard.

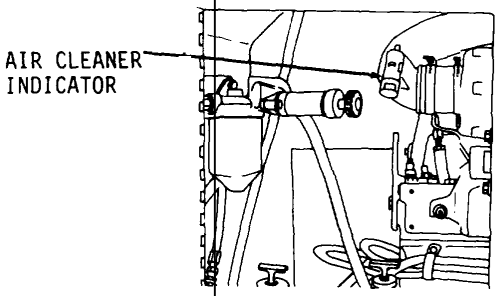
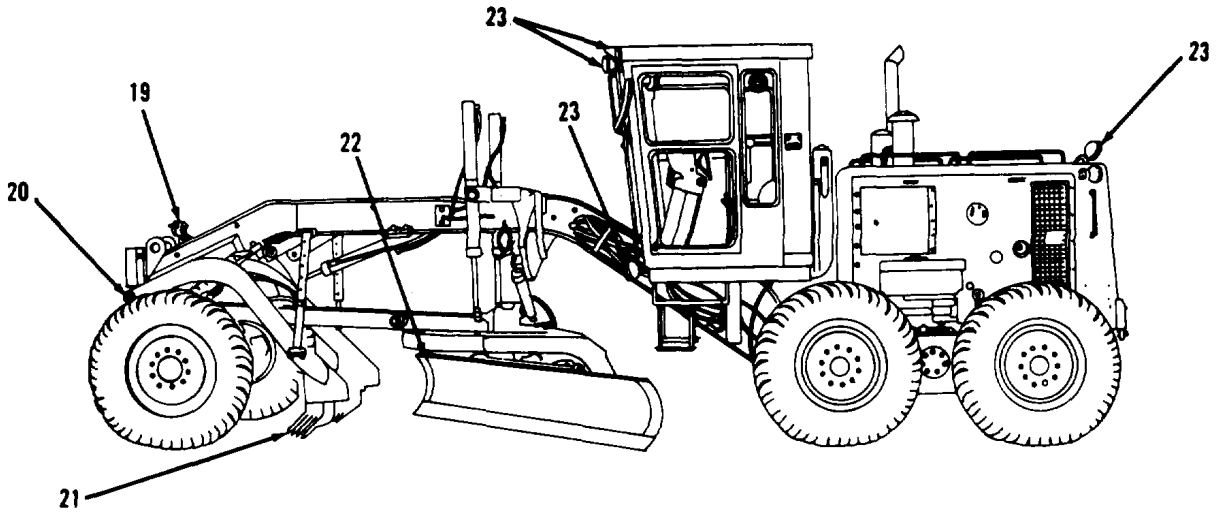


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

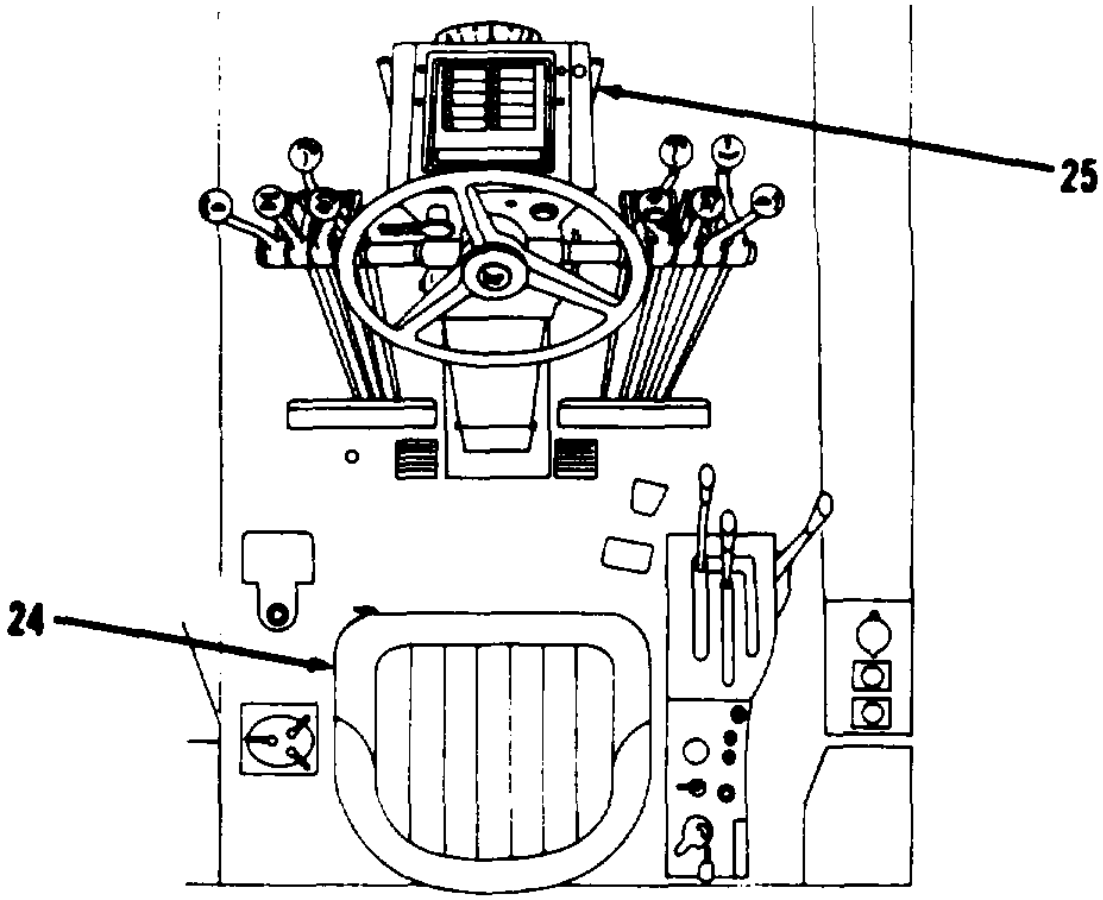


PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
19						BLACKOUT DRIVE LIGHT	
	X					Check for damaged light.	
20						STEERING	
	X					Check steering linkage for cracks, distortion or structural damage.	Cracked, distorted, or structural damage.
21						SCARIFIER	
	X					Check for excessive wear, structural damage or missing teeth.	Structural damage, excessive wear or missing teeth.
22						CIRCLE DRIVE	
	X					Check for structural damage.	Structural damage.
23						HEAD LIGHTS, FLOOD LIGHTS AND SIGNALS	
	X					Check for damage.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table. -Continued



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
24						OPERATOR'S SEAT/SEAT BELT	
	X					Check operation of seat and seat belt. Operator must be able to reach all hand operated/foot operated controls.	Inoperative seat or seat belt or missing seat belt.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

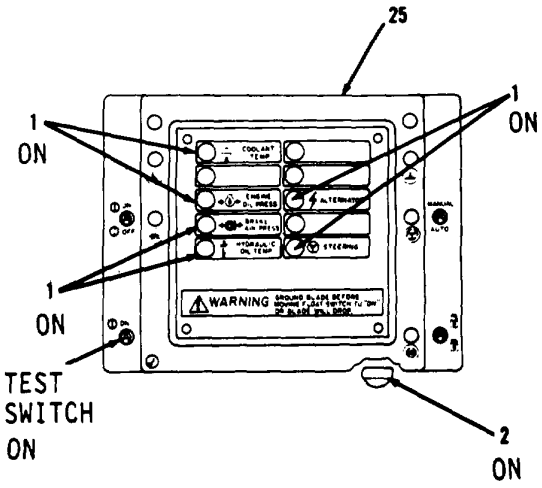
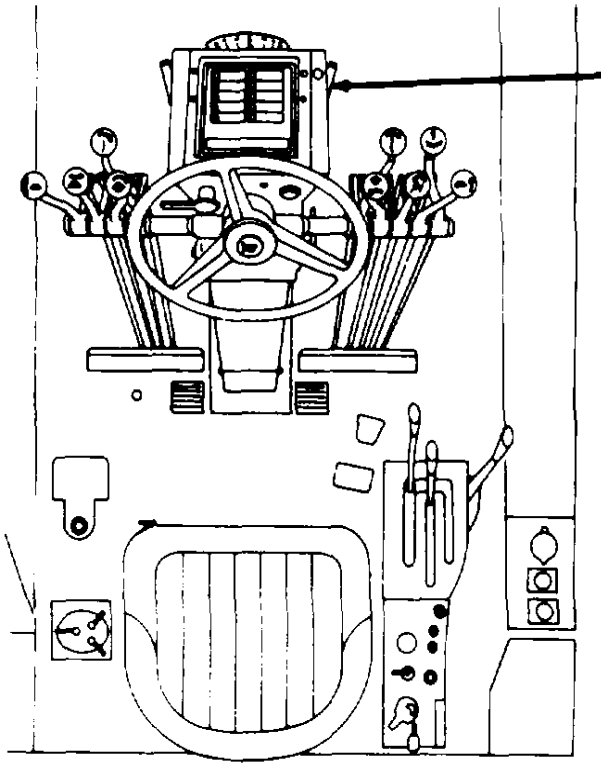
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
25						EMS PANEL	
	X					a. Turn the disconnect switch on, leave the engine off and move the test switch to "ON". Check for the following:	
						NOTE The following is a series of checks for the EMS Panel.	
						(1) All indicators should be on.	Indicators off.
						(2) Master fault light should be on.	Light off.
						(3) Fault alarm should be off.	Alarm on.
							NOTE Brake air pressure indicator may be off if air pressure in the system is above 65 psi. Check air pressure gages.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table. -Continued



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
25						EMS PANEL-Continued	
						b. With the disconnect switch on and the engine off, move the test switch to off. Check for the following:	
						(1) Coolant temperature indicator should be off.	Indicator on.
						(2) Engine oil pressure indicator should be on.	Indicator off.
						(3) Brake air pressure indicator should be on.	Indicator off.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
25						EMS PANEL-Continued	
						(4) Hydraulic oil temperature indicator should be off.	Indicator on.
						(5) Alternator indicator should be on.	Indicator off.
						(6) Steering indicator should be on.	Indicator off.
						(7) Master fault light should be on.	Light off.
						(8) Fault alarm should be off.	Alarm on.

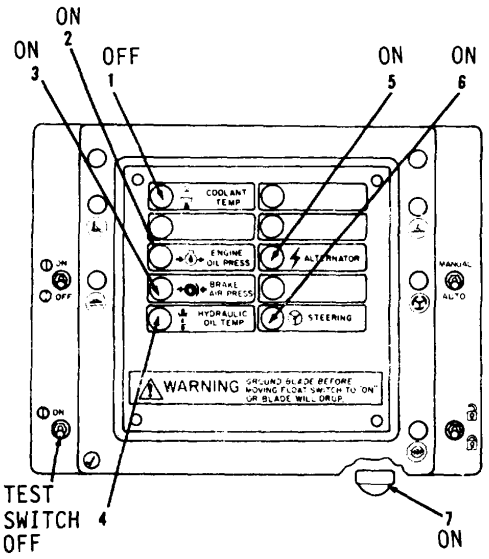
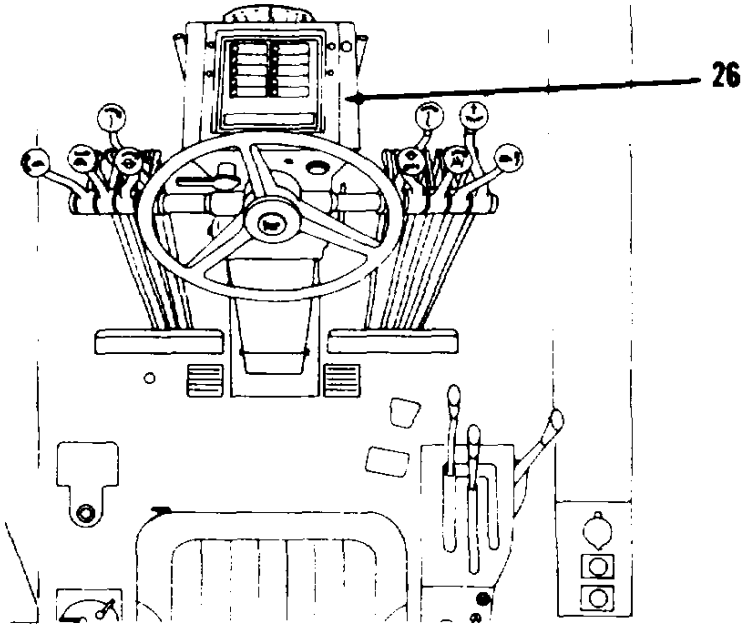


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table. - Continued



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
						START THE ENGINE:	
26						EMS PANEL	
		X				a. With the disconnect switch on, the test switch off and the engine running, check for the following:	
						(1) All indicators should be off.	Indicator(s) on.
						(2) Master fault light should be off.	Light on.
						(3) Fault alarm should be off.	Alarm on.

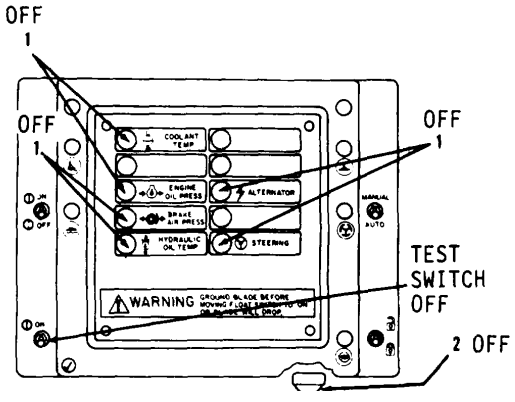


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before D - During A - After W - Weekly M - Monthly

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
26						EMS PANEL	
		X				b. With the disconnect switch on and the engine running, move the test switch to ON. Check for the following:	
						(1) All indicator should be on.	Indicator(s) off.
						(2) Master fault light should be on.	Light off.
						(3) Fault alarm should be on.	Alarm off.

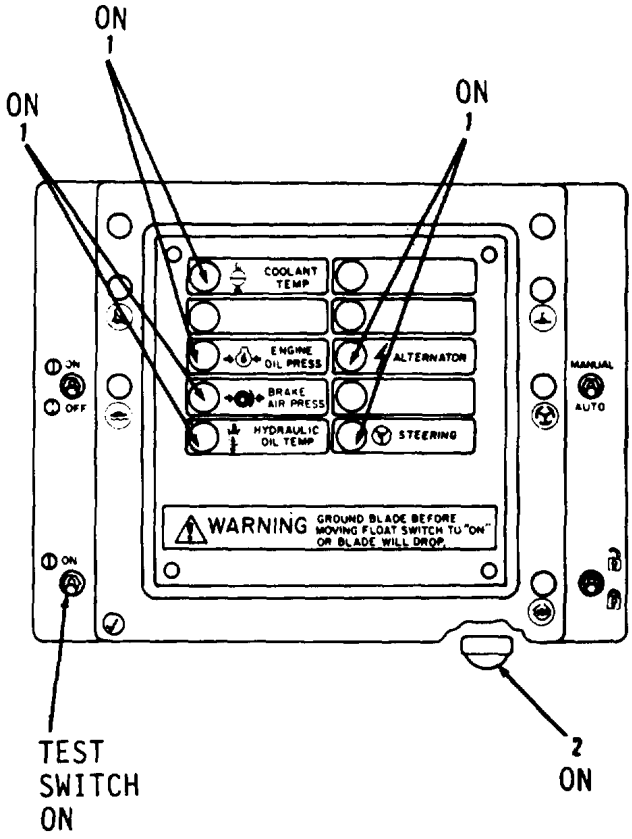
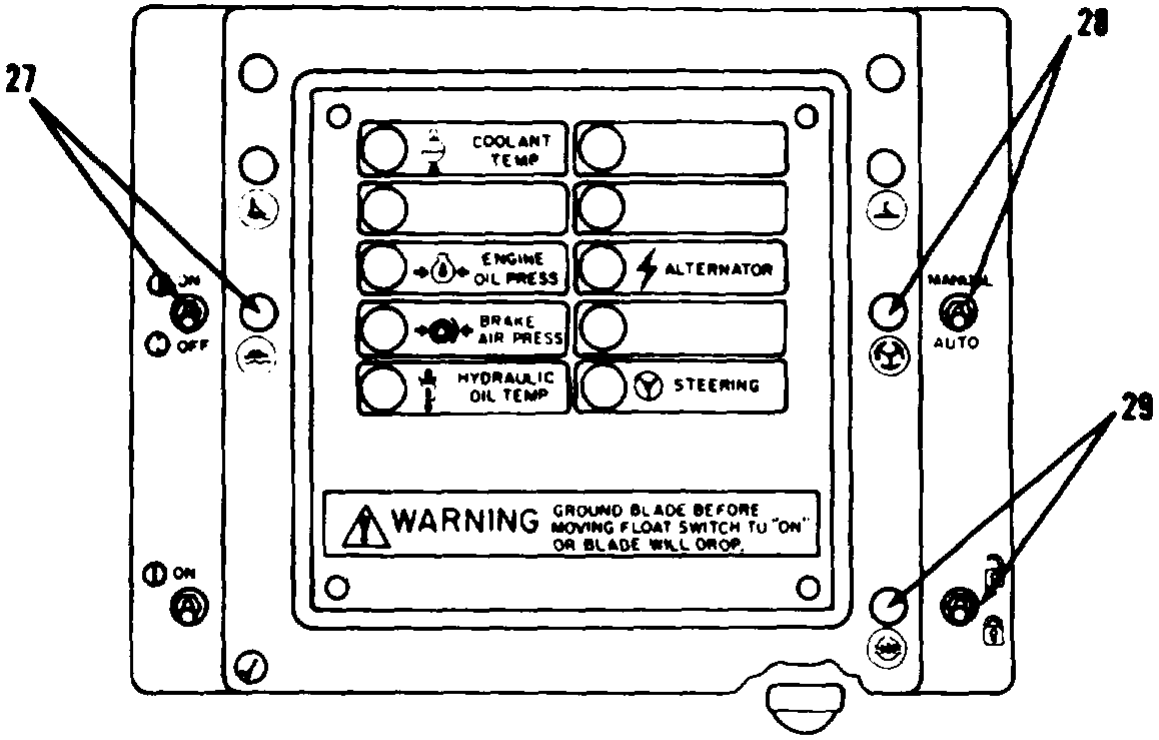


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.-Continued

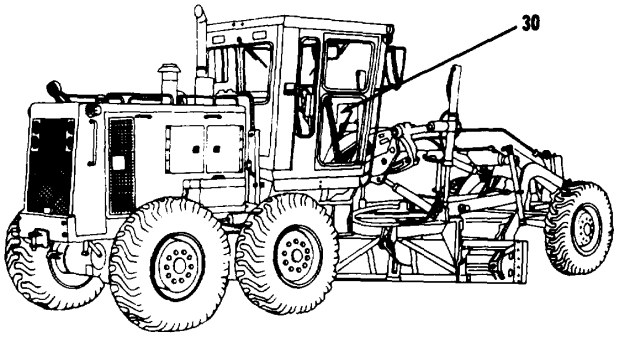


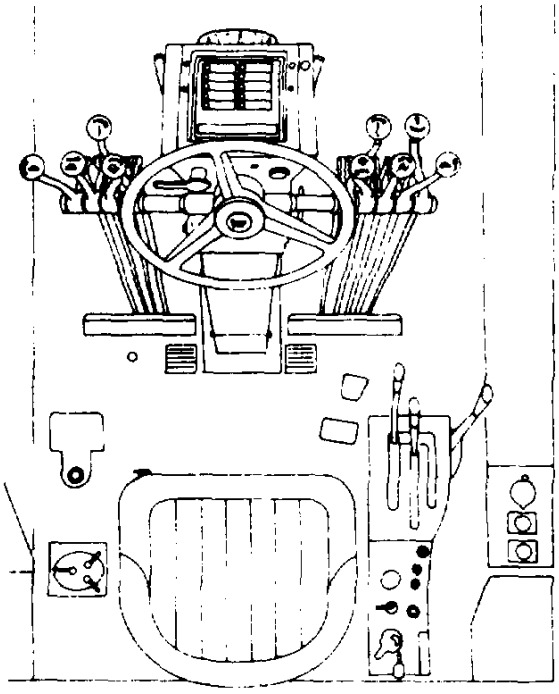
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before D - During A - After W - Weekly M - Monthly

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
27						BLADE FLOAT	
		X				Move the switch to ON position Indicator light should go on.	Indicator off.
28						SUPPLEMENTAL STEERING	
		X				Move the switch to the MANUAL position. Indicator light should go on and vehicle steers normally.	Indicator off or poor steering.
29						DIFFERENTIAL LOCK	
		X				Move the switch to unlock position. Indicator light should go on.	Indicator off.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.



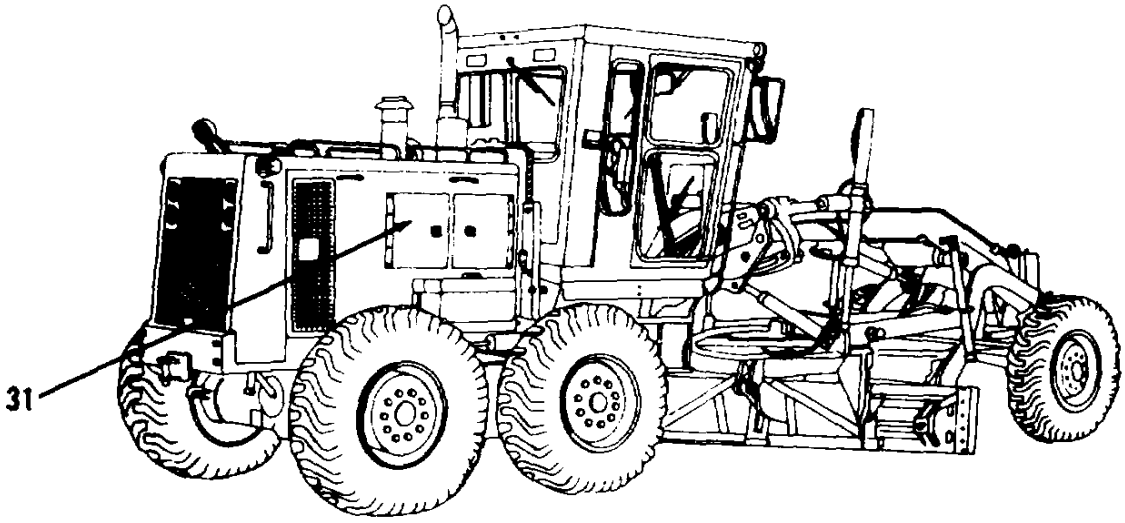


PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
30						OPERATIONAL CONTROLS	
	X					a. Check for proper steering.	Will not steer or has erratic operation.
	X					b. Check service brakes. Slowly move the vehicle and check for brake operation. **WARNING** Be sure the blade is lowered to the ground.	Brakes do not stop vehicle.
	X					c. Check implement controls. Move each lever and check for proper operation.	Implements inoperable.

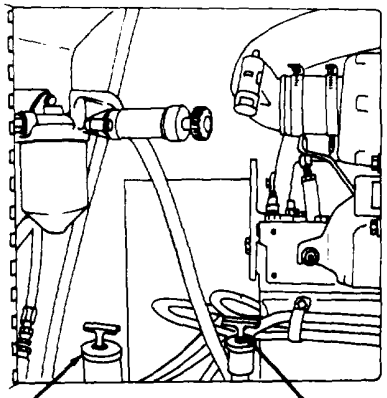
Table 2-1. Operator/Crew Preventive Maintenance Checks and Services Table.-Continued



PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **D - During** **A - After** **W - Weekly** **M - Monthly**

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
31	X					TRANSMISSION/DIFFERENTIAL OIL LEVEL While the engine is at low idle: check the transmission oil level. Maintain level in the OPERATING RANGE on the dipstick.	



Section III. OPERATING UNDER USUAL CONDITIONS

WARNING

Do not operate unless you have read and understood the instructions in this operator's manual.

2-28. INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF TESTS.

WARNING

See that the area around the 13OG Grader is clear of all personnel. Do not allow unauthorized personnel on the vehicle.

Use grabirons and steps when mounting the vehicle.

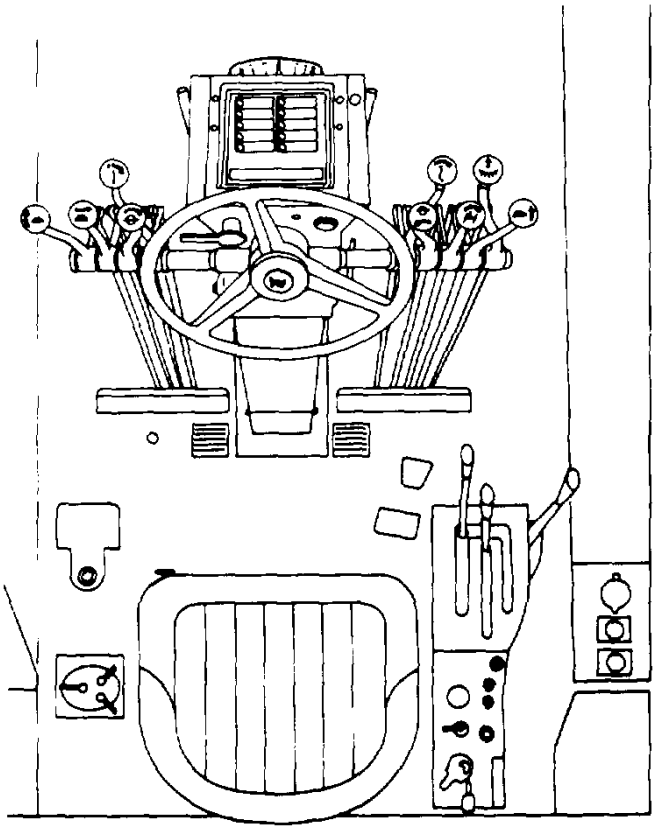
a. Lubricate. Refer to LO 5-3805-261-12.

b. Perform Your Before (B) PMCS. Refer to paragraph 2-27.

c. Adjust the Seat. Refer to paragraph 2-14.

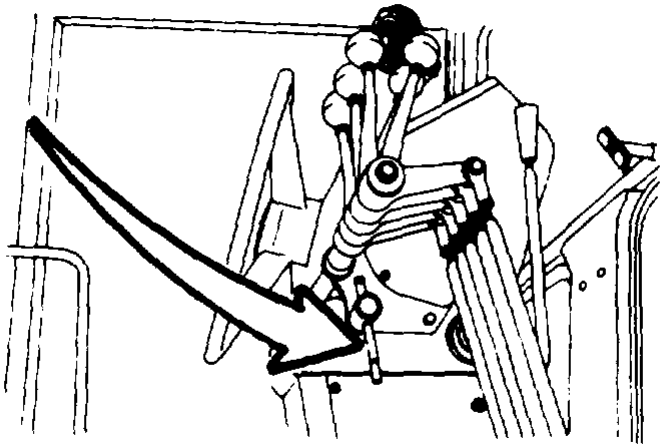
d. Adjust Rear View and Both Side Mirrors.

e. Adjust Steering Console. Move lever forward or backward to unlock console. Adjust console. Move lever to center position to lock console in position.



2-28. INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF TESTS.-Continued

f. Adjust Steering Wheel Tilt. Turn lever counterclockwise to unlock. Adjust steering console. Turn clockwise to lock.



g. Fasten and Adjust Seat Belt. Refer to paragraph 2-15.

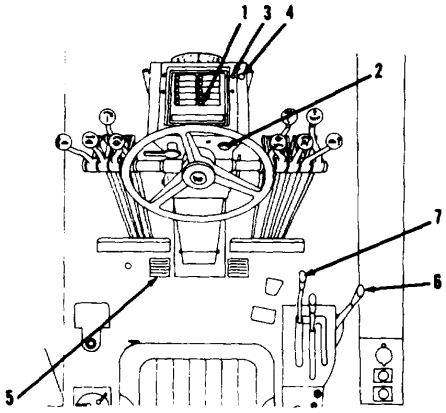
h. Test Supplemental Steering.

WARNING

A dead cell in a battery will result in loss of supplemental steering capability.

Legend

1. EMS Steering fault indicator
2. Fault light
3. Supplemental steering function indicator
4. Supplemental steering function switch
5. Transmission modulator pedal
6. Governor control lever
7. Transmission control lever



(1) Turn the disconnect switch on. The EMS steering fault indicator (1) and fault light (2) flash until the engine is started. The supplemental steering function indicator (3) will go on for three seconds.

(2) Start the Engine. Refer to paragraph 2-29. The EMS steering fault indicator (1) and fault light (2) turn off. The supplemental steering function indicator (3) is off.

With the engine running, push down on the hydraulic unloading valve. The EMS steering fault indicator (1), fault light (2) and fault alarm go on. The supplemental steering function indicator (3) does not light.

2-28. INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF TESTS.

With the engine still running, move the supplemental steering function switch (4) to MANUAL and hold. The vehicle should steer normally. The EMS steering fault indicator (1) remains off. The supplemental steering function indicator (3) lights.

(3) Stall the engine. Press and hold the transmission modulator pedal (5) down. Set the governor control lever (6) at low idle and the transmission control lever (7) in highest gear.

Release the transmission modulator pedal (5) suddenly, to stall the engine. The EMS steering fault indicator (1) goes on (as well as the fault light and fault alarm) and the supplemental steering function indicator (3) goes on. The 130G Grader will steer normally.

Pull the accelerator pedal up to the engine shut-off position. The supplemental steering function indicator (3) goes off. The EMS steering fault indicator (1) and fault light (2) stay on until you restart the engine or turn off the main disconnect switch.

2-29. OPERATING PROCEDURES.

a. Mounting and Dismounting.

(1) Use steps and grabirons when mounting or dismounting the machine.

(2) Face the machine when mounting or dismounting.

(3) Do not use the steering wheel as a handhold. The machine could move.

(4) Do not jump off the machine.

b. Starting the Engine.

WARNING

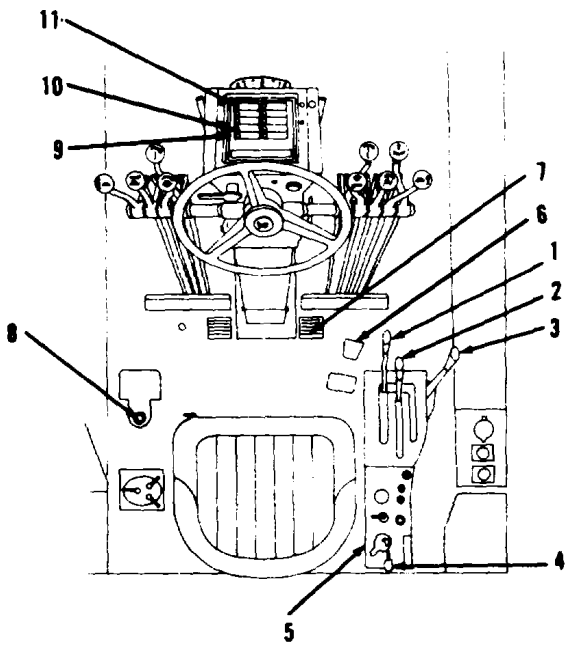
Be sure the parking/emergency brake is in the park position before starting the engine, to prevent accidental movement of the vehicle.

2-29. OPERATING PROCEDURES.-Continued

b. Starting the Engine.-Continued

Legend

1. Transmission control lever
2. Parking/emergency brake and transmission lock control
3. Governor control lever
4. Centershift lock pin switch
5. Disconnect switch
6. Accelerator
7. Service brake
8. Hydraulic unloading valve rod
9. Hydraulic oil temperature fault indicator
10. Brake air pressure fault indicator
11. Coolant temperature fault indicator



(1) Be sure the transmission control lever (1) is in neutral and the parking/emergency brake and transmission lock control is in PARK.

(2) Be sure all controls are in HOLD or OFF position.

(3) Be sure the centershift lock pin switch (4) is in the INDEX AND RUN position.

CAUTION

Do not turn the disconnect switch off while engine is running. This will not shut the engine down and may damage the electrical system. Stop the engine by pulling accelerator up past detent.

(4) Turn the disconnect switch (5) on.

(5) Observe all EMS fault indicators for proper operation before engaging the start switch.

(a) The brake air pressure fault indicator (10) will be on if air pressure is below 65 psi (449 kPa).

(b) The coolant temperature fault indicator (11) will normally be off.

(c) The hydraulic oil temperature fault indicator (9) will normally be off.

(d) Apply the service brake (7) several times until the brake air pressure fault indicator (10) comes on. The fault alarm should also sound.

2-29. OPERATING PROCEDURES.

b. Starting the Engine.

(e) If any of the EMS fault indicators do not function properly, notify your supervisor or organizational maintenance.

(6) Move the governor control lever (3) to half engine speed.

(7) If the starting temperature is below 60 degrees F (16 degrees C), push down and hold the hydraulic unloading valve rod (8) until the engine starts.

NOTE

When temperatures are below O degrees F (-18 degrees C), hold the hydraulic unloading valve down for 1 to 2 minutes after the engine starts.

(8) Depress the accelerator (6) past the detent.

CAUTION

If engine oil pressure fault indicator and fault light stay lit and fault alarm continues to sound 10 to 15 seconds after engine starts, lift accelerator to engine shut-off position. Turn main disconnect switch off and notify organizational maintenance.

CAUTION

Do not crank the engine for more than 30 seconds. Allow the starter motor to cool for two minutes before cranking again.

(9) Push in and turn the start switch to START. Release the switch when the engine starts.

NOTE

With the engine running at low idle, release the hydraulic unloading valve slowly. This allows the pump to be loaded gradually with cold, thick oil.

(10) Keep the engine at low idle until the systems are warm.

2-29. OPERATING PROCEDURES.-Continued

c. Starting Aids.

(1) Winter oils.

CAUTION

Use SAE 10W oil only in the temperature ranges indicated.

Compartment	SAE 10W Viscosity Temperatures
Engine Crankcases	50 degrees F to -4 degrees F
Transmissions	50 degrees F to -20 degrees F
Hydraulic System	90 degrees F to -10 degrees F

NOTE

At lower than temperatures shown above, see your supervisor or organizational maintenance.

(2) Batteries. Keep batteries charged to a corrected specific gravity of 1.250 or above. Otherwise, an external electrical source may be required to start engine.

(3) Ether starting aid.

WARNING

Ether is a poison and is flammable.

Use it only in well ventilated areas.

Use it with care to avoid fires.

Avoid breathing the ether vapors. Do not allow repeated contact of ether with skin.

Do not use ether in environments above 200 degrees F (93 degrees C).

2-29. OPERATING PROCEDURES.

c. Starting Aids.

CAUTION

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

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

(b) After pushing the button, allow two seconds before pushing it again.

(c) Continue the use of ether starting aid every two seconds after the engine starts until it is running smoothly.

(4) Slave starting the engine. Starting receptacle accepts booster cables with a mating plug. Use a battery cart or another vehicle as a power source.

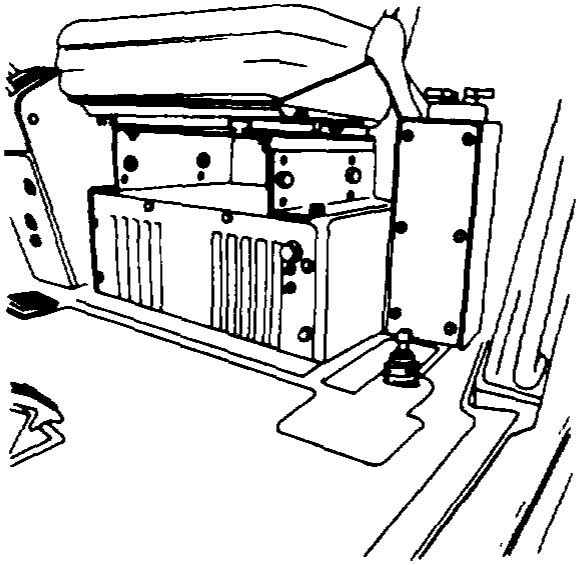
WARNING

Be sure the parking/emergency brake and transmission controls lever is in the PARK position before starting the engine to prevent accidental movement of the machine.

CAUTION

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

This machine has a 24 volt starting system. Use only an equal voltage for boost starting.



2-29. OPERATING PROCEDURES.-Continued

c. Starting Aids.-Continued

(a) Insert the plug end of the slave cable into the starting receptacle of assisting vehicle and the receptacle on the 130G Grader.

(b) In absence of a slave cable, attach the positive (+) jumper cable to the positive (+) terminal of the power source first. Attach the negative (-) jumper cable to the negative (-) terminal.

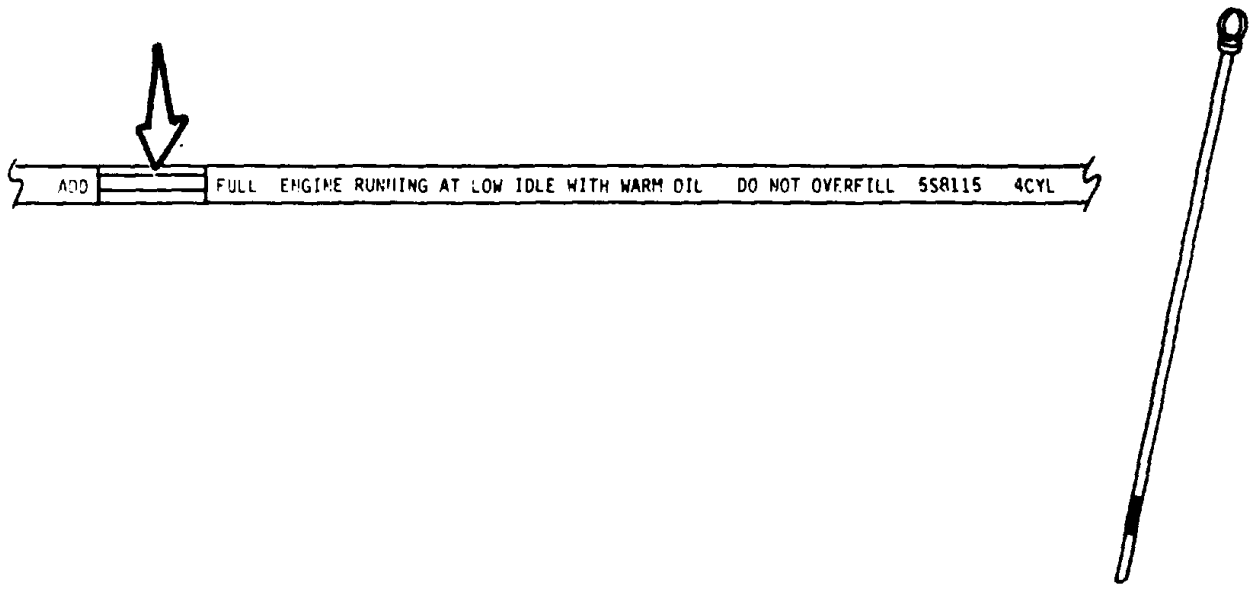
(c) Insert the key and turn the disconnect switch on.

(d) Start the engine. Remove the plug end of the slave cable after the engine starts.

d. After Starting.

(1) Perform your During (D) PNCS. Refer to paragraph 2-27.

(2) Check the engine oil level with the engine running, if it is not to be stopped. Maintain the oil level between ADD and FULL marks shown on the ENGINE RUNNING AT LOW IDLE WITH WARM OIL side of the dipstick.



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

(4) Test the hydraulic controls. Allow extra warmup time if controls are sluggish.

When the temperature is below 35 degrees F (2 degrees C), move all hydraulic controls slowly to warm them up. Move each cylinder several times to warm it.

2-29. OPERATING PROCEDURES.

e. Moving the 130G Grader.

WARNING

Be sure all people are in the clear before moving the 130G Grader or its implements.

Be sure your seat belt is fastened.

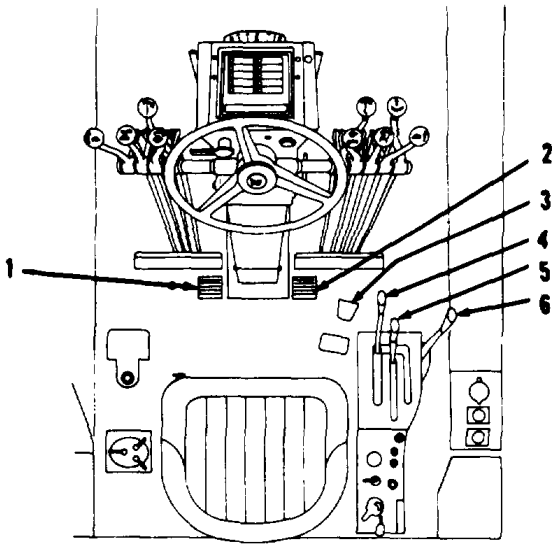
Do not coast downhill. Keep the transmission engaged. Do not push down on the transmission modulator pedal while going downhill.

CAUTION

Be sure the EMS brake air pressure fault indicator, fault light and fault alarm are off.

Legend

1. Transmission modulator pedal
2. Service brake
3. Accelerator
4. Transmission control lever
5. Parking/emergency brake and transmission lock control
6. Governor control lever



(1) Move governor control lever (6) to low idle position.

(2) Raise all implements.

(3) Depress the transmission modulator pedal (1).

(4) Apply the service brake (2).

(5) Release parking/emergency brake and transmission lock control (5).

CAUTION

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

(6) Move transmission control lever (4) left (FORWARD) or right (REVERSE). Pull back to the desired gear to move (normally second or third).

2-29. OPERATING PROCEDURES.-Continued

e. Moving the 130G Grader.-Continued

NOTE

The engine can be started with the transmission range selector in gear, however, the vehicle will not move. Should this occur, move the transmission range selector to neutral, then to desired speed.

(7) Release the transmission modulator pedal (1) and the vehicle will start to move.

(8) Set the governor control lever (6) to obtain the desired speed.

(9) Operate under a light load for the first five minutes.

(10) Push accelerator (3) down and vehicle will move faster than speed set by governor control lever. Release accelerator and vehicle will resume governed speed.

(11) Apply the service brake (2) to stop the machine.

f. Changing Speed and Direction.

CAUTION

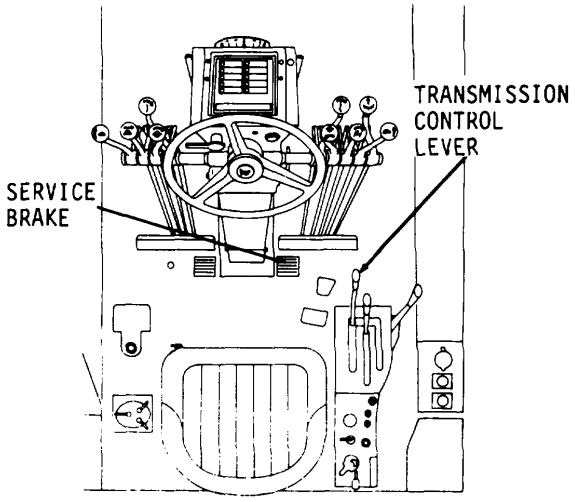
Reduce ground speed before downshifting to prevent possible damage to vehicle.

For your comfort and maximum service life of power train parts, use transmission modulator pedal and/or service brake when first moving the vehicle or changing directions.

(1) Upshift one speed at a time. Increase engine speed as needed.

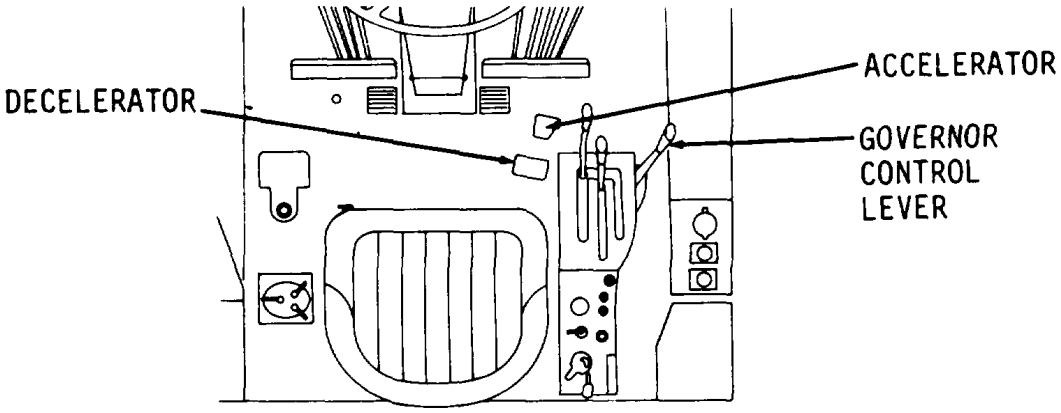
(2) When changing directions, stop the vehicle with the service brake as you move the transmission control lever to neutral. Then shift to the direction and gear you want.

(3) Downshift one speed at a time. If downshifting under a heavy load, increase the engine speed to match the speed of the lower gear.



2-29. OPERATING PROCEDURES.

g. Changing Engine Speed. Increase or decrease speed. Set the engine speed by moving the governor control lever as needed.



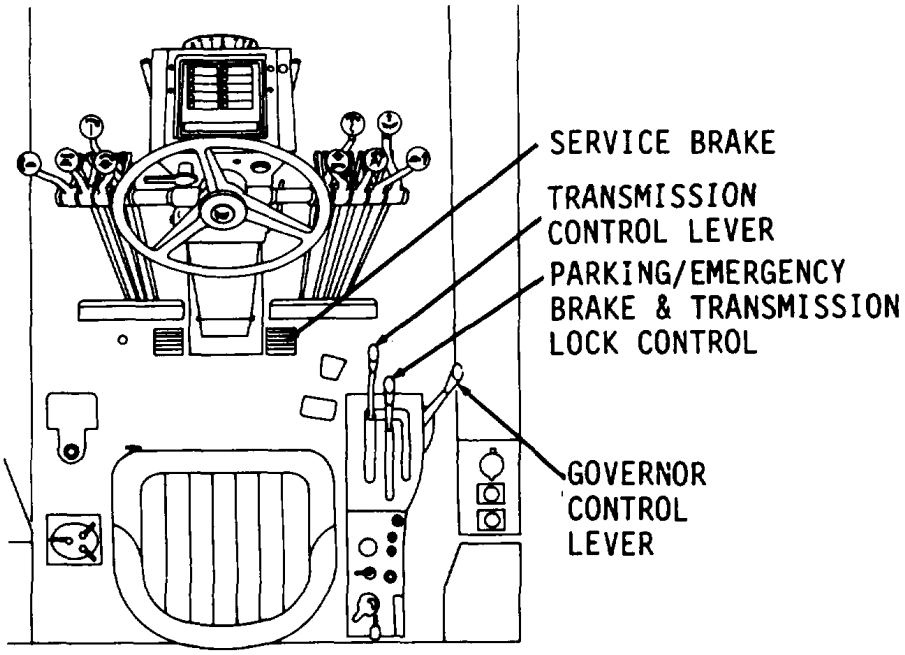
Temporarily decrease engine speed by depressing the decelerator. Release and engine returns to speed set by governor.

Depress accelerator to increase engine speed. Release pedal and speed returns to that set by governor control lever.

h. Stopping the Grader.

WARNING

If the service brake fails, the vehicle can be stopped using the parking/emergency brake. The brake fully applies. Be prepared for a sudden stop.



2-29. OPERATING PROCEDURES.-Continued

h. Stopping the 130G Grader.-Continued

(1) Move the governor control lever forward to reduce engine speed.

(2) Apply the service brake pedal and transmission modulator pedal to stop the vehicle.

(3) Move the transmission control lever to neutral. Apply the parking/emergency brake.

i. Parking the 130G Grader.

(1) When stopped according to the procedures, run the engine at low idle for five minutes. This will allow the engine to cool.

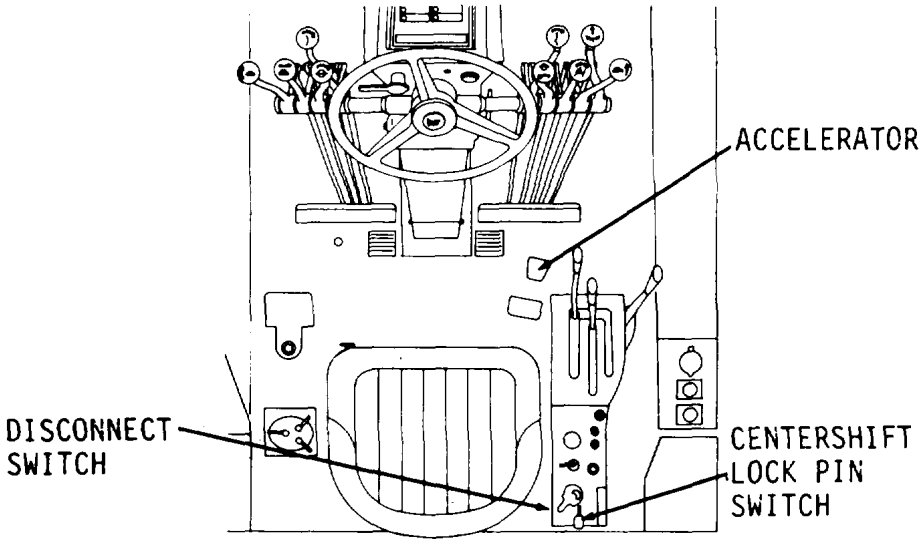
(2) Apply the parking/emergency brake.

(3) Lower the blade and scarifier to the ground. Apply slight down pressure.

j. Stopping the Engine.

CAUTION

Stopping the engine right after it has worked under a heavy load can cause overheating and carbon buildup in the turbocharger housing.



(1) Park the 130G Grader and operate the engine at low idle for five minutes.

(2) Pull the accelerator up, past the detent. This will stop the engine.

(3) Turn the disconnect switch off. Remove the key.

2-29. OPERATING PROCEDURES.

j. Stopping the Engine.

NOTE

When parked, the disconnect switch must be off and the centershift lock pin switch in INDEX AND RUN.

Do not try to stop the engine by turning off the disconnect switch.

(4) In freezing weather, drain the air reservoirs.

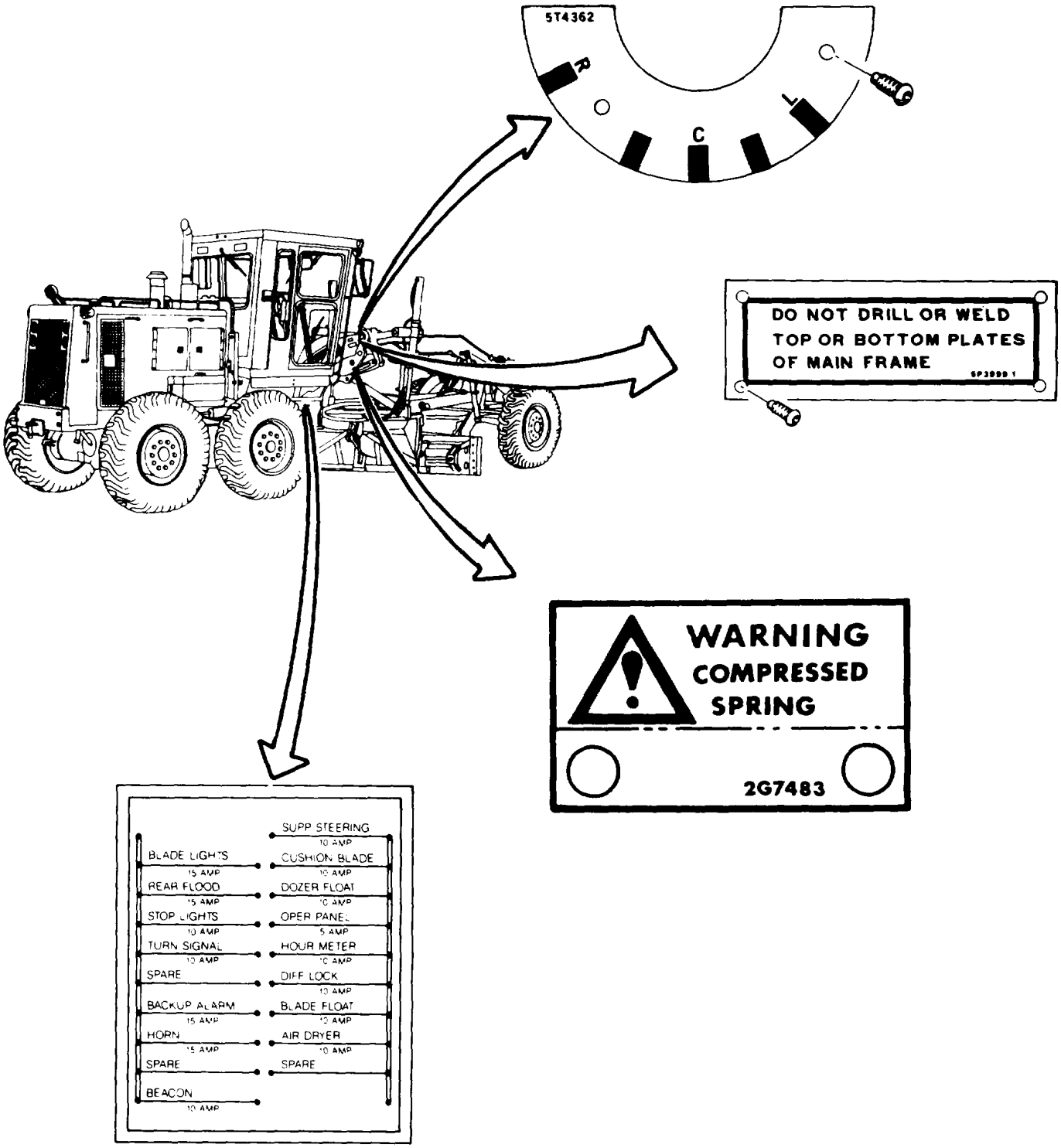
(5) When leaving the machine, close and lock the cab doors and windows. Lock all vandalism guards and covers in place.

2-30. PREPARATION FOR MOVEMENT.

See TM 55-3805-261-14 Transportability Guidance For The 13OG Grader.

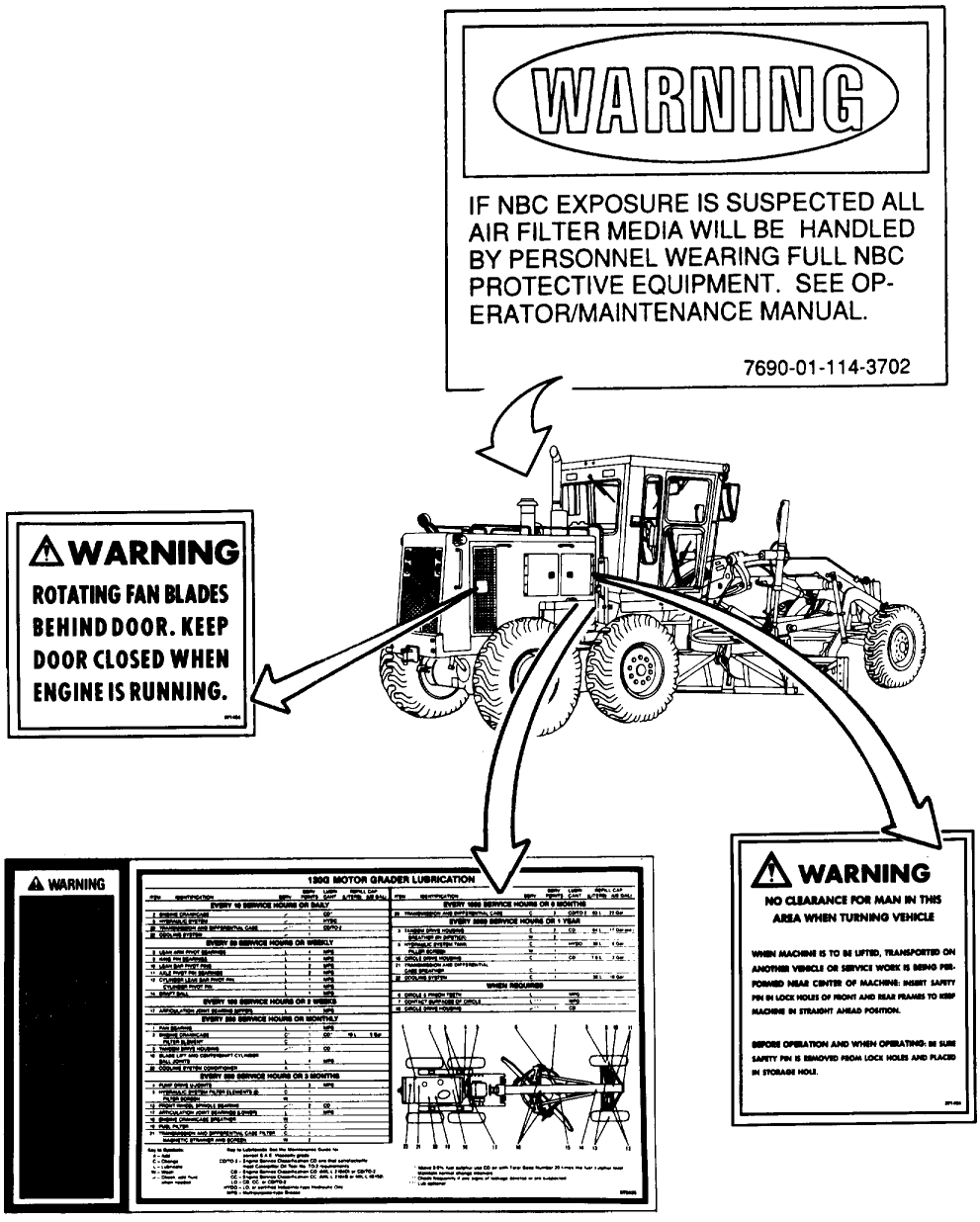
2-31. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES. These notes are strategically placed on the vehicle for your convenience and protection. Know where they are and pay attention to what they say.

a. Exterior, Right Side.



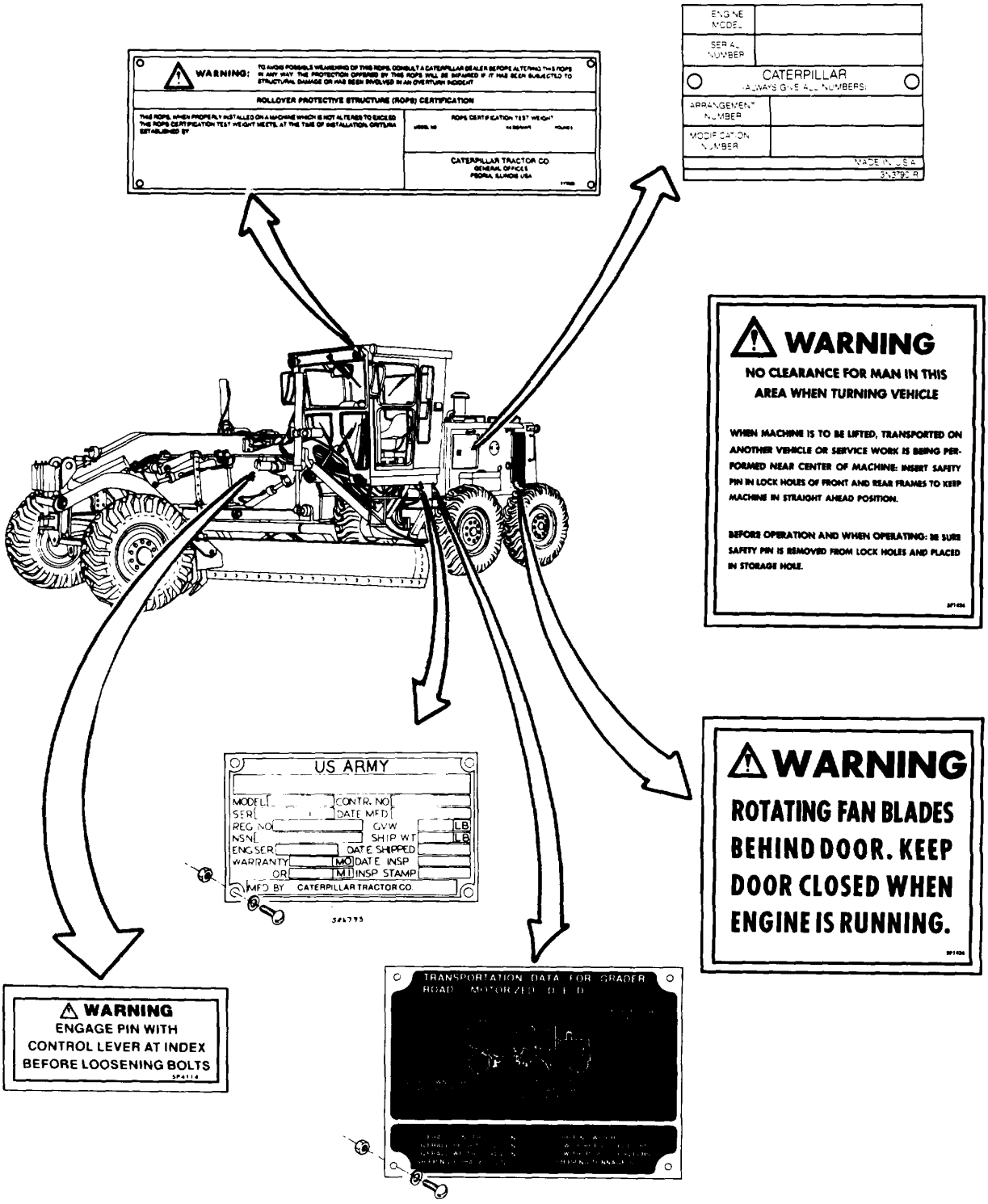
2-31. OPERATION INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES.

a. Exterior, Right Side.



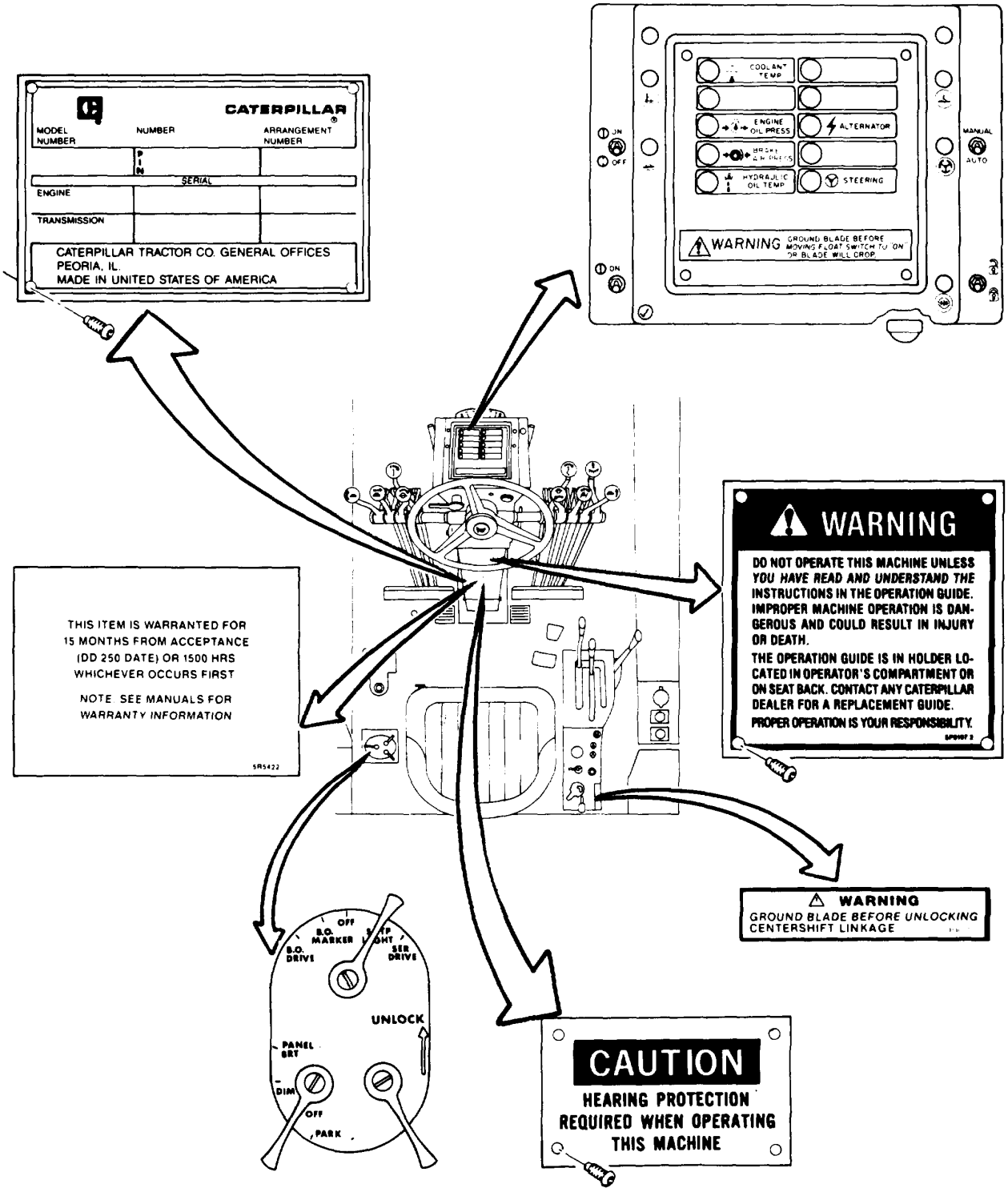
2-31. OPERATION INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES.-Continued

b. Exterior, Left Side.



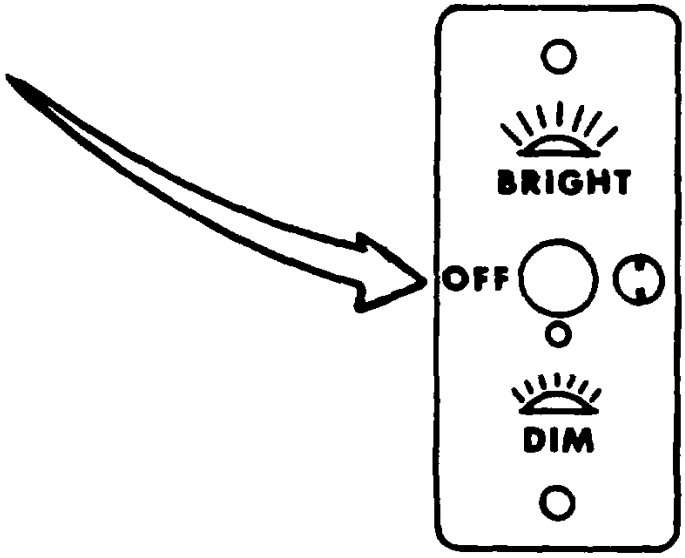
2-31. OPERATION INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES.

c. Interior (Cab).

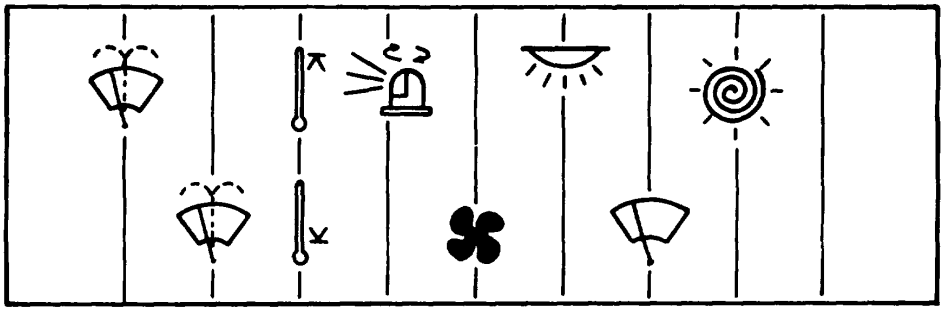


2-31. OPERATION INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES.-Continued

d. Dome Light Switch Decal. (Front, upper-right corner of cab.)



e. Fuse Box Decal. (Rear, upper-right side of cab.)



Section IV. OPERATION UNDER UNUSUAL CONDITIONS.

2-32. OPERATION IN UNUSUAL WEATHER.

a. Extreme Cold.

(1) General. Extensive preparation of the vehicle is required for extremely cold weather. Extreme cold causes many problems:

- Lubricants thicken or congeal.
- Batteries may freeze or loose their electrical efficiency.
- Electrical insulation may crack and cause short circuits.
- Fuel may not readily vaporize for combustion.
- Various materials will become hard, brittle and easily damaged.

2-32. OPERATION IN UNUSUAL WEATHER.

a. Extreme Cold.

(2) Cooling system. Inspect for leaks and general condition. Make sure clamps are tight. Check fluid level in radiator. Refer to paragraph 3-6. Notify organizational maintenance if system needs service.

(3) Fuel tank. Do not allow to remain partially empty for a long period of time in extremely cold weather. Fill after each work period to help avoid water condensation in the fuel tank. Remove all ice and snow from around the fuel filler opening before refueling. Refer to paragraph 3-6.

(4) Electrical system. Inspect battery cables, wiring harness and wiring. Check for breaks or cracks caused by cold weather. Report any to organizational maintenance.

Save your batteries. Use lights and other electrical equipment as little as possible.

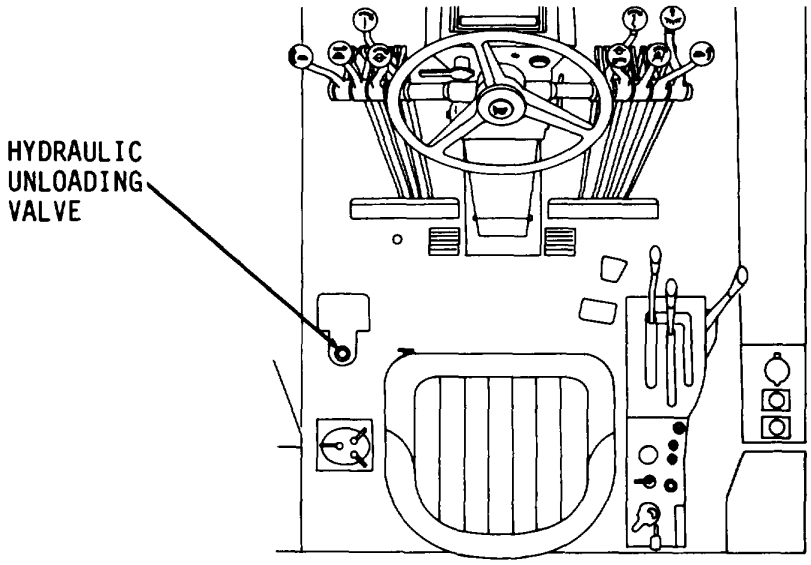
(5) Lubrication. Lubricate according to LO 5-3805-261-12. You will be provided with lubricants with a pour point below the lowest expected operating temperature.

(6) Engine operation.

(a) Before starting, make sure fuel and oil in the engine transmission and tandems are thin enough to flow. If the oil drips from the dipstick, it is thin enough for the engine to be started.

(b) Use the ether starting aid. Refer to paragraph 2-29.

(c) Hold hydraulic unloading valve down to reduce load on engine starter. Keep hydraulic unloading valve down one to two minutes after the engine starts.



2-32. OPERATION IN UNUSUAL WEATHER.-Continued

a. Extreme Cold.-Continued

(d) With the engine running at low idle, release the hydraulic unloading valve slowly to allow the pump to be loaded gradually with the cold, thickened oil.

(e) Run the engine at reduced speed only long enough to circulate the oil through the engine. Then increase speed and warm up the engine. Low idling speeds during extremely cold temperatures can result in incomplete combustion and the formation of heavy deposits on the valves.

(f) Cover radiator if necessary to bring engine up to operating temperature.

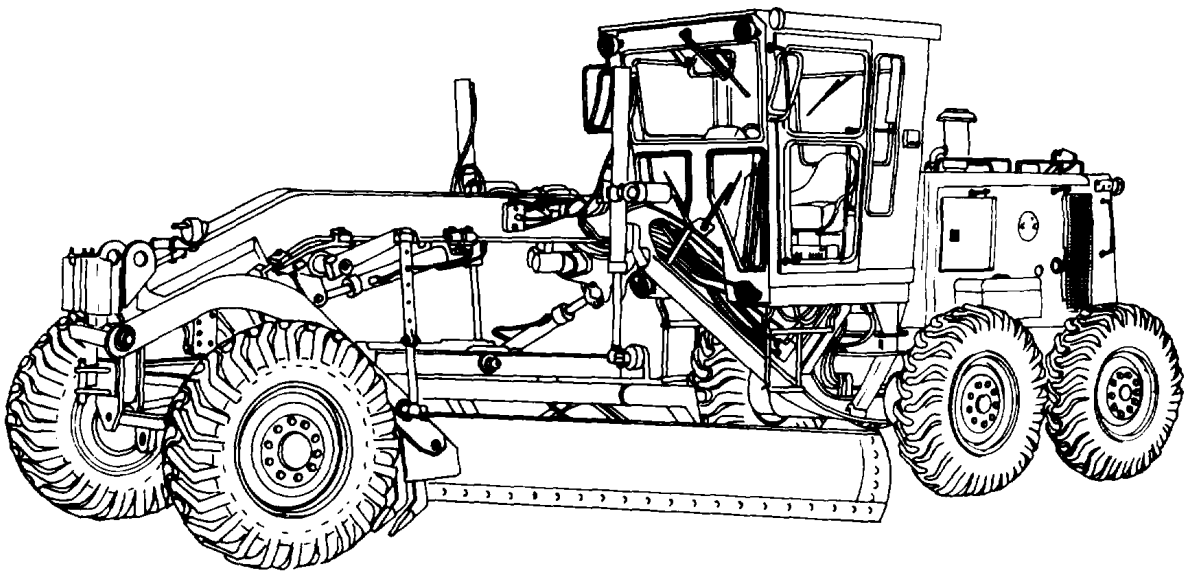
(7) Vehicle operation.

(a) Test brakes and vehicle controls carefully.

(b) Move all implement controls slowly to warm the hydraulic oil. Cycle each one several times. Normal warm-up period is three to ten minutes.

(c) Operate under a light load for the first five minutes of operation.

(8) At halt or parking.



(a) Run vehicle onto planks to prevent tires from freezing to the ground.

(b) Clean wet-snow and mud from tires and cylinders before it freezes.

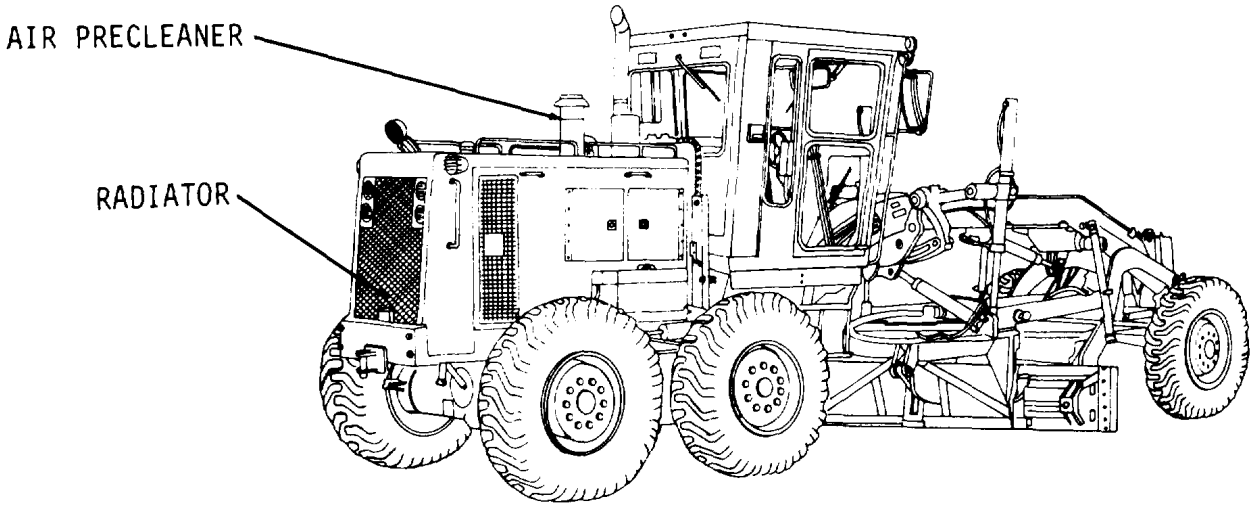
(c) Place planks under blade and scarfier so they don’t freeze to the ground.

2-32. OPERATION IN UNUSUAL WEATHER.

b. Extreme Heat.

(1) General. You must naturally be alert for the possibility of overheating. Keep a close eye on EMS engine coolant and hydraulic oil temperature indicators.

If coolant or hydraulic temperature indicators come on, you may operate at three-fourths workload until indicators go out. It is important to maintain engine rpm to help cooling. If indicators stay on after more than ten minutes of reduced workload, stop the vehicle and notify organizational maintenance.



(2) Cooling system.

(a) Check coolant level at frequent intervals and keep radiator cap tight. Refer to paragraph 3-6.

(b) Be sure the radiator is free of bugs, dust and other foreign matter.

(c) Check fan belt tension frequently. Report any damaged or loose belts to organizational maintenance.

(3) Lubrication. Lubricate according to LO 5-3805-261-12. You will be provided with lubricant suitable for extreme heat.

(4) Air cleaner. Check and clean air precleaner at closer than normal intervals. Check air cleaner indicator frequently. Notify organizational maintenance if the red indicator locks in the visible position.

(5) At halt or parking. Park the vehicle in a shaded area, if possible.

2-32. OPERATION IN UNUSUAL WEATHER.-Continued

c. Rainy or Humid Condition.

(1) General. Protect vehicle from moisture. Keep operator's compartment as dry as possible.

(2) Fuel system. Keep fuel tank full to cut down on water collecting in the fuel tank. Refer to paragraph 3-6b.

(3) Lubrication. Lubricate according to LO 5-3805-261-12.

2-33. OPERATING IN DUSTY OR SANDY AREAS.

a. General. Abrasive sand and dust can cause wear on many parts of the 13OG Grader. It can clog your air cleaner and radiator.

b. Cooling System. Keep radiator air passages open. Inspect frequently. Refer to paragraph 3-6.

c. Air Cleaner. Inspect and clean precleaner screen frequently. Check air cleaner indicator at closer than normal intervals. Notify organizational maintenance if red indicator locks in visible position.

d. Lubrication. Lubricate according to LO 5-3805-261-12. Lubricate at more frequent intervals. Take special care cleaning fittings and lubrication openings. Keep dust and dirt out of lubricants.

CAUTION

After completing operations in soft terrain and BEFORE beginning operations in normal terrain, add air to the tires to return them to usual operating pressure of 35 psi.

e. Tire Pressure. When operating the vehicle on soft sand at slow speeds, the tire inflation pressure may be decreased for improved traction. Refer to FM 21-305.

f. At Halt or Parking. Make sure operator's compartment doors, windows and vents are tightly closed. Protect engine compartment from windblown dust and sand.

2-33. OPERATING IN DUSTY OR SANDY AREAS.

g. Earth Moving Equipment. Check hydraulic cylinders, top of circle, centershift linkage and articulation cylinders frequently. Do not allow dust, dirt or sand to collect in these areas.

2-34. OPERATION IN SALTWATER AREAS. Keep your vehicle as clean as possible. Wash down with fresh water after use. Inspect wiring connections closely for corrosion. Keep lubrication points clean and well lubricated. Refer to LO 5-3805-261-12.

2-35. OPERATION AT HIGH ALTITUDES. Coolant level and engine instruments and indicators must be watched closely. Add coolant if necessary. Refer to paragraph 3-6.

NOTE

Engine operates at less than peak performance at high altitudes.

2-36. OPERATION IN SNOW. Fuel tank should be kept full. Keep snow and ice away from fuel filler. Clean snow away from outside indicators.

2-37. FORDING. The 130G Grader can be forded in water depths up to 30 inches. Observe the following precautions when fording any body of water:

a. Before Fording. Check the depth of the water at its deepest point. Make sure the bottom is even enough for fording. Do not ford even the narrowest stream more than 30 inches deep. Make sure your engine is operating at full efficiency.

Raise blade and scarifier to maximum height. Set blade angle crosswise to vehicle.

Set transmission lever in low. Set governor control high to minimize the danger of stalling.

b. During Fording. Enter in water slowly to minimize waves and backwash. Speed should not exceed three to four mph. If stalling occurs, notify organizational maintenance.

c. After Fording. Lubricate the vehicle completely as soon as possible after fording. Refer to LO 5-3805-261-12.

Section V. Towing and Special Techniques

2-38. TOWING THE MACHINE.

Towing the Machine

The machine may be towed up to 365 m (400 yards) Towing the machine greater distances is not recommended.

⚠ WARNING

Be sure the tow line is strong enough and is in good condition.

Attach the tow line only to the towing connection points provided on the frame. Do not tow faster than 8 km/h (5 mph).

Shielding must be provided on the towed and towing machines to protect the operator if the tow line breaks.

Do not have tension on the tow line when inspecting it. Do not jerk the tow line; it may break.

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

Do not allow riders on a machine that is being towed.

Always block the wheels before removing the axle shafts or disconnecting the parking/emergency brake.

If the axle shafts are removed or the parking/emergency brake is disconnected, block the wheels when parking.

NOTICE

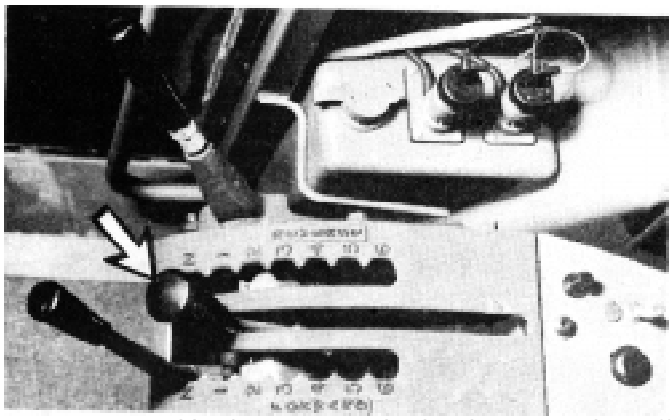
To tow the machine, it is necessary to disconnect the parking/emergency brake.

2-38. TOWING THE MACHINE. (CONT)

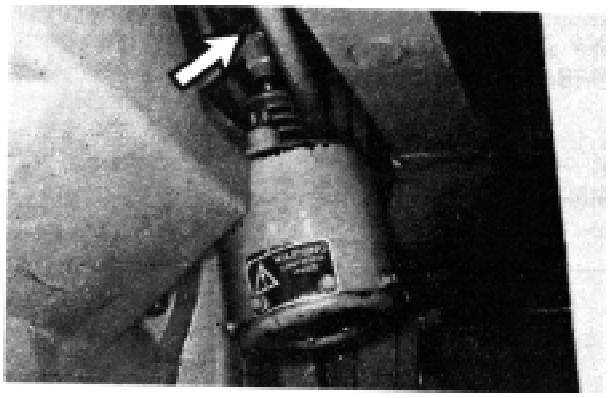
Disconnect the Parking/Emergency Brake

⚠ WARNING

Block the wheels securely so that the machine can not move. When working on the rotochamber with the parking/emergency brake lever in the off position, a sudden loss of air pressure will let the rod move rapidly.



1. Move parking/emergency brake lever to the off position.

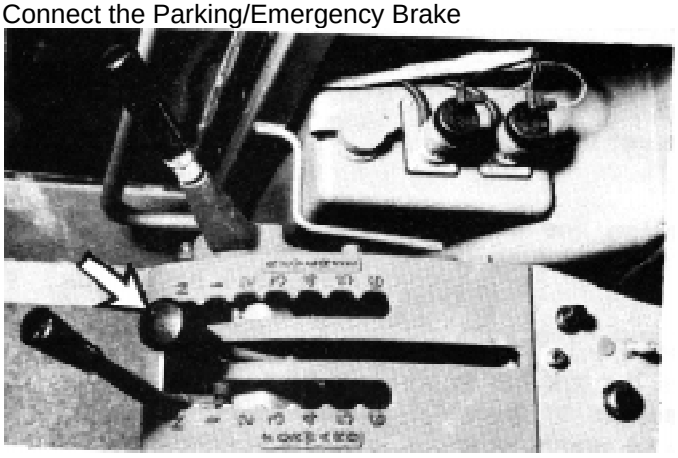


2. Remove the pin from the rod end of the rotochamber.

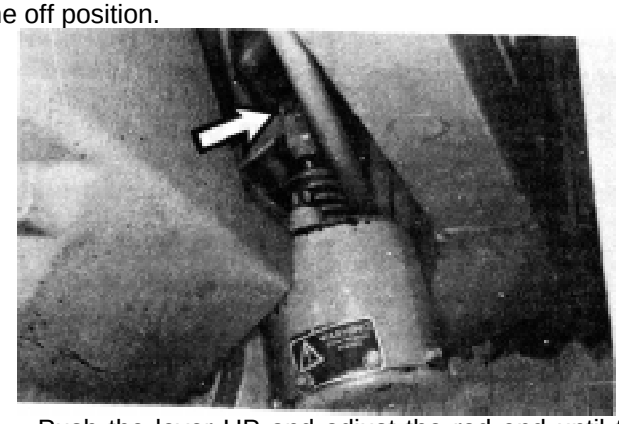
NOTICE

Before operating the machine, connect the rotochamber for the parking/emergency brake. See "Connect the Parking/Emergency Brake," which follows.

Connect the Parking/Emergency Brake



1. Make sure the parking/emergency brake lever is in the off position.



2. Push the lever UP and adjust the rod end until the lever has a small amount of free movement. Install the pin.

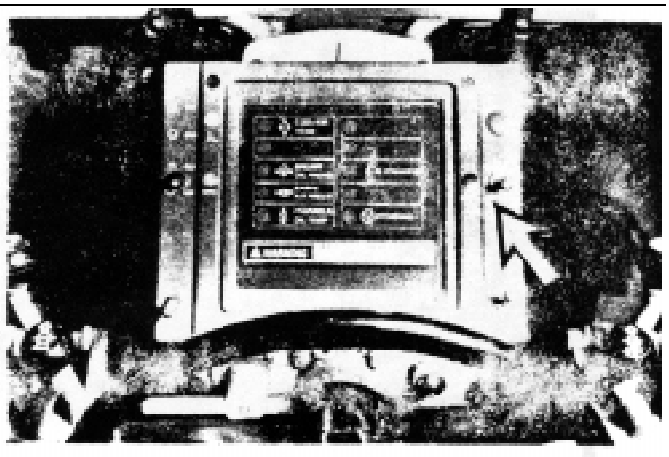
2-39. TOWING MACHINES EQUIPPED WITH SUPPLEMENTAL STEERING.

⚠ WARNING

A dead cell in the machine's batteries will result in loss of supplemental steering capability.

NOTE: Follow the procedures given in "Towing the Machine" if necessary to disconnect and connect the parking/emergency brake

Making Steering Correction



NOTICE

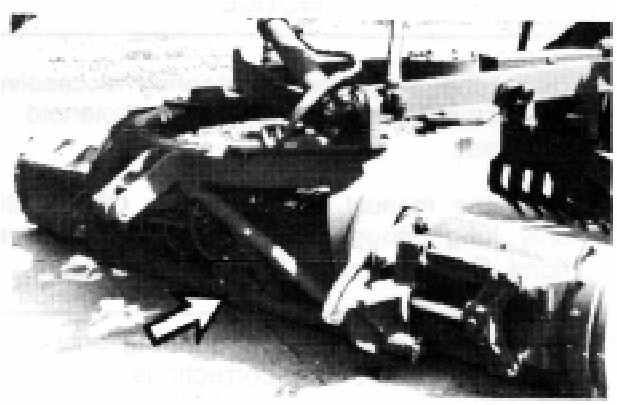
Using the supplemental steering excessively will cause the motor and solenoid to overheat.

Hold the manual switch in the ON position only long enough to make steering corrections. Do not exceed two minute duration.

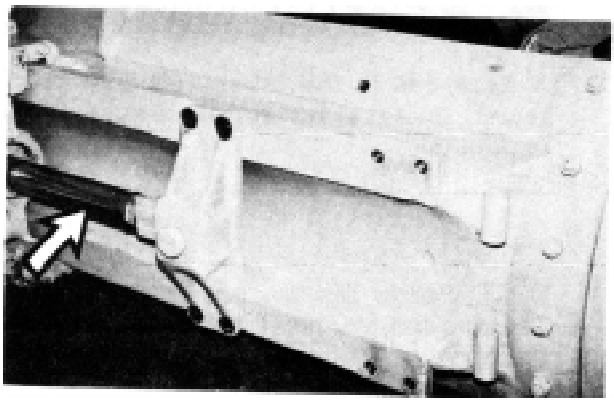
Activate the supplemental steering only when making steering corrections

Move and hold manual switch to MANUAL. Make the steering correction, then release the switch. It will return to AUTO.

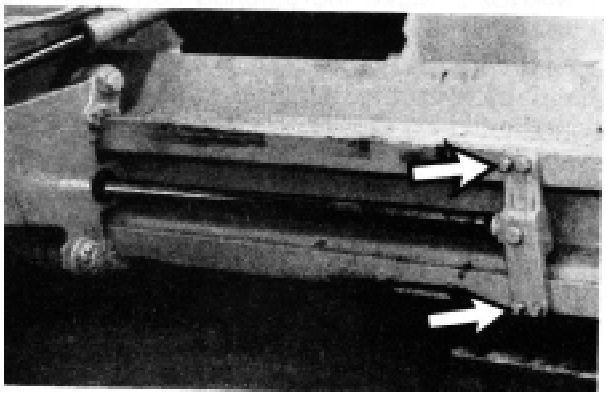
2-40. EXTENDING MOLDBOARD.



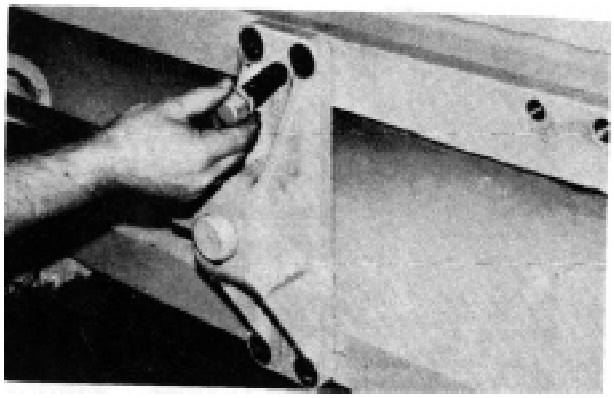
1. Lower the blade to the ground.



3. Retract the cylinder rod.



2. Loosen the bolts securing the cylinder rod end bracket to the moldboard. Remove the bolts and lockwashers.



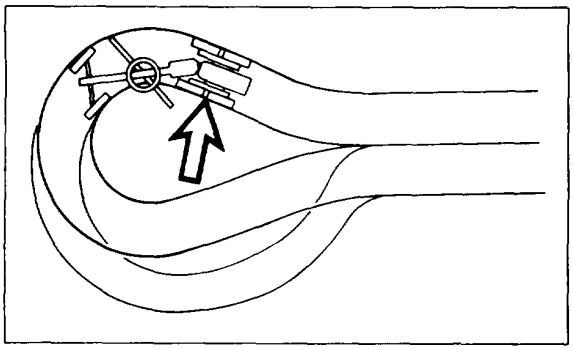
4. Align the bolt holes in the bracket with the alternate holes in the moldboard.

5. Install the lockwashers, bolts and tighten the bolts.

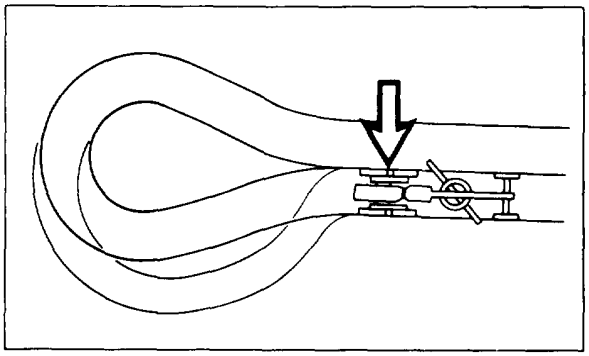
2-41. TURNING AROUND USING ARTICULATION.

NOTICE

To prevent possible damage to the drive train, be sure the differential is unlocked before turning or maneuvering the machine. Keep the differential unlocked until traveling in a straight line.



1. Turn LEFT and articulate the frame LEFT.

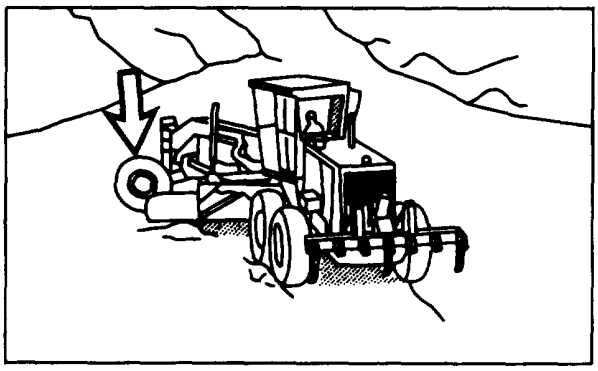


2. Turn RIGHT and articulate the frame STRAIGHT. Continue to grade.

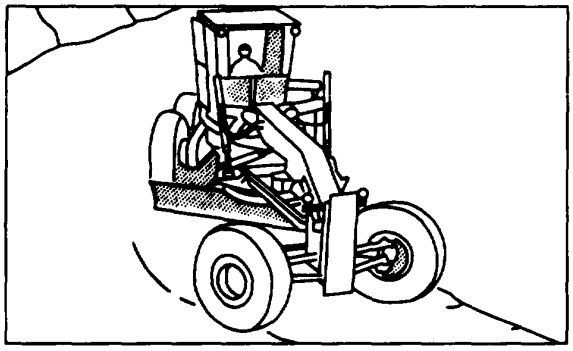
2-42. TURNING AROUND IN TIGHT AREAS.

NOTICE

If necessary to cross a ditch when turning, back across it.

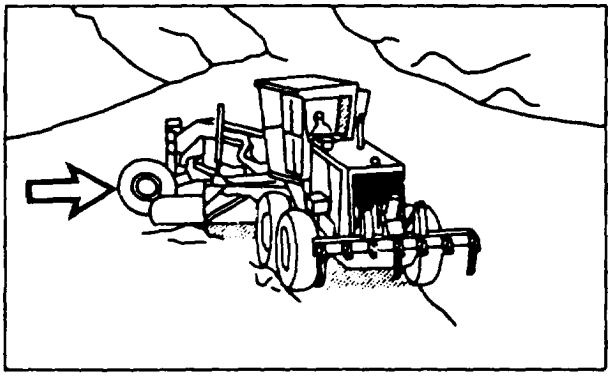


1. Lean the wheels slightly in the direction of forward turn (right for right turn, left for left turn), turn the wheels.

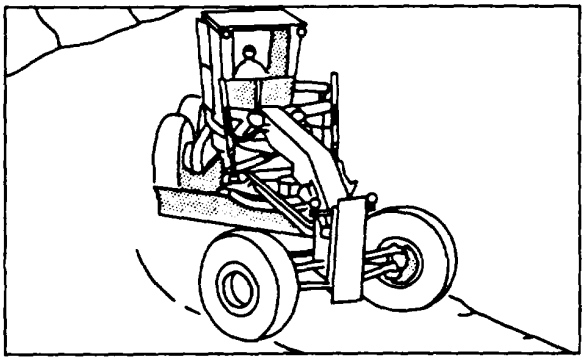


Travel as far as possible in the direction of the forward turn.

2-42. TURNING AROUND IN TIGHT AREAS. (CONT)

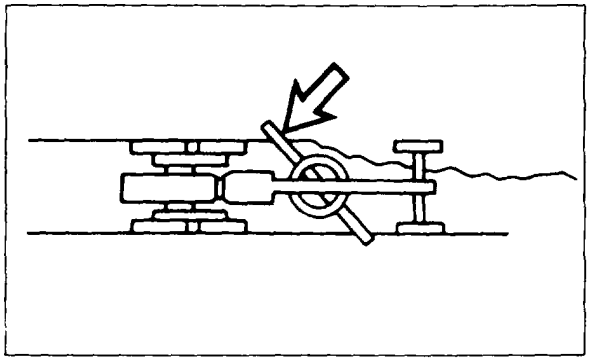


2. Turn the front wheels in the opposite direction. Back the machine as far as possible to line it up with the new direction of travel.

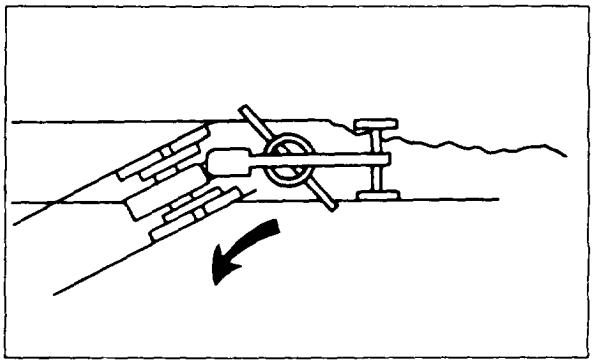


3. Turn the wheels to the new travel direction. Straighten the wheels after the turn is completed.

2-43. BACKING OUT OF A DROPOFF OR DITCH.

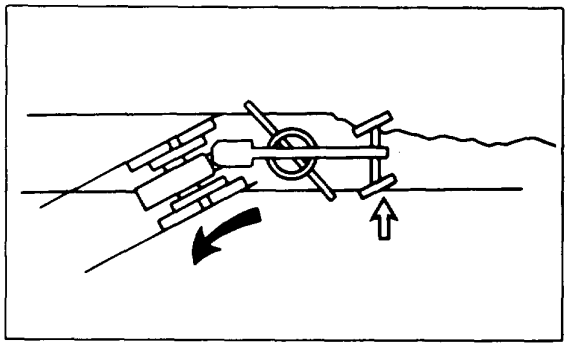


1. Stop the machine. Raise the blade and implements.

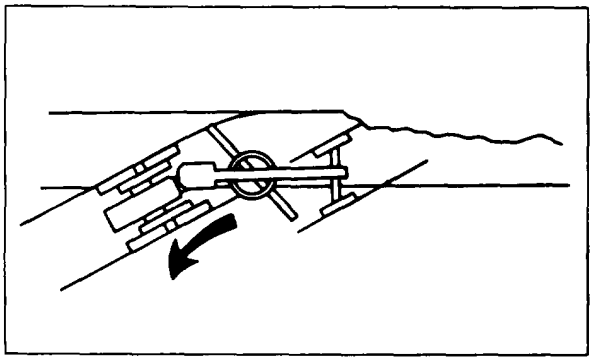


2. Articulate RIGHT while moving back slowly.

2-43. BACKING OUT OF A DROPOFF OR DITCH. (CONT)

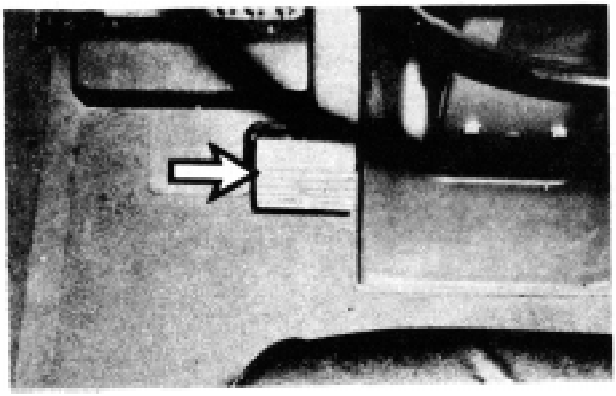


3. Turn LEFT while moving back slowly.



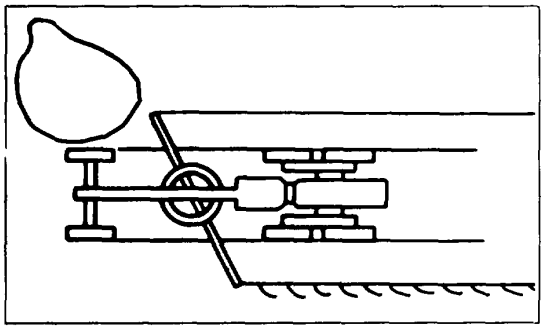
4. Continue to back out until the machine is completely out of the dropoff or ditch.

2-44. GRADING AROUND AN OBJECT.



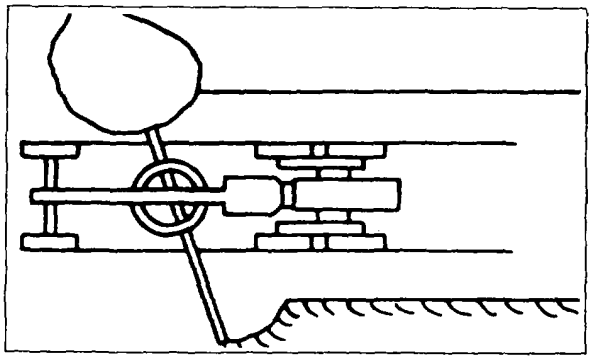
Depress the transmission modulator pedal to move the machine slowly (inch) around an object.

NOTE: Grade as close to the object as possible to minimize hand cleanup.

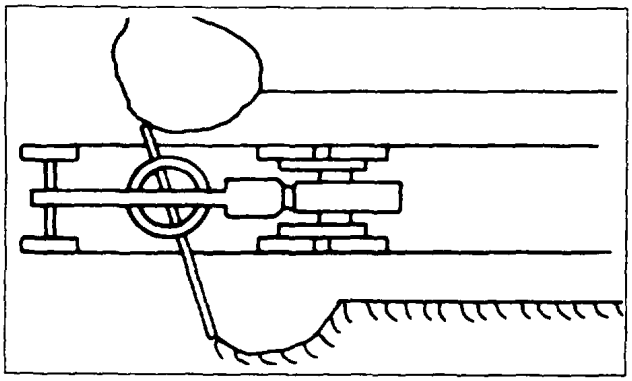


1. Grade close.

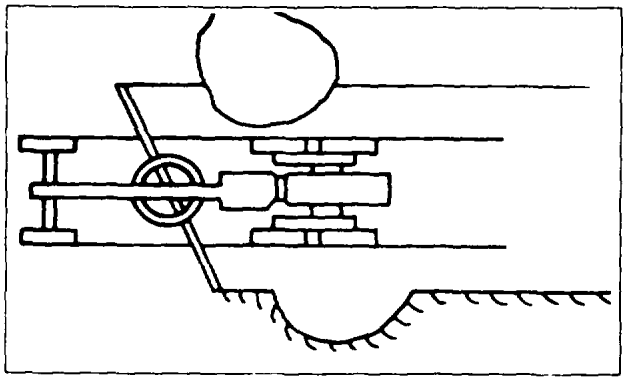
2-44. GRADING AROUND AN OBJECT. (CONT)



2. Move blade



3. Move blade

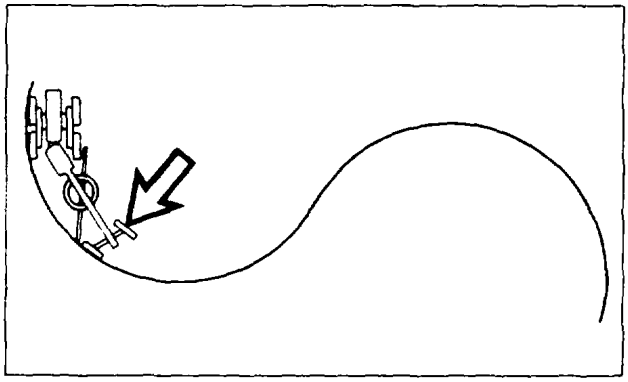


4. Move blade

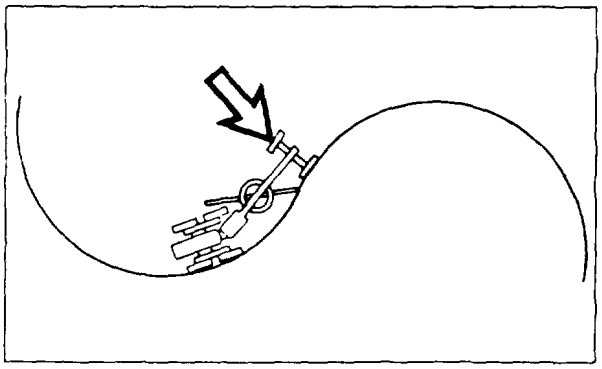
2-45. GRADING ON AN "S" CURVE.

NOTICE

Do not allow the moldboard to contact the tires when articulating the machine.

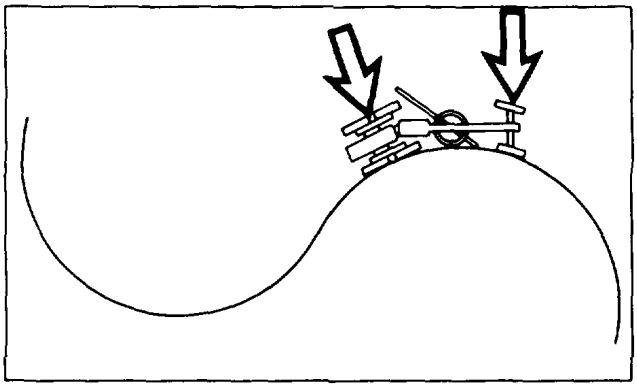


1. Articulate LEFT, turn LEFT, sideshift RIGHT.

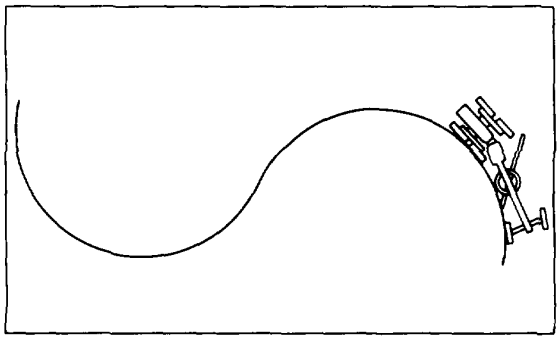


2. Turn STRAIGHT, move sideshift as necessary

2-45. GRADING ON AN "S" CURVE. (CONT)

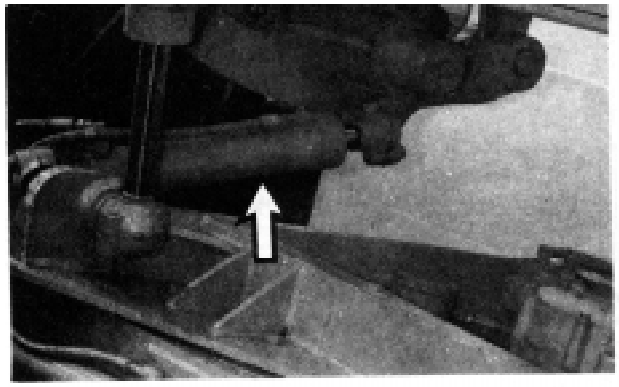


3. Articulate RIGHT, turn RIGHT, sideshift LEFT.

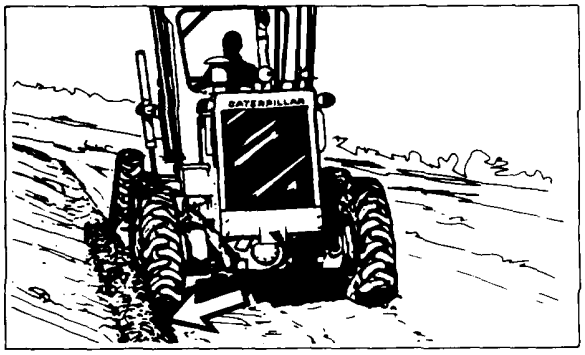


4. Continue to grade.

2-46. RIGHT HAND LEVELING.

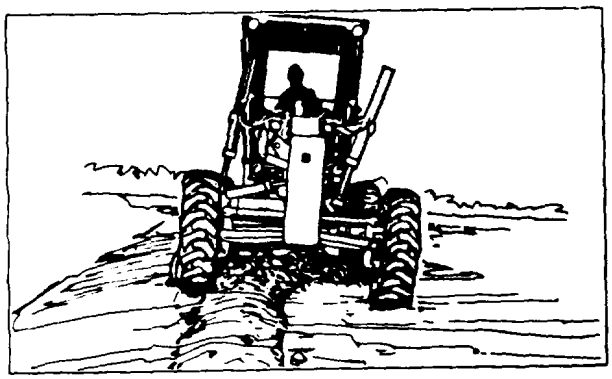


1. Use the centershift cylinder to position the circle approximately 200 mm (8 inches) to the left. Move the centershift lock pin lever to the INDEX and RUN position.

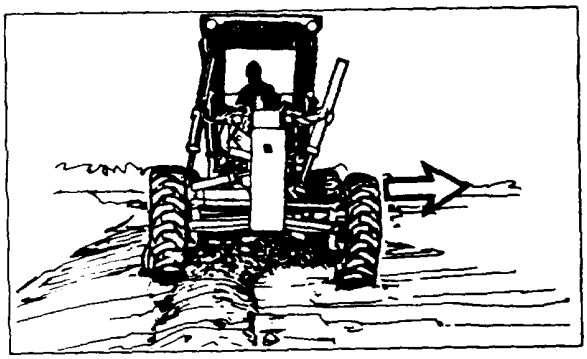


2. Set the blade to cast material outside of the left rear wheels.

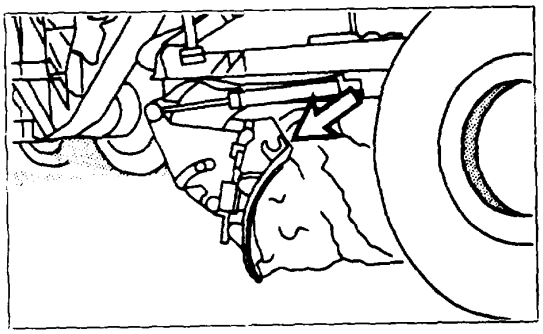
2-46. RIGHT HAND LEVELING. (CONT)



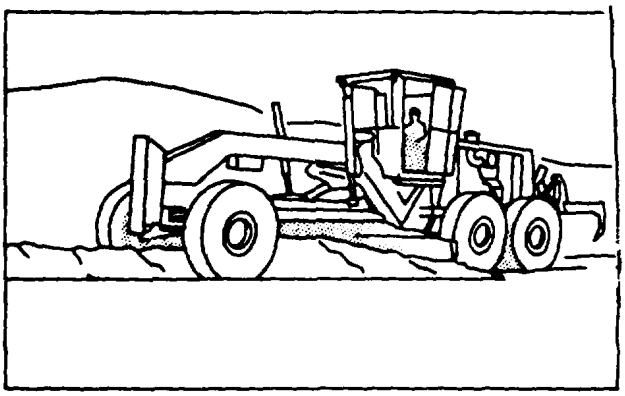
3. Set the blade horizontal at the desired depth of the cut.



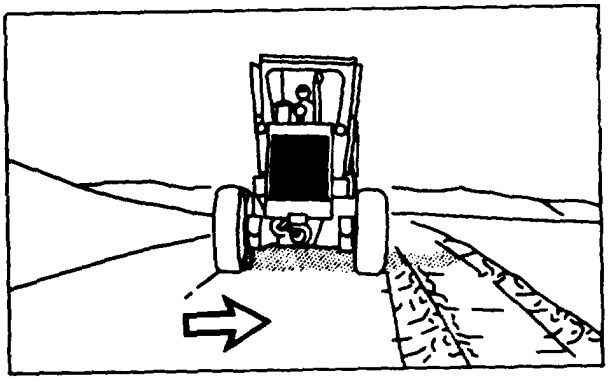
4. Lean the wheels to the left to overcome the side draft.



5. Tip the blade to the best position for the material being worked. Start with the top of the moldboard slightly ahead of the cutting edge.



6. Under good conditions, work the material from side to side.



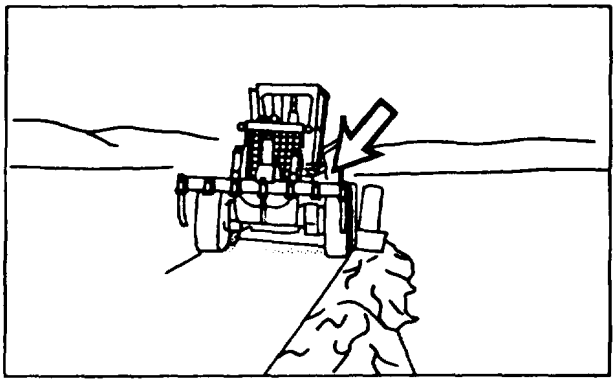
7. Spread the loose material over the surface until it is smooth.

Normally, the machine is used with the frame straight for flat blading. Articulate it to counteract side draft from heavy blade loads. Turn the front of the tandems toward the heel of the moldboard.

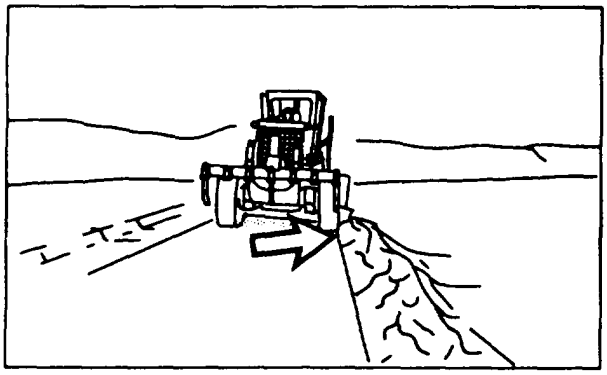
If the wheels start to spin, turn the front of the tandems away from the heel of the moldboard. This will reduce the width of the cut and reduce the load on the machine.

In normal leveling work, deliver the material to the outside of the rear wheels. This will maintain a smooth surface for the rear wheels.

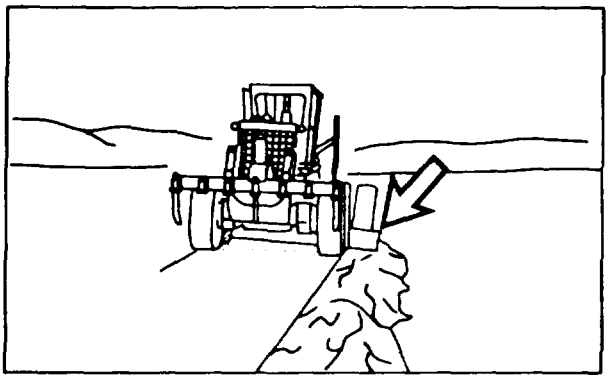
2-47. LEFT HAND LEVELING.



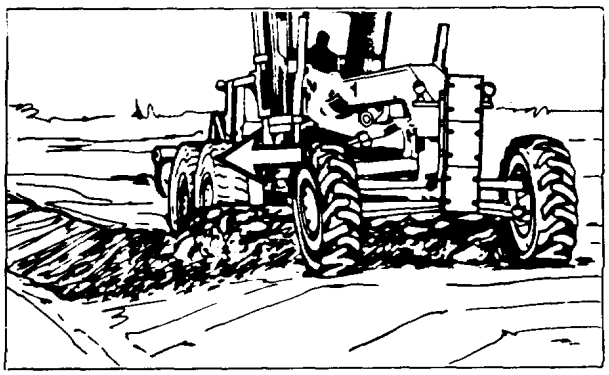
1. Position the circle 200 mm (8 inches) to the right. Move the centershift lock pin lever to the INDEX and RUN position.



2. Set the blade to cast the material outside of the right rear wheels.



3. Set the blade horizontal at the desired depth of cut.



4. Lean the wheels to right Operate the same as for right hand leveling.

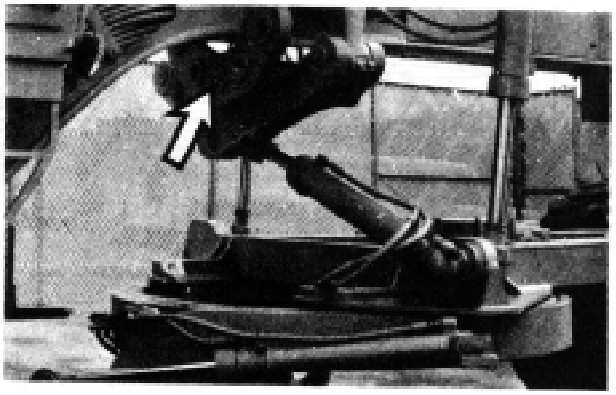
2-48. RIGHT HAND V' DITCHING.

⚠ WARNING

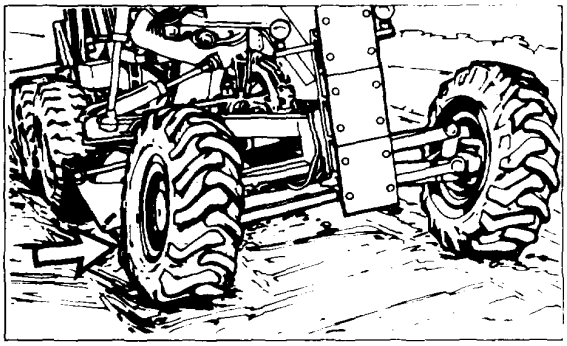
Be sure to ground moldboard before retracting centershift lock pin.

NOTICE

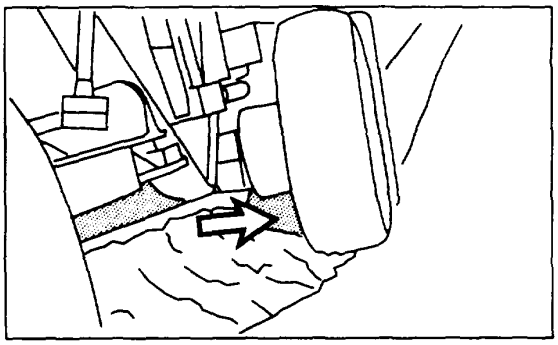
Position the frame straight. If the machine is articulated, the tire sidewalls may be forced against the back slope, causing tire sidewall damage and also force dirt between the tire and rim, causing air loss and flat tires.



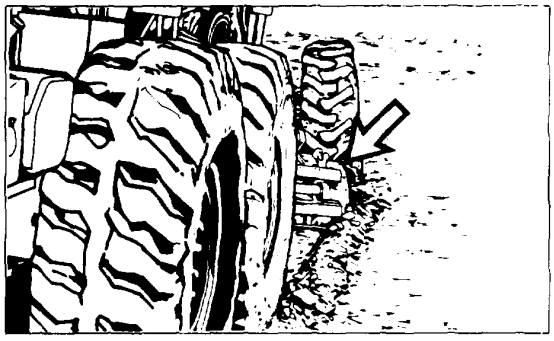
1. Set the centershift lock pin as shown. Move the centershift lock pin lever to the INDEX and RUN position.



2. Set the blade with the right end In line with the outer edge of the right front tire. Tilt the moldboard so the top of the blade is slightly ahead of the cutting edge.

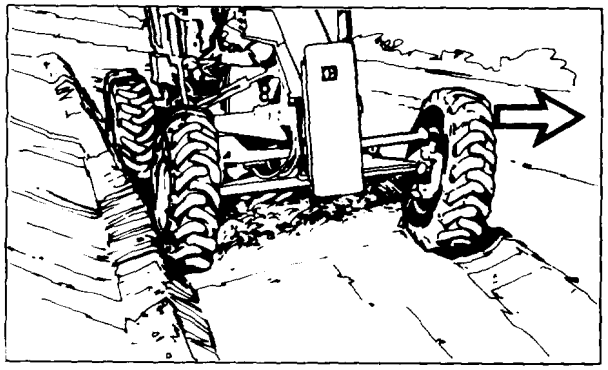


3. Raise the left lift cylinder to the high position. Angle the blade to deliver the material inside the left rear wheels.

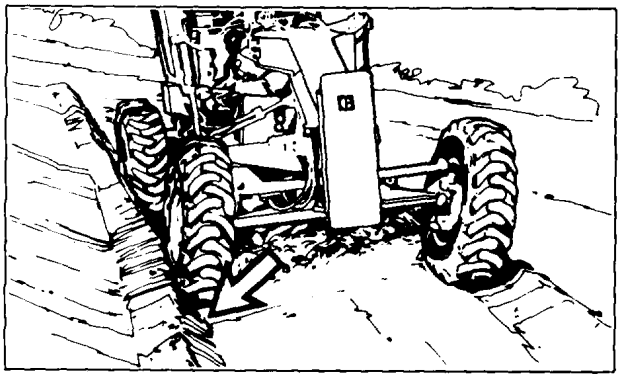


4. Lower the right lift cylinder to set the blade tip for desired depth of cut.

2-48. RIGHT HAND "V DITCHING. (CONT)



5. Lean the wheels to the left. Make a shallow, 50 to 100 mm (2 to 4 in), marking pass.



6. Keep the right front tire in the bottom of the ditch. Continue ditching to the desired depth.

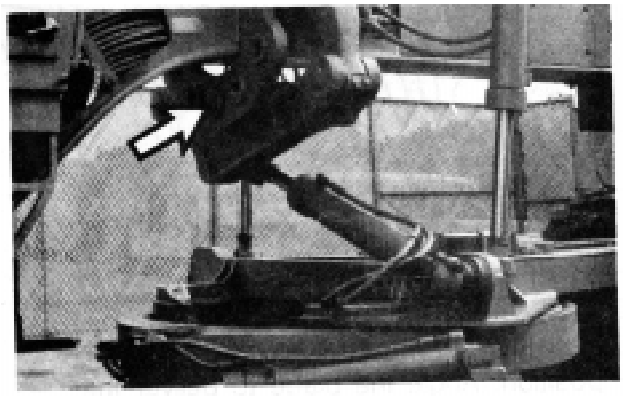
2-49. LEFT HAND "V DITCHING

⚠ WARNING

Be sure to ground moldboard before retracting centershift lock pin.

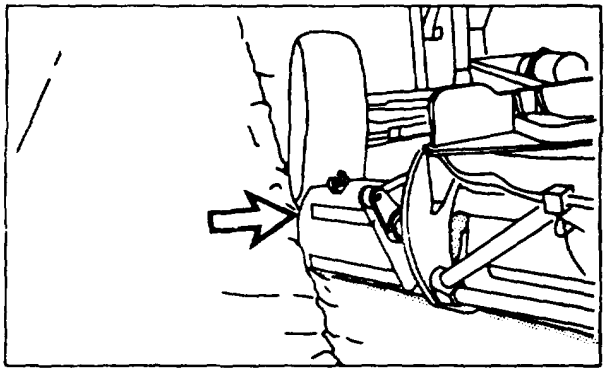
NOTICE

Position the frame straight. If the machine is articulated, the tire sidewalls may be forced against the back slope causing tire sidewall damage and also force dirt between the tire and rim, causing air loss and flat tires.

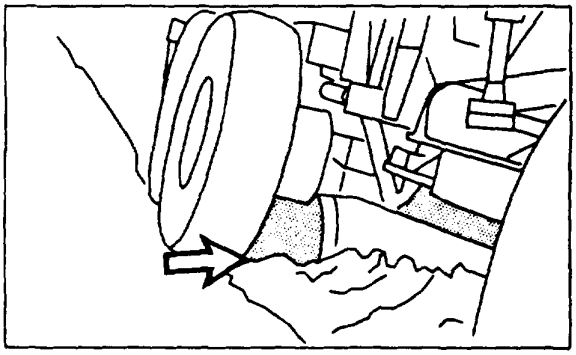


1. Set the centershift lock pin as shown. Move the centershift lock pin lever to the INDEX and RUN position.

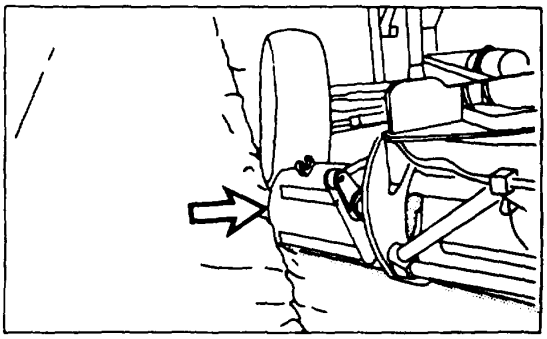
2-49. LEFT HAND "V DITCHING. (CONT)



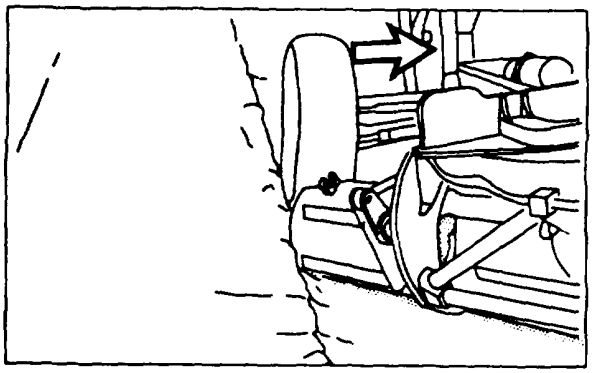
2. Set the blade with the left end in line with the outer edge of the left front tire. Tilt the moldboard so the top of the blade is slightly ahead of the cutting edge.



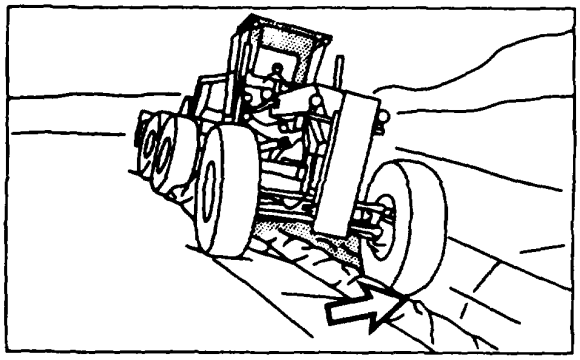
3. Raise the right lift cylinder to high position Angle the blade to deliver the material Inside the right rear wheels.



4. Lower the left lift cylinder to set the blade tip for the desired depth of cut.



5. Lean the wheels to the right. Make a shallow, 50 to 100 mm (2 to 4 in), marking pass.

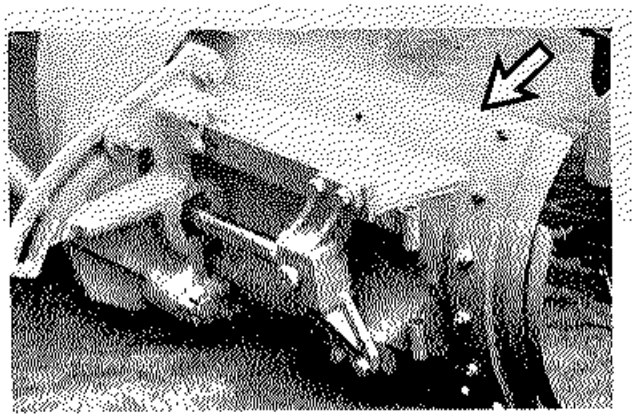


6. Keep the left front tire in the bottom of the ditch. Continue ditching to the desired depth.

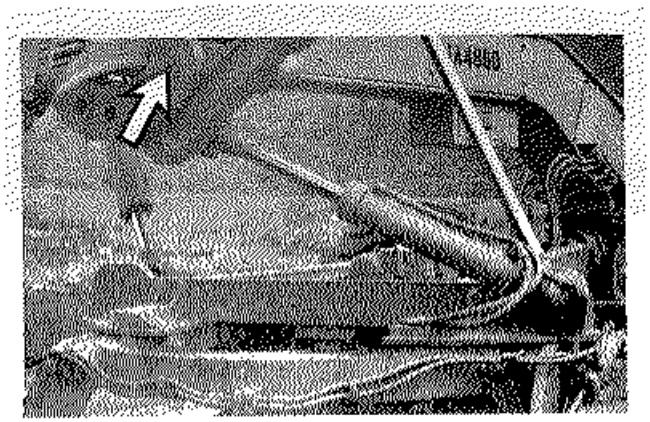
2-50. DITCH BACK SLOPING.

⚠ WARNING

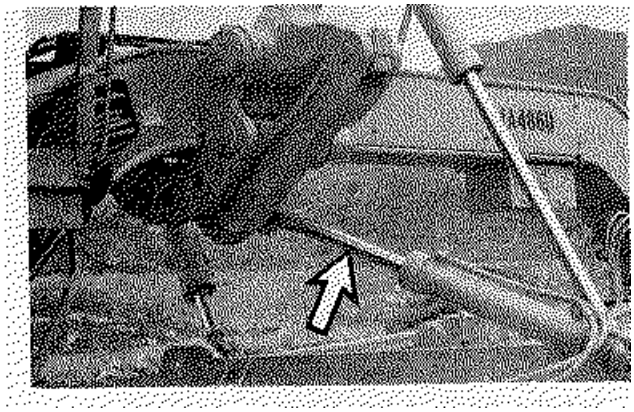
Be sure to ground moldboard before retracting centershift lock pin.



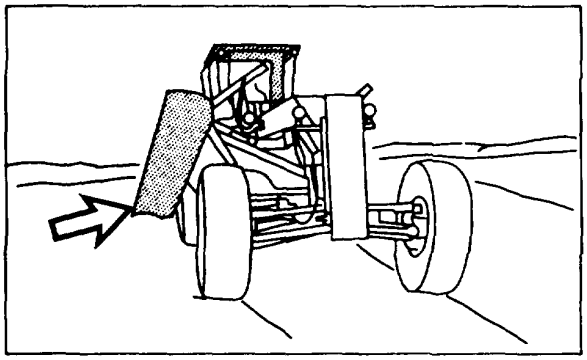
1. Tilt the blade forward.



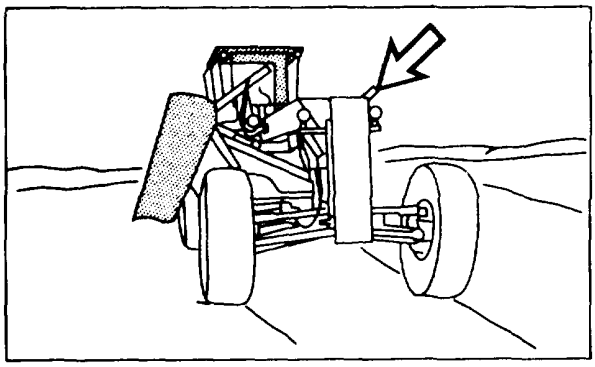
2. Shift the centershift pin to the top position by using both blade lift controls. Move the centershift lock pin lever to INDEX and RUN position.



3. Extend the centershift cylinder as needed.



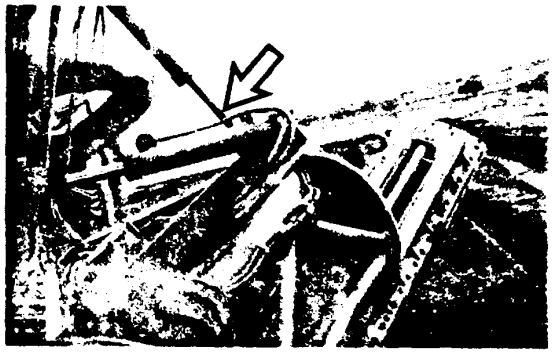
4. Rotate the circle to the left.



5. Lower the left lift cylinder while the circle is turning.

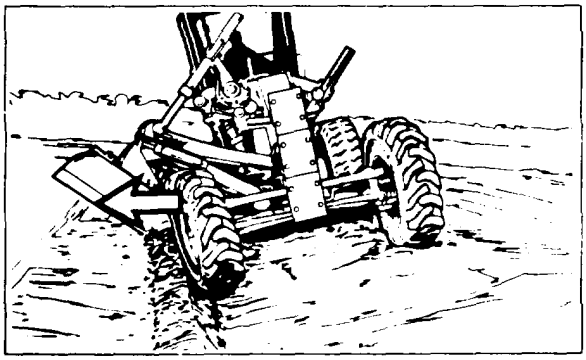
2-50. DITCH BACK SLOPING (CONT)

6. Set the heel of the blade in front of the right rear tire.

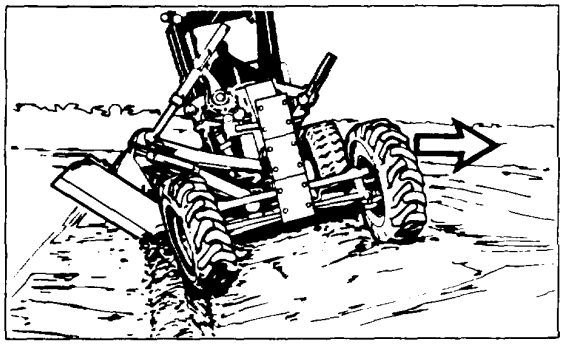


7. Lower the right lift cylinder to set the degree of slope.

NOTE: The wheels should normally be near the vertical position



8. Lean the wheels toward the slope for a heavier cut.

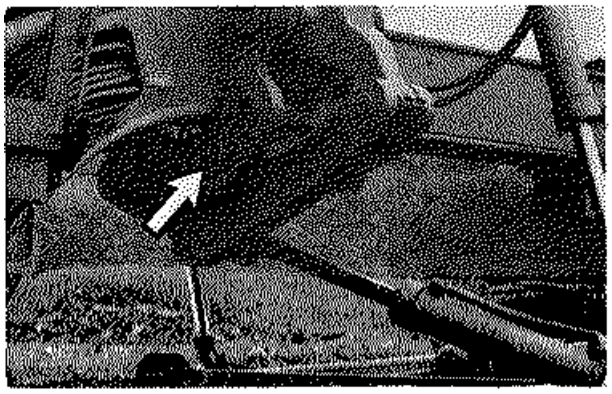


9. Lean the wheels away from the slope for lighter cut.

2-51. RIGHT HAND DITCH CLEANUP.

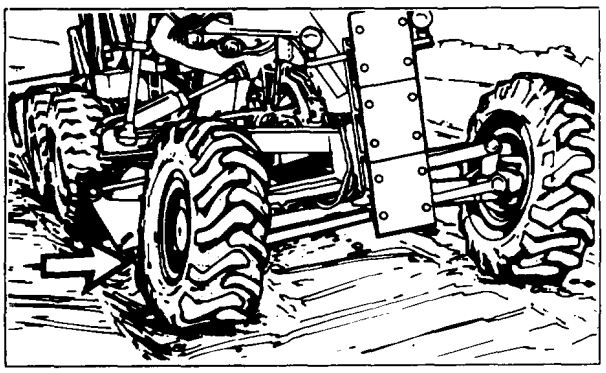
⚠ WARNING

Be sure to ground moldboard before retracting centershift lock pin.

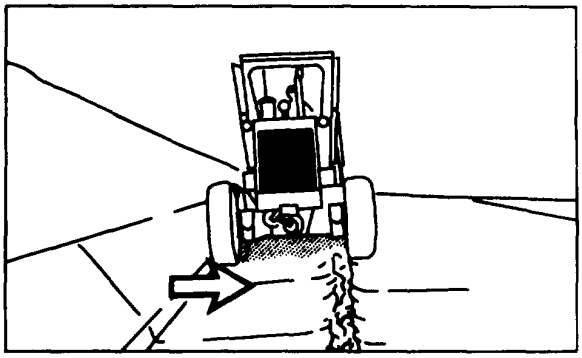


1. Move the centershift lock pin to the position shown. Move the centershift lock pin lever to the INDEX and RUN position.

2. Set the right end of the blade behind the right front tire.

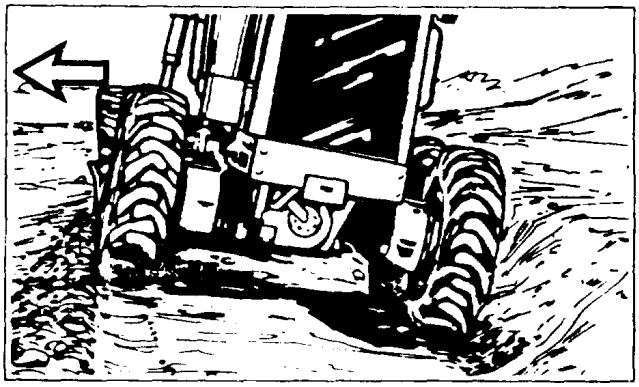


3. Lower the right lift cylinder to set the blade to the depth of the ditch.

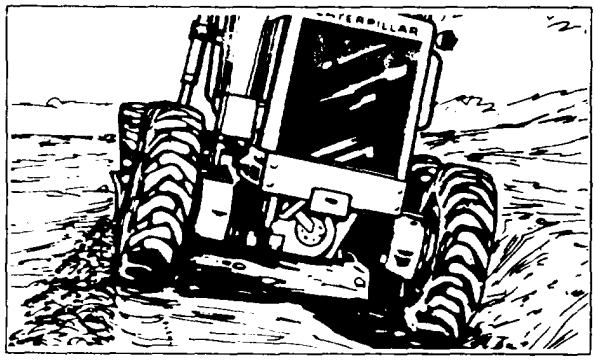


4. Set the left lift cylinder to deliver the material onto the slope between the tandems, without cutting.

2-51. RIGHT HAND DITCH CLEANUP. (CONT)



5. Lean the front wheels slightly to the left.

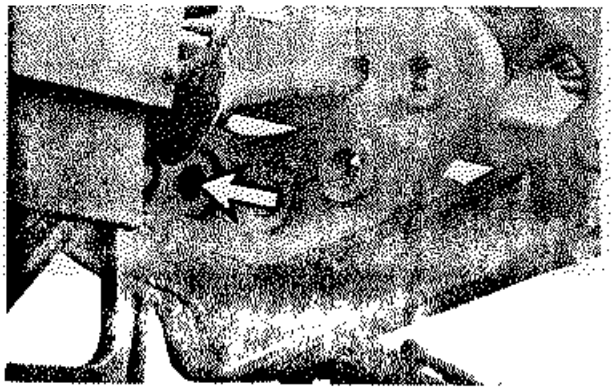


6. Another pass Is required to move the material up the slope and onto the shoulder. Spread the material and finish the final grade.

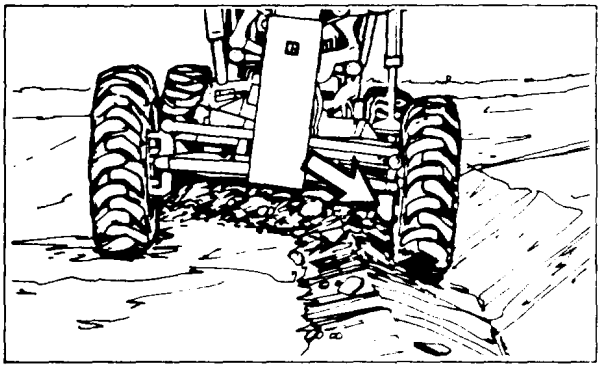
2-52. LEFT HAND DITCH CLEANUP.

⚠ WARNING

Be sure to ground moldboard before retracting centershift lock pin.

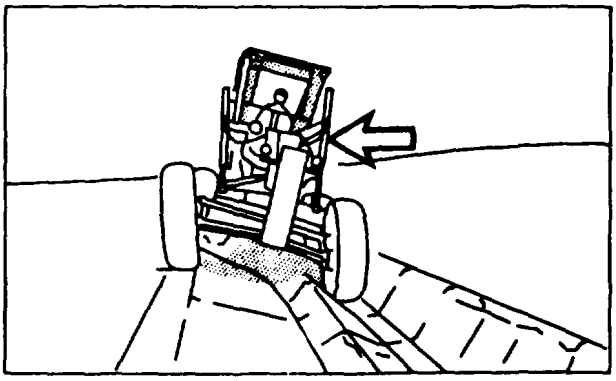


1. Move the centershift lock pin to the position shown Move the centershift lock pin lever to the INDEX and RUN position.

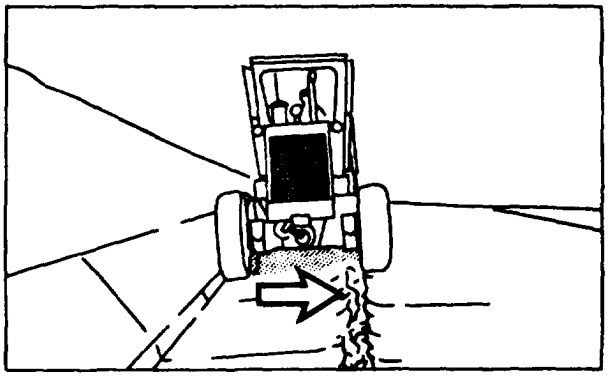


2. Set the left end of the blade behind the left front tire.

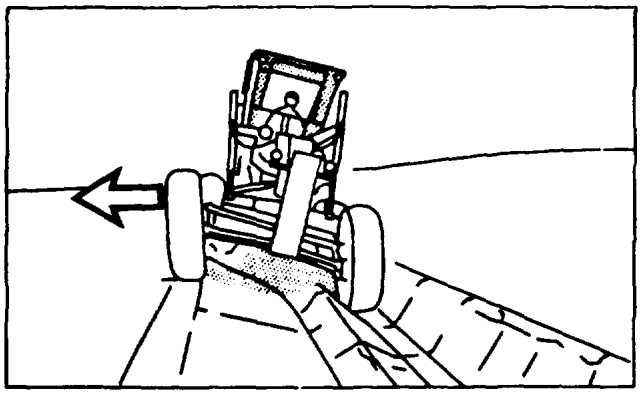
2-52. LEFT HAND DITCH CLEANUP (CONT)



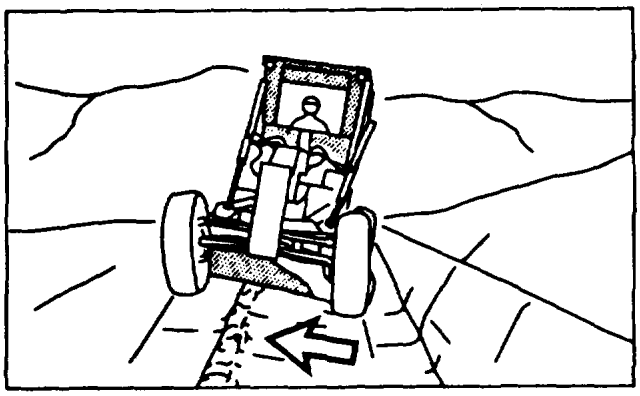
3. Lower the left lift cylinder to set the blade to the depth of the ditch.



4. Set the right lift cylinder to deliver the material onto the slope between the tandems, without cutting.



5. Lean the front wheels slightly to the right.

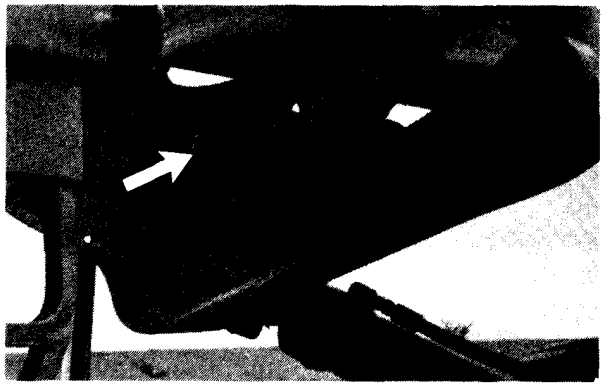


6. Another pass is required to move the material up the slope and onto the shoulder. Spread the material and finish the final grade.

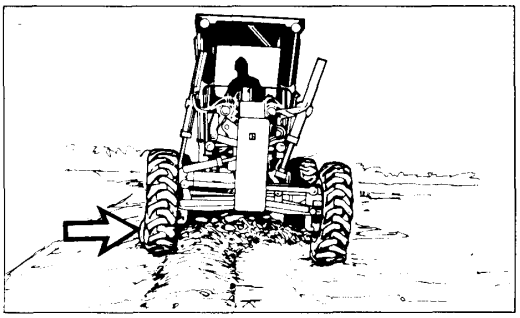
2-53. RIGHT HAND SHOULDER CLEANUP.

⚠ WARNING

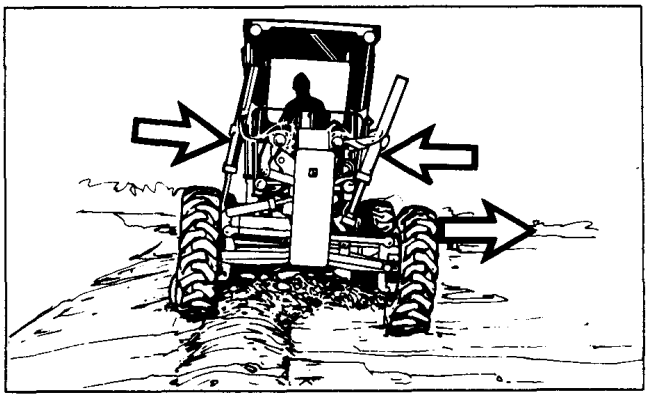
Be sure to ground moldboard before retracting centershift lock pin.



1. Move the centershift lock pin to the position shown. Move the centershift lock pin lever to the INDEX and RUN position.



2. Set the blade so the right end is in line with the outer edge of the right tire. The material must be delivered between the wheels.



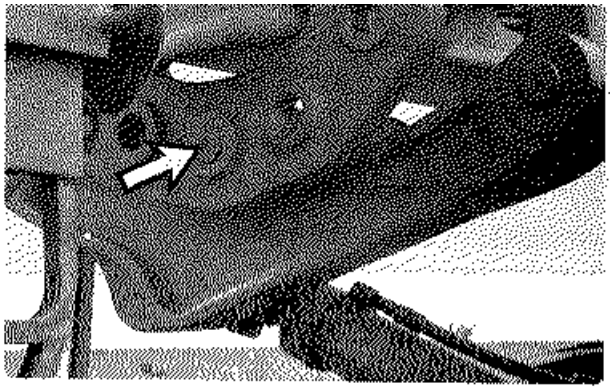
3. Lower the lift cylinders so the blade is horizontal and at the desired depth of the cut.

4. Lean the front wheels slightly to the left.

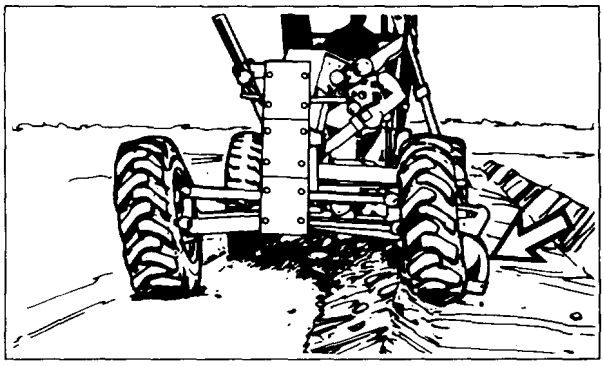
2-54. LEFT HAND SHOULDER CLEANUP.

⚠ WARNING

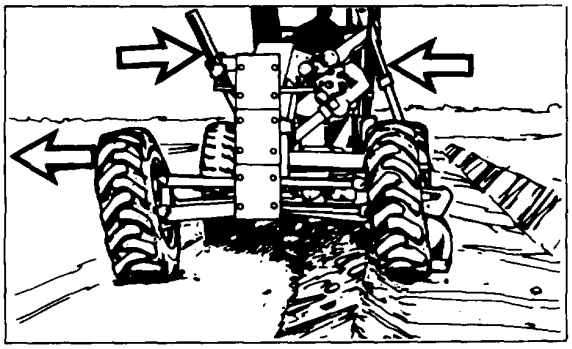
Be sure to ground the moldboard before retracting the centershift lock pin.



1. Move the centershift lock pin to the position shown. Move the centershift lock pin lever to the INDEX and RUN position.



2. Set the blade so the left end is in line with the outside edge of the left front tire. The material must be delivered between the wheels.



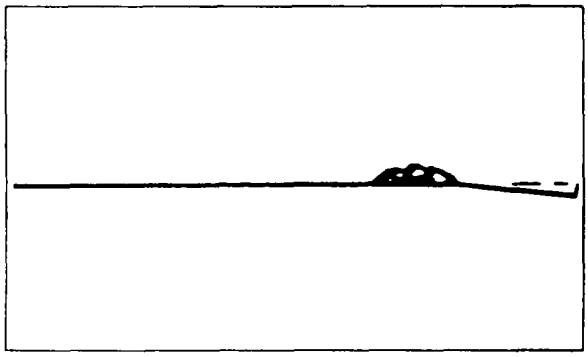
3. Lower the lift cylinders until the blade is horizontal and at the desired depth of the cut.

4. Lean the front wheels slightly to the right.

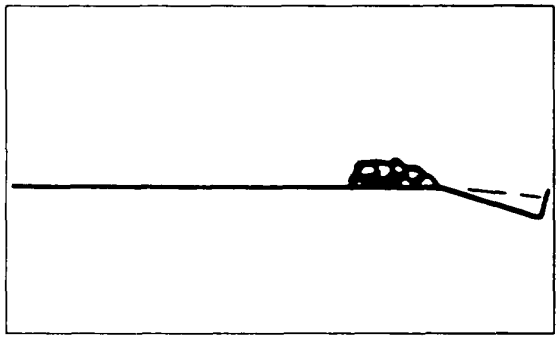
2-55. ROAD BUILDING - "V" DITCH METHOD.

The steps shown are for one side. Repeat on the opposite side of the road.

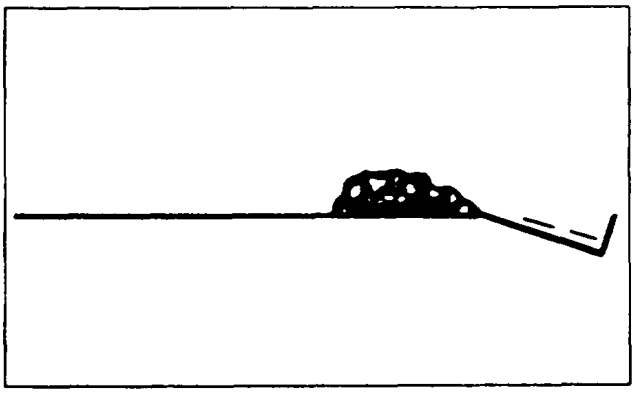
NOTE: The machine frame should be articulated when performing steps 4 and 7.



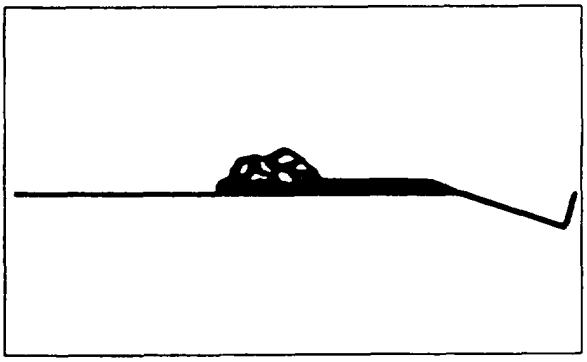
1. Ditch line: Light cut.



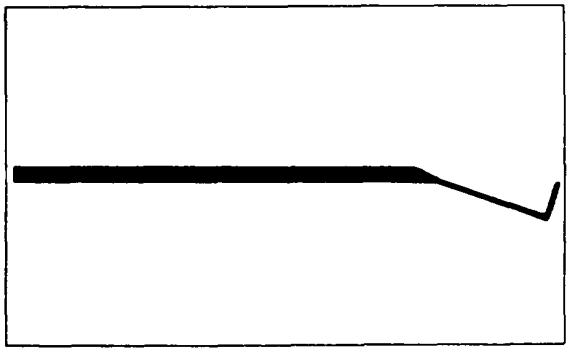
2. Second cut: Heavy.



3. Third cut: Heavy.

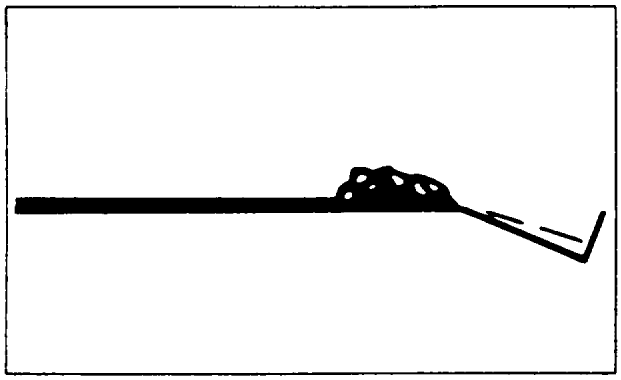


4. Clean the shoulder.

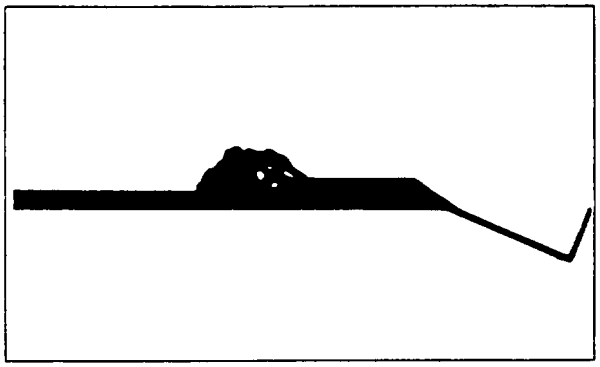


5. Level to center.

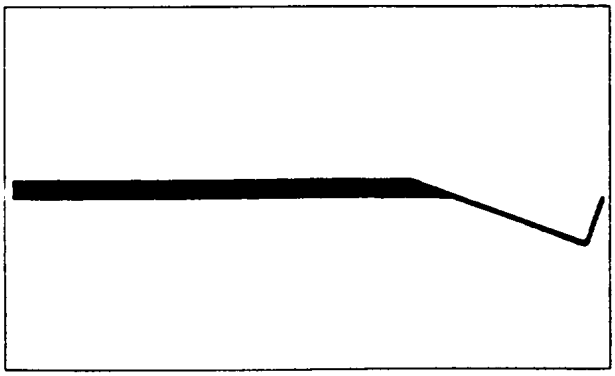
2-55. ROAD BUILDING - "V" DITCH METHOD. (CONT)



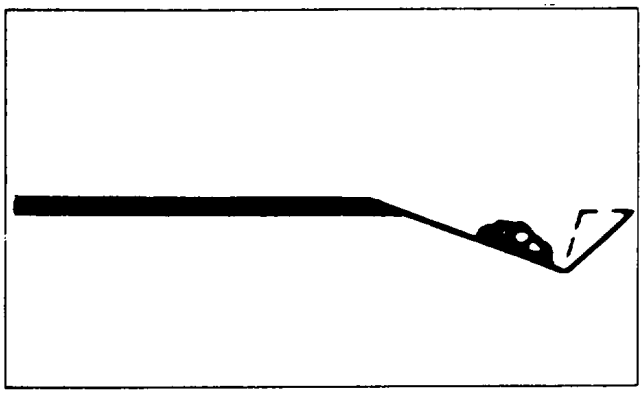
6. Fourth cut: Heavy.



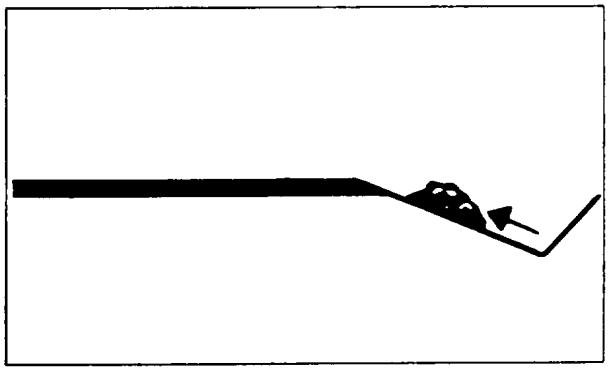
7. Clean shoulder.



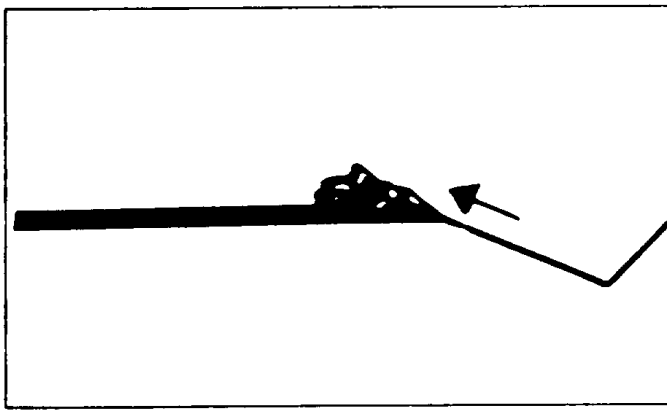
8. Spread to center.



9. Slope and bank.

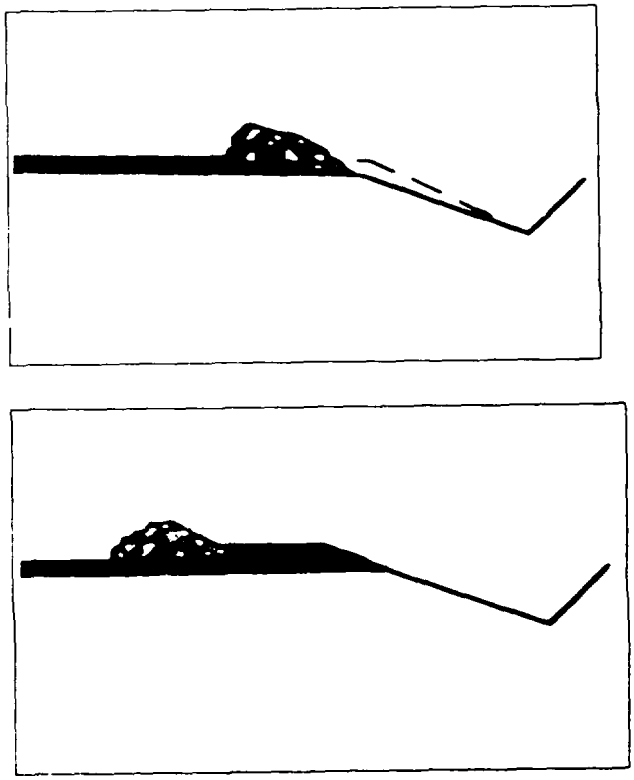


10. Clean bottom of ditch.

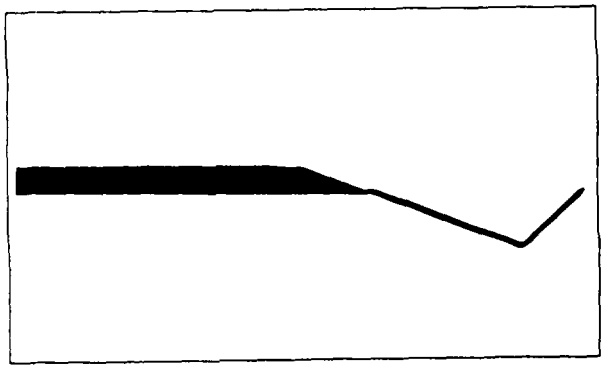


11. Ditching pass (to clean and shape inside slope).

2-55. ROAD BUILDING - "V" DITCH METHOD. (CONT)



12. Finishing shoulder pass.

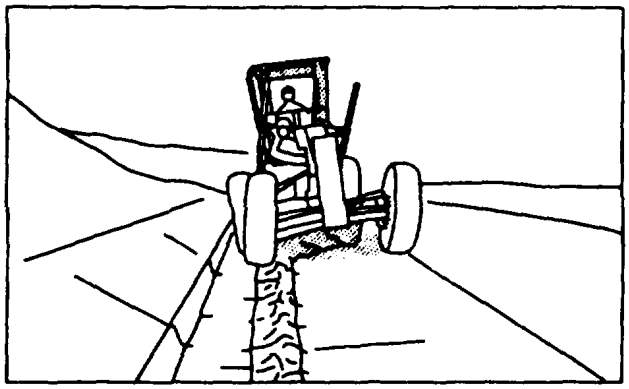


13. Level and finish.

2-56. FLAT BOTTOM DITCHING.

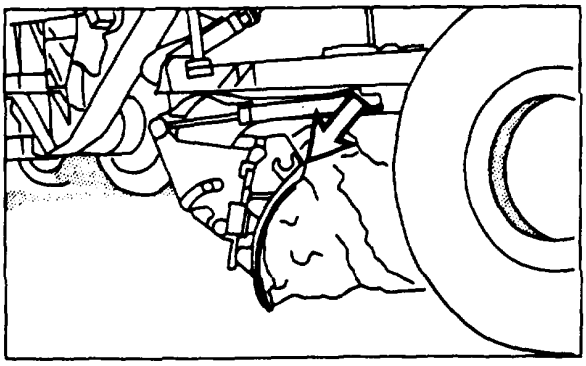
⚠ WARNING

Be sure to ground the moldboard before retracting the centershift lock pin.



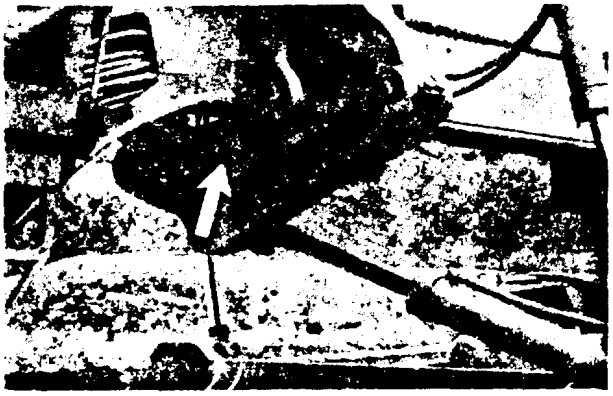
If no "V" ditch exists, make one to the desired depth of the flat bottom ditch.

NOTE: The shoulder slope should be flatter than normal, ending at the finished shoulder line.

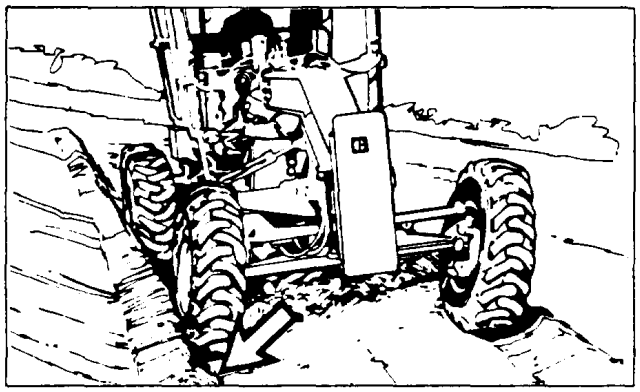


1. Tip the blade forward.

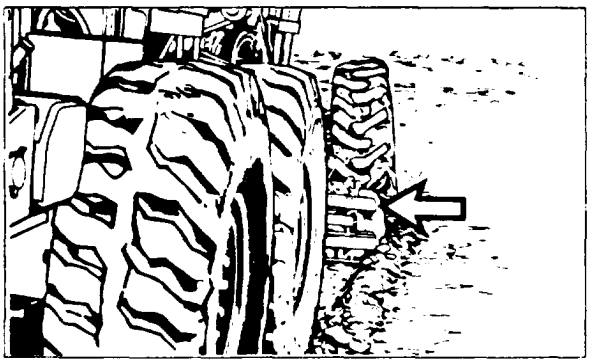
2-56. FLAT BOTTOM DITCHING. (CONT)



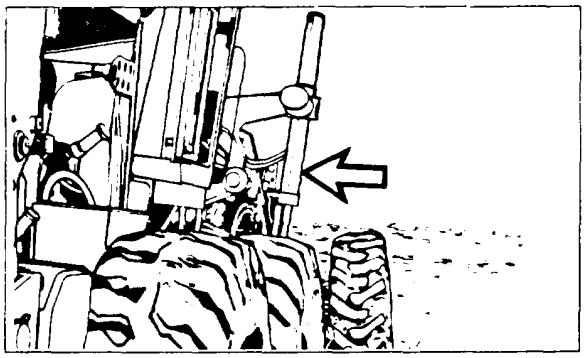
2. Move the centershift lock pin to the position shown Move the centershift lock pin lever to the INDEX and RUN position.



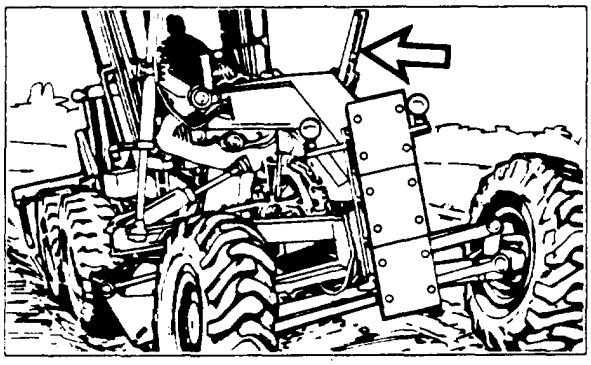
3. Have the right front tire in the bottom of the "V" ditch.



4. Set the blade so the toe is inside the right front tire at the desired width of the flat bottom ditch



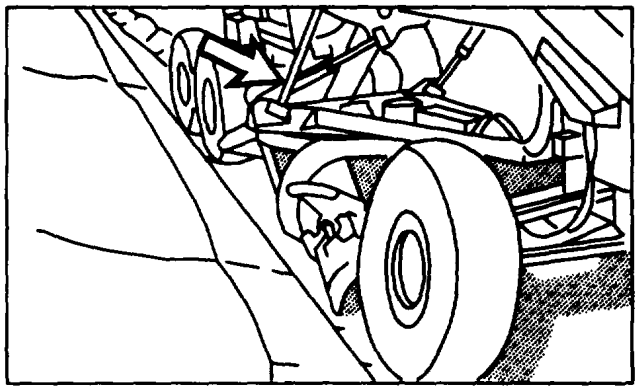
5. Lower the right lift cylinder to set the depth of the cut.



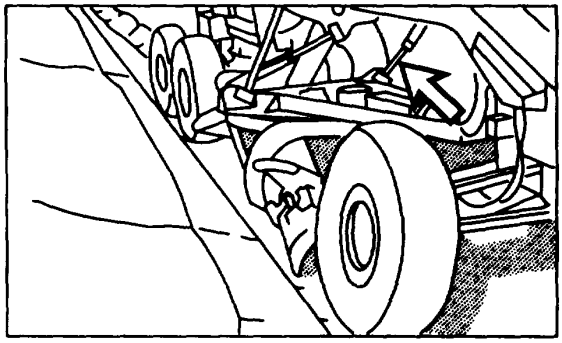
6. Raise the left lift cylinder to set the desired shoulder slope.

7. Lean the front wheels to the left. Cut the second "V" ditch to the same depth or slightly above the first one.

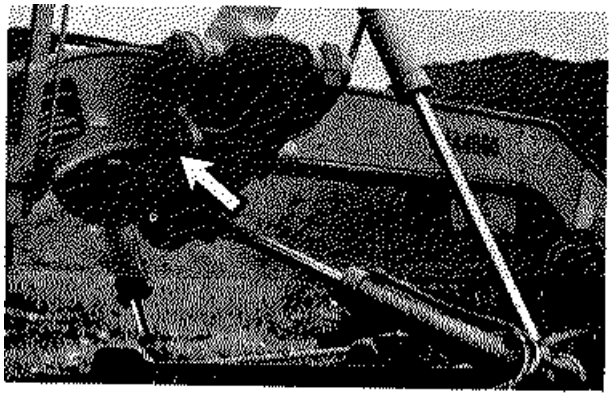
2-56. FLAT BOTTOM DITCHING. (CONT)



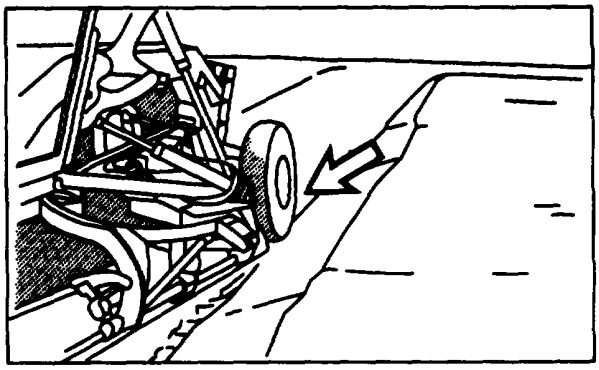
8. Cut a flat bottom. Set the right lift cylinder to the required depth.



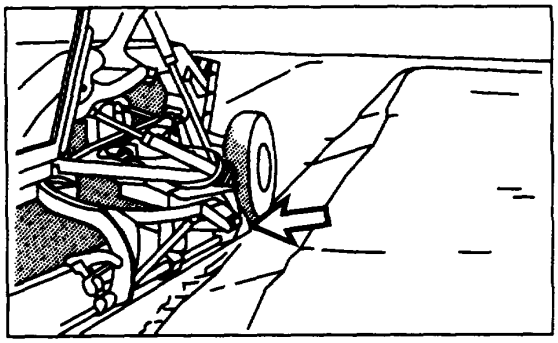
9. Set the left lift cylinder as required.



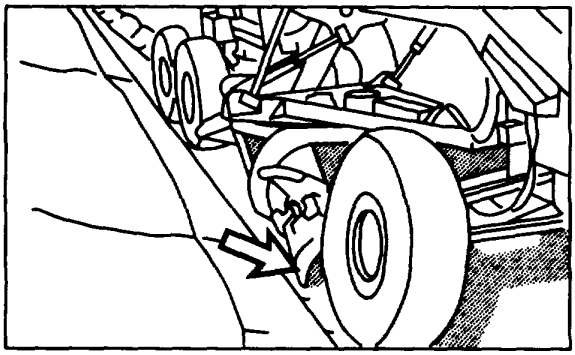
10. Move the centershift lock pin to the position shown. Move the centershift lock pin lever to the INDEX and RUN position.



11. Start the right front tire in the bottom of the first "V" ditch.

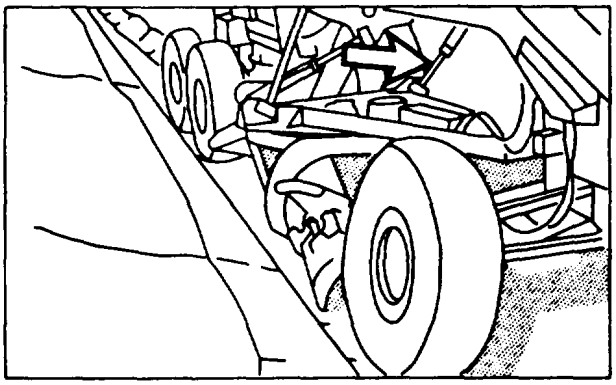


12. Set the right end of the blade at the bottom of the backslope.

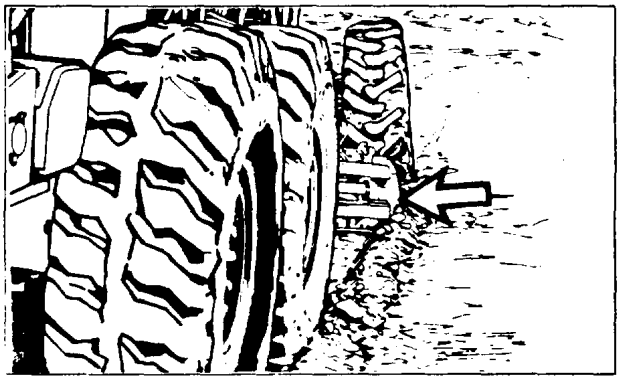


13. Lower the right lift cylinder so the point of the blade is on the established grade of ditch.

2-56. FLAT BOTTOM DITCHING.



14. Lower the left lift cylinder to the desired depth of cut Lean the front wheels to the left.

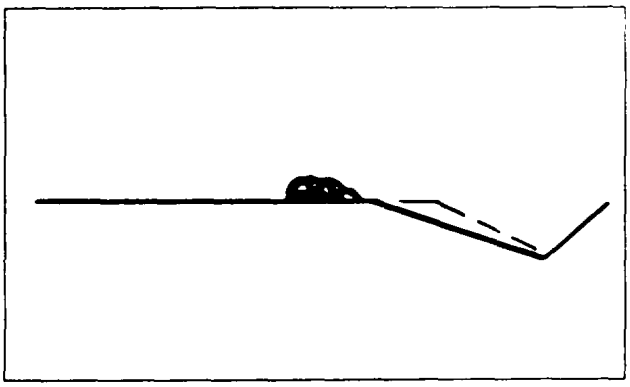


15. Set the blade at a sharp angle and move the material up the slope of the ditch.

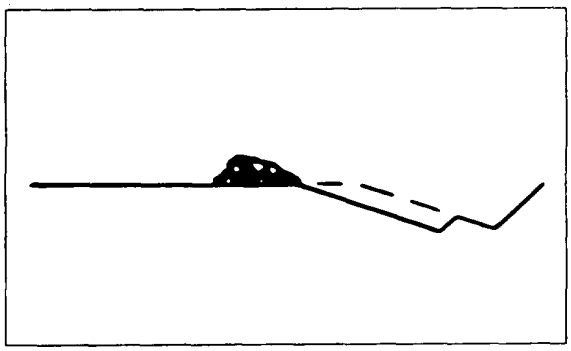
16. Spread the windrow and finish the final grade.

2-57. ROAD BUILDING- FLAT BOTTOM DITCH METHOD.

Steps shown are for one side. Repeat on the opposite side of the road

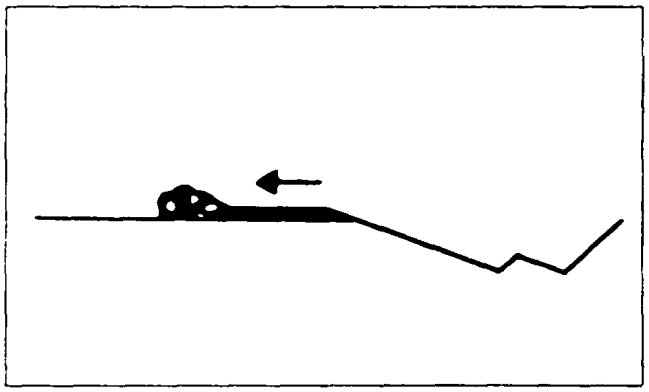


1. Flatten the inside slope.

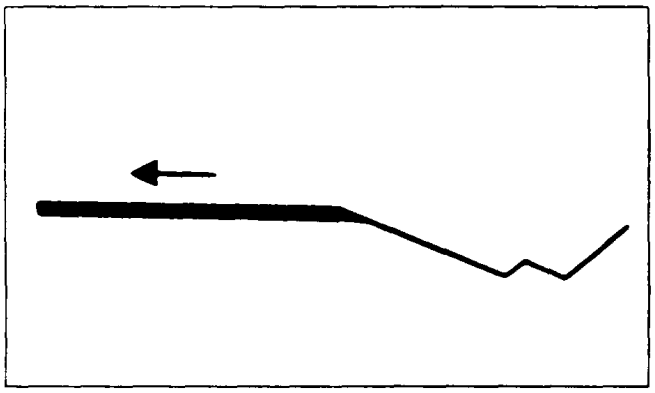


2. Left hand trench cut to bottom width and depth.

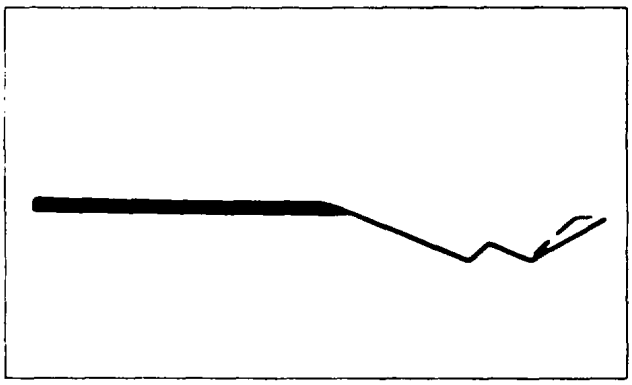
2-57. ROAD BUILDING- FLAT BOTTOM DITCH METHOD. (CONT)



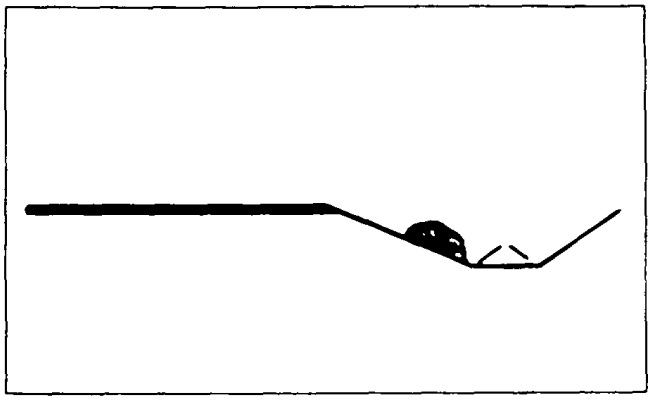
3. Clean the shoulder.



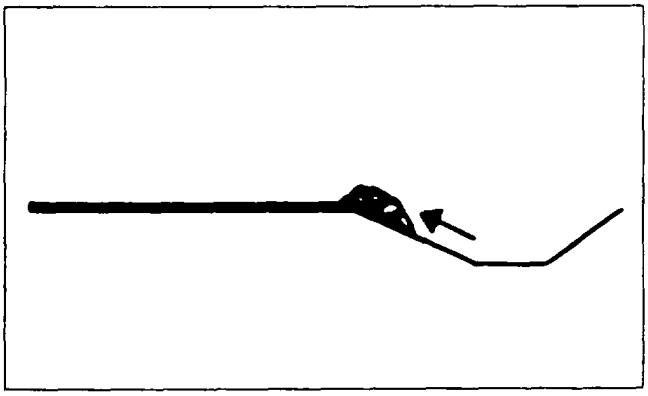
4. Spread to center.



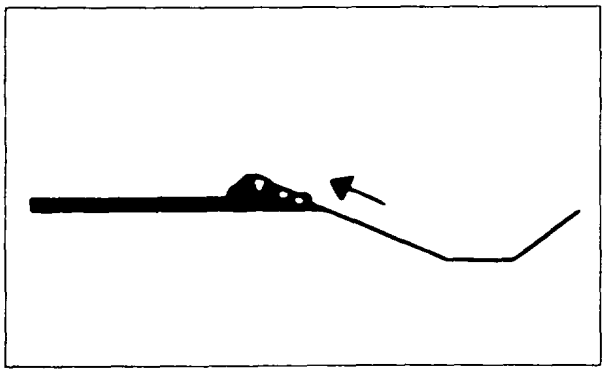
5. Finish the bank slope.



6. Flatten bottom ditch out.

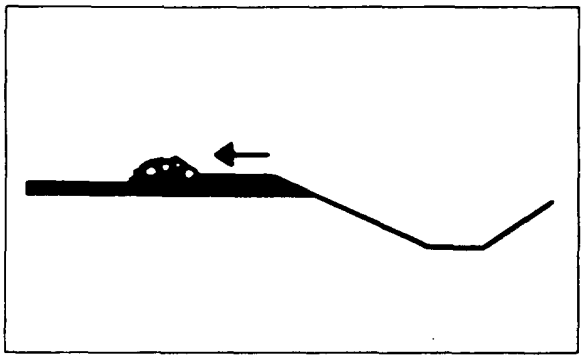


7. Clean the ditch.

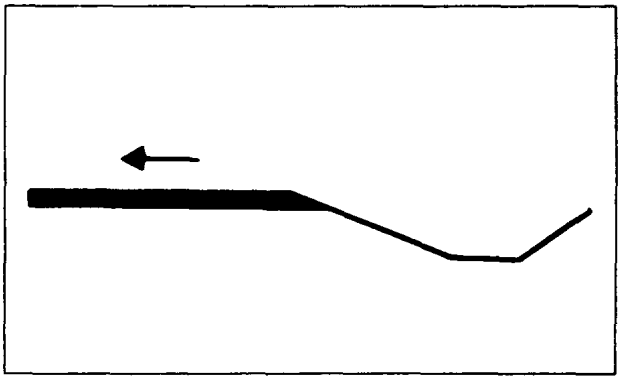


8. Clean the inside slope.

2-57. ROAD BUILDING- FLAT BOTTOM DITCH METHOD. (CONT)

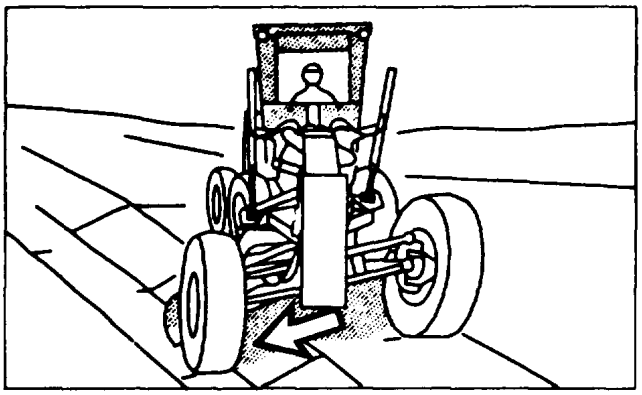


9. Finishing shoulder pass

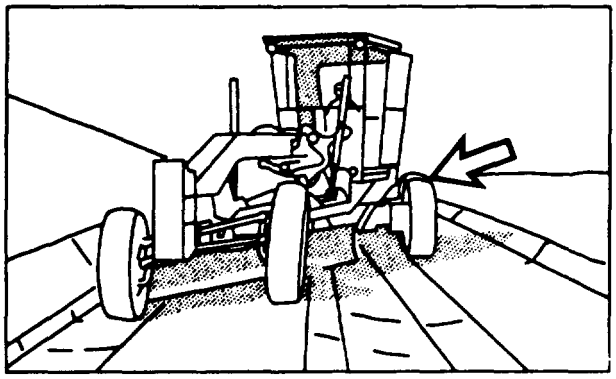


10. Level and finish.

2-58. GRADING IN A WET DITCH.



1. Articulate the machine so the front wheels and the blade are in the ditch. Steer with the front wheels.



2. Keep the rear wheels on the shoulder to prevent wheel slippage in wet or soft material in the ditch.

NOTE: This method may be used to avoid obstructions whenever cleaning old ditches, which may have tree overhangs, rock ledges, etc.

2-59. GRADING ON A 3 TO 1 SLOPE.

⚠ WARNING

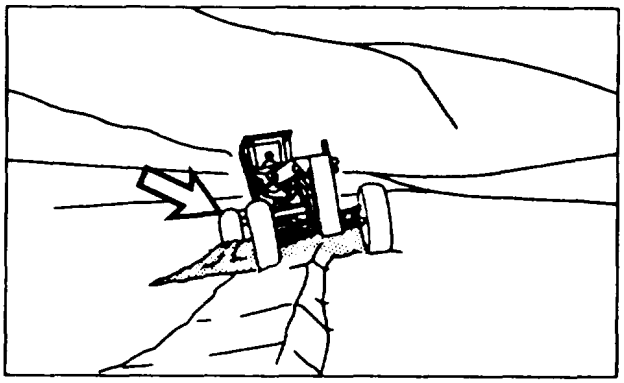
Be completely familiar with the machine before operating on extreme side slopes.

Never fully articulate the machine uphill on steep slopes.

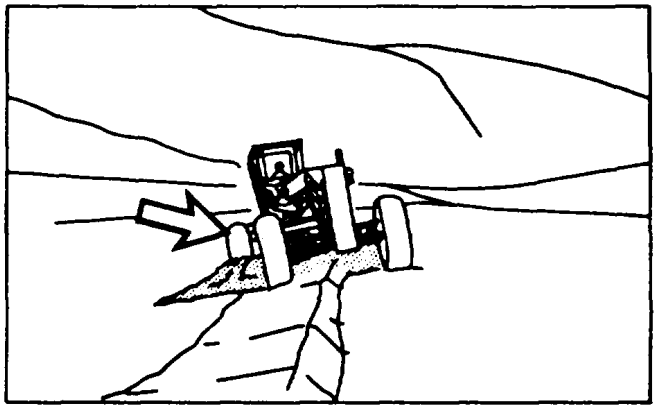
NOTICE

On steep slopes, the machine should be operated in first gear, at a reduced engine speed.

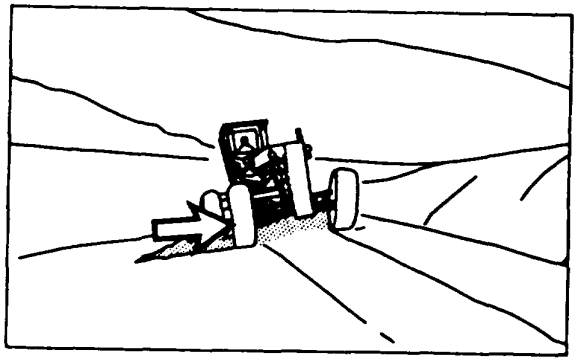
When working on slopes, use the accelerator to control the speed of the machine.



When operating on extreme slopes, use crab steering to keep the back of the grader on the downhill side of cut.



Articulate the frame, to place the frame in an offset position, for maximum stability.

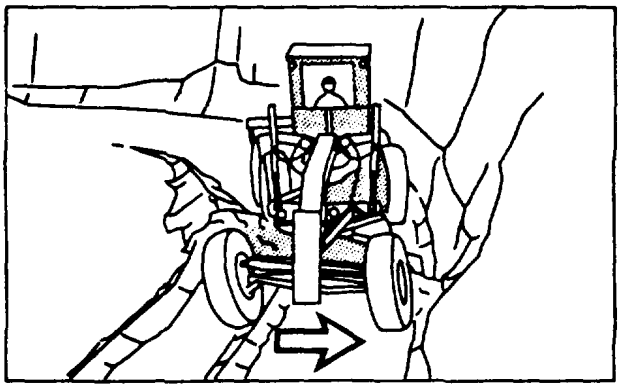


Use crab steering when the front of the machine tends to slip due to the heavy side load on the blade.

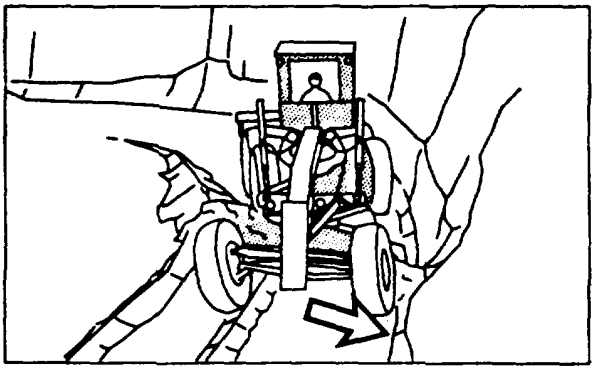
2-60. HIGH BANK CUTS - RIGHT SIDE

⚠ WARNING

Be sure to ground the moldboard before retracting the centershift lock pin.

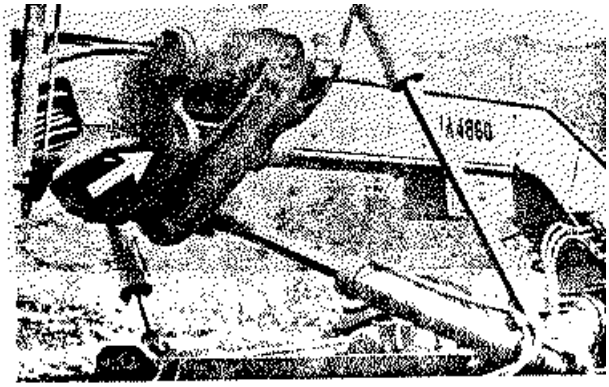


1. The road bed at the base of the cut must be uniform.



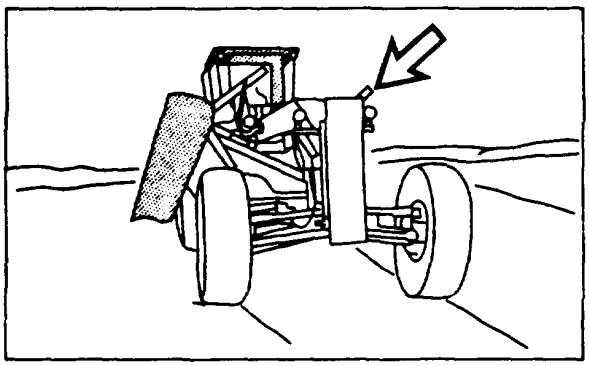
2. If the material is hard, slope the road bed slightly Into the bank to keep the machine from sliding away from the bank.

3. Tip the moldboard 3/4 to full position forward.



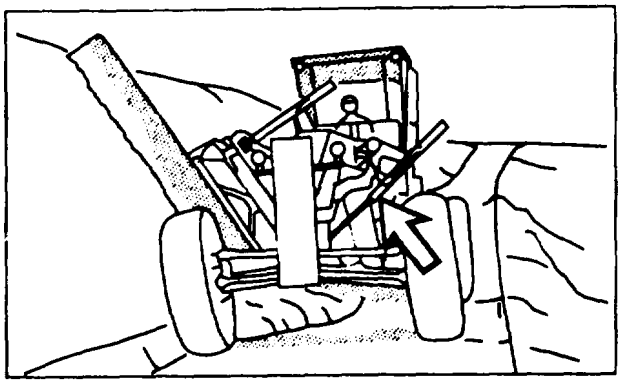
4. Move the centershift lock pin to the position shown. Move the centershift lever lock pin lever to the INDEX and RUN position.

5. Sideshift the moldboard to the right.

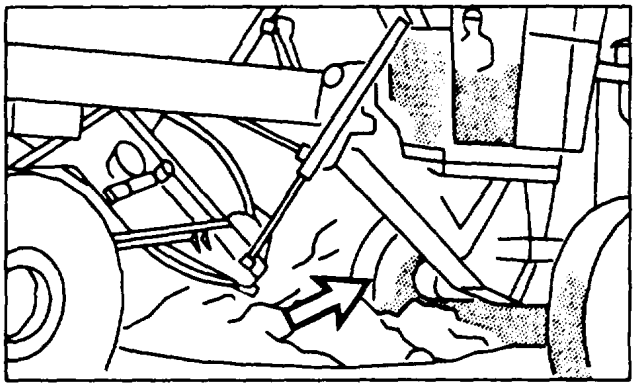


6. Rotate the circle counterclockwise. Lower the left lift cylinder while the circle is turning.

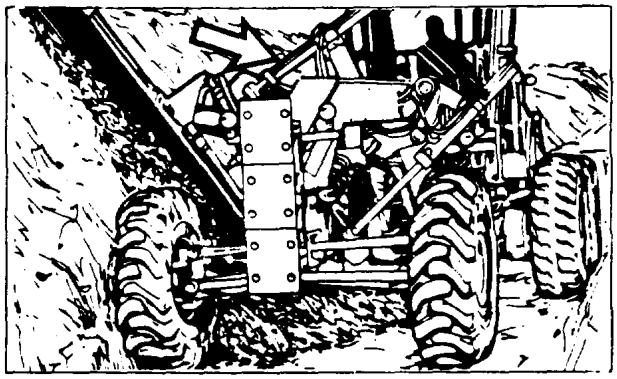
2-60. HIGH BANK CUTS - RIGHT SIDE (CONT)



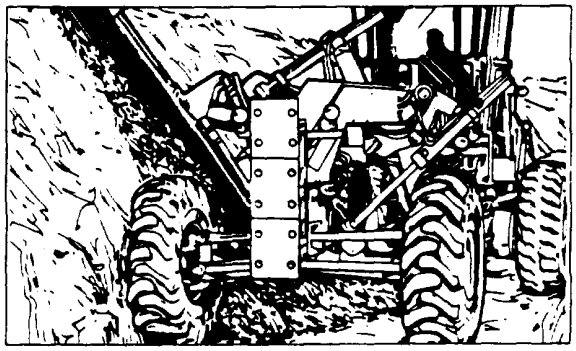
7. Lower the left lift cylinder to set heel of the blade at the bottom of the slope and in line with the outer edge of the rear tire.



8. The right rear tires should be in the "V" at the base of the slope.

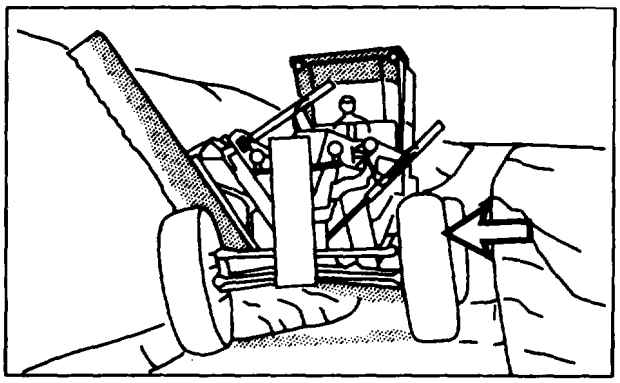


9. Lower the right lift cylinder to set the desired degree of bank slope.



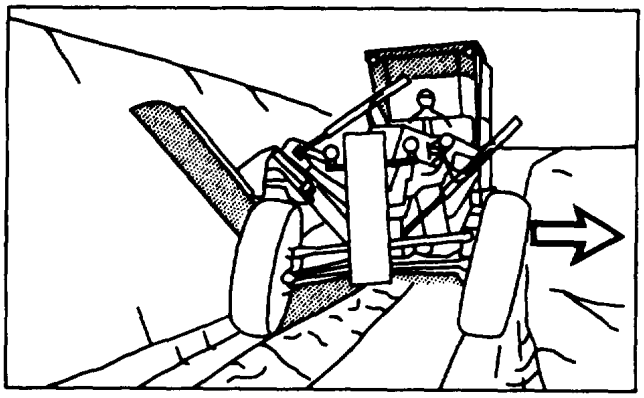
10. Move into the cut gradually.

2-60. HIGH BANK CUTS - RIGHT SIDE (CONT)



NOTE: The wheels normally should be near the vertical position.

11. Lean the wheels toward the slope for a heavier cut.



12. Lean the wheels away from the slope for a lighter cut.

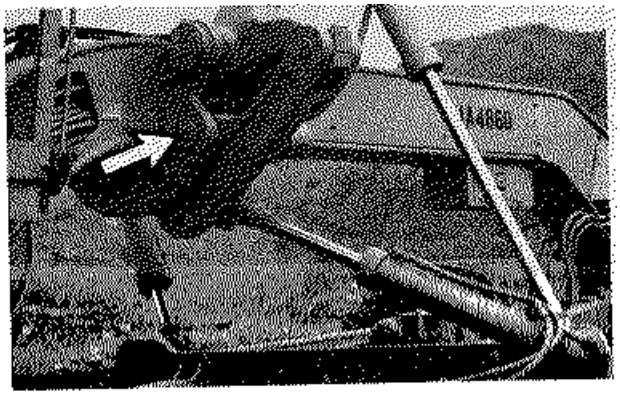
Keep the material from the slope moved to the outside of the rear wheels.

The procedure shown is for, the right side. Position the moldboard opposite to that shown for the left side.

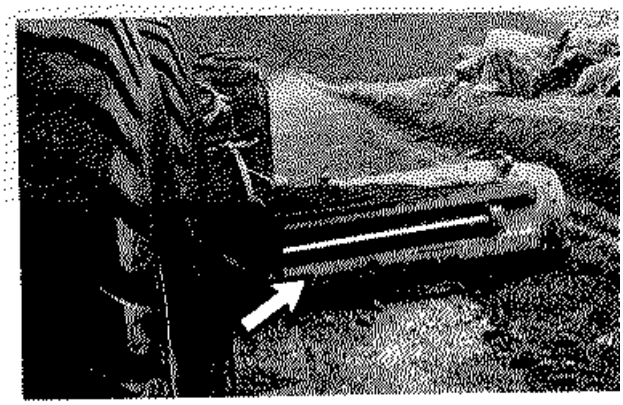
2-61. EXTREME SIDE REACH

⚠ WARNING

Be sure to ground the moldboard before retracting the centershift lock pin.



1. Move the centershift lock pin to the position shown. Move the centershift lever lock pin lever to the INDEX and RUN position.



2. Sideshift the moldboard as shown.

2-61. EXTREME SIDE REACH (CONT)

3. Lower the blade to the desired depth and set it at an angle to deliver the material to the side.

NOTE: Right side shown. For extreme left side reach, position the centershift lock pin and moldboard opposite to that shown.

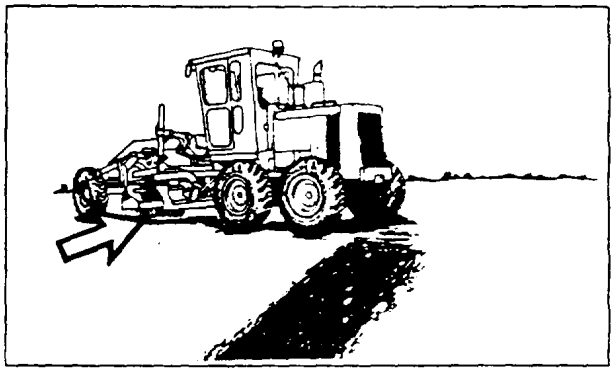
2-62. FRONT MOUNTED SCARIFIER OPERATION

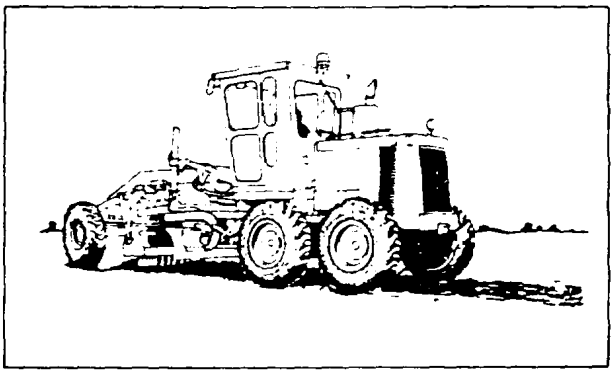
NOTICE

When using the scarifier, the frame must be straight.

When carrying the scarifier in the fully raised position, do not allow the scarifier beam to contact the drawbar.

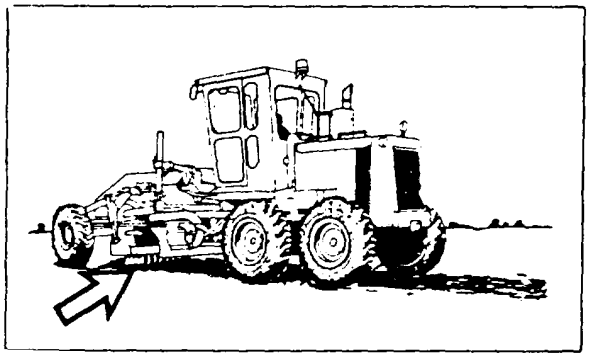
Raise the scarifier when turning, to avoid damage to the teeth.



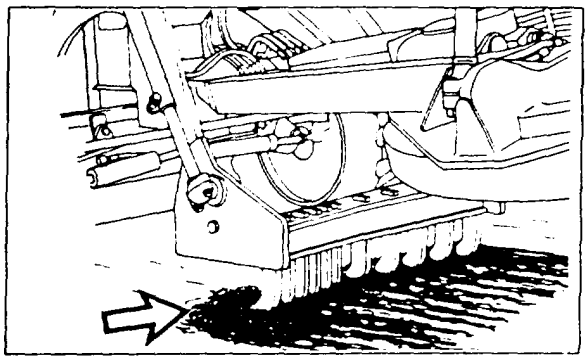


Enter the material gradually, while traveling in a straight line.

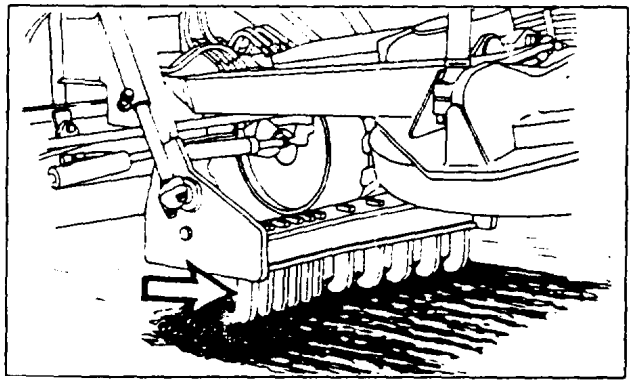
2-62. FRONT MOUNTED SCARIFIER OPERATION (CONT)



Use all the shanks in light material, fewer shanks in heavier material.

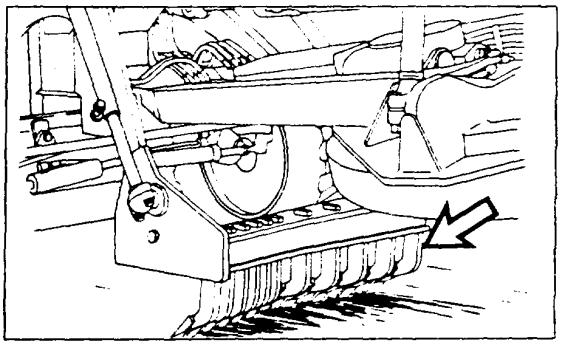


Break up paving by digging under the surface and lifting the scarifier.



Keep the scarifier as deep as conditions permit. Match travel speed to the load.

Work downhill on grades.



Angle the front scarifier for use in hard material.

All the teeth can remain in the front scarifier when level grading with the blade.

Remove all the front scarifier teeth, and set the lift links at the shortest distance, when reverse blading or ditching.

Clean the scarifier when dirt begins to accumulate.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

The purpose of this chapter is to provide you with lubrication instructions and troubleshooting procedures to help you keep your equipment in good running order.

INDEX

Section I. LUBRICATION INSTRUCTIONS

3-1. LUBRICATION INSTRUCTIONS.

a. For lubrication under normal conditions, refer to LO 5-3805-261-12.

b. For instructions on lubrication in weather below OoF (-18oC), refer to TM 9-207.

c. For lubrication before and after fording, refer to TM 9-238.

d. After operating in dusty or sandy conditions, clean and inspect all lubrication points. Lubricate vehicle in accordance with LO 5-3805-261-12.

3-2. LUBRICATION INFORMATION.

a. Care of Lubricants. Keep all lubricants in clean, closed containers and store in a dry area away from external heat. Don't allow dust, dirt or other foreign matter to mix with lubricants during storage or use. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts that do not require lubrication free of lubricants. Use a clean cloth to wipe all dirt and other foreign matter from lubrication points. Clean caps, covers, plugs and surrounding area before removing them from the vehicle. Clean lubrication points after lubrication to prevent accumulation of foreign matter.

c. Points of Lubrication. Refer to LO 5-3805-261-12 for lubrication points and intervals of lubrication.

Section II. OPERATOR/CREW TROUBLESHOOTING PROCEDURES

3-3. TROUBLESHOOTING INFORMATION. The table lists the common malfunctions which you may find during the operation or maintenance of the grader and its components. You should perform the tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests, inspections or corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

3-4. TROUBLESHOOTING SYMPTOM INDEX.

3-5. TROUBLESHOOTING PROCEDURES.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

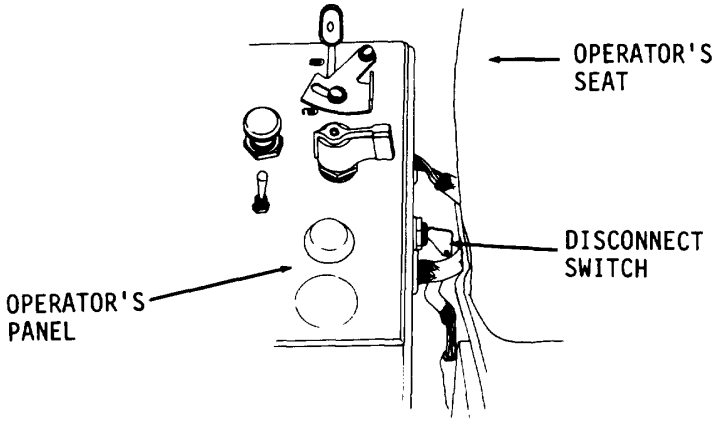
1. ENGINE FAILS TO CRANK OR CRANKS SLOWLY WHEN STARTER SWITCH IS ACTIVATED.

CAUTION

After every 30 seconds of cranking, allow two minutes for the starter motor to cool.

Step 1. Check to see if disconnect switch is on.

If off, insert key and turn switch clockwise.

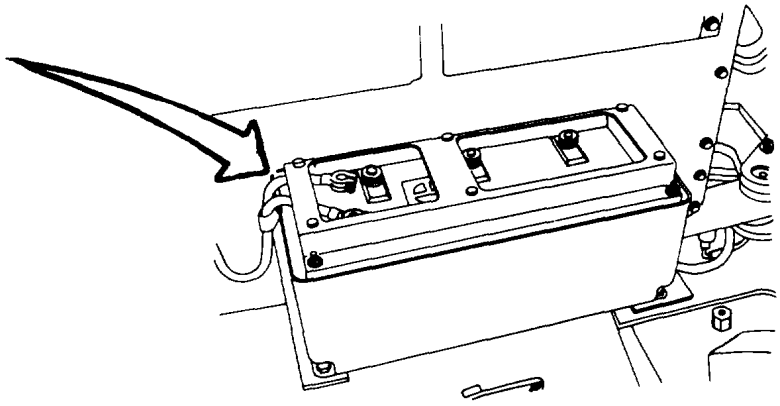


Step 2. Check battery electrolyte level. Refer to paragraph 3-6.

WARNING

Do not smoke or allow open flame or sparks near the batteries. Battery electrolyte is toxic and corrosive. Use protective goggles and gloves and remove jewelry. Avoid contact with skin, eyes and clothes. Do not breathe the vapors.

If low, fill to proper level. Refer to paragraph 3-6.



3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK OR CRANKS SLOWLY WHEN STARTER SWITCH IS ACTIVATED. -Continued

Step 3. Check to see if battery cables are loose, broken or corroded.

If loose or corroded, clean and tighten loose connections at batteries and ground. If cables are broken, notify organizational maintenance.

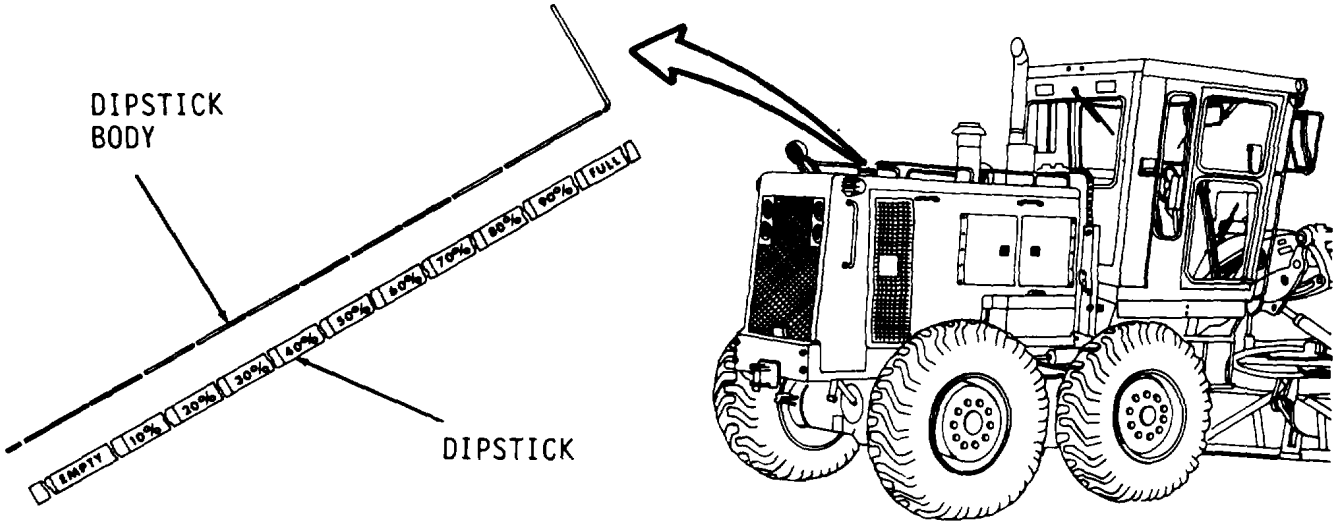
NOTE

Malfunctions in the charging system can also cause this problem.

2. ENGINE CRANKS BUT FAILS TO START.

Step 1. Check fuel level.

If no fuel, fill fuel tank and notify organizational maintenance. Refer to paragraph 3-6.



Step 2. Check for broken, leaking or kinked fuel lines and hoses.

If fuel lines and hoses are broken, leaking or kinked, notify organizational maintenance.

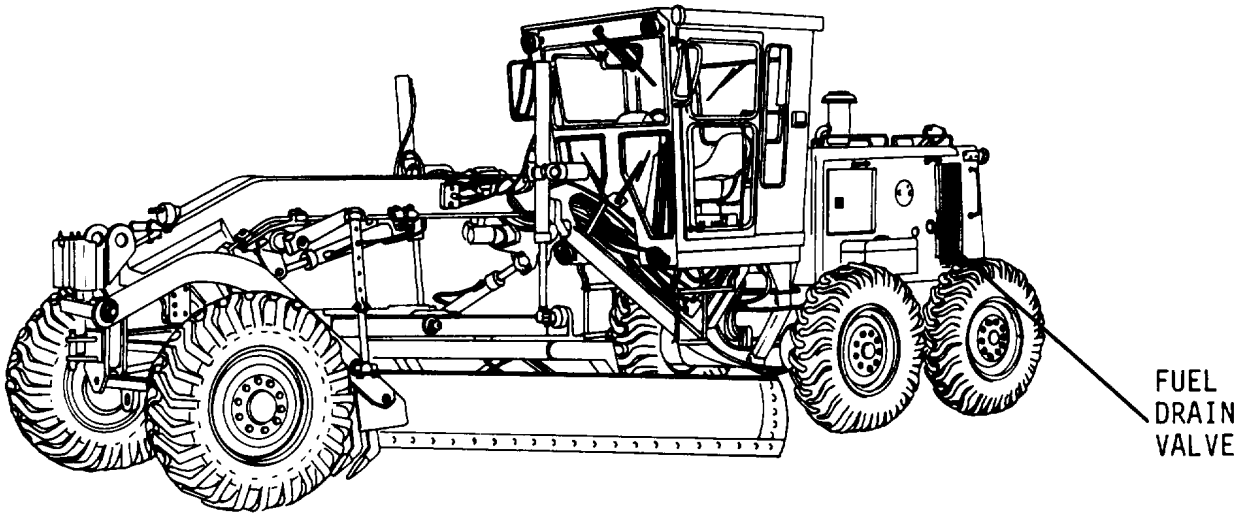
3-5. TROUBLESHOOTING PROCEDURES.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START.

Step 3. Check fuel tank for moisture and sediment. Refer to paragraph 3-6.

If tank has any moisture and sediment, drain until clean fuel flows from tank. Refer to paragraph 3-6.



NOTE

Clogged fuel lines, dirty fuel filter, poor quality fuel and/or leaks in the fuel injection system can also cause this problem. Notify organizational maintenance.

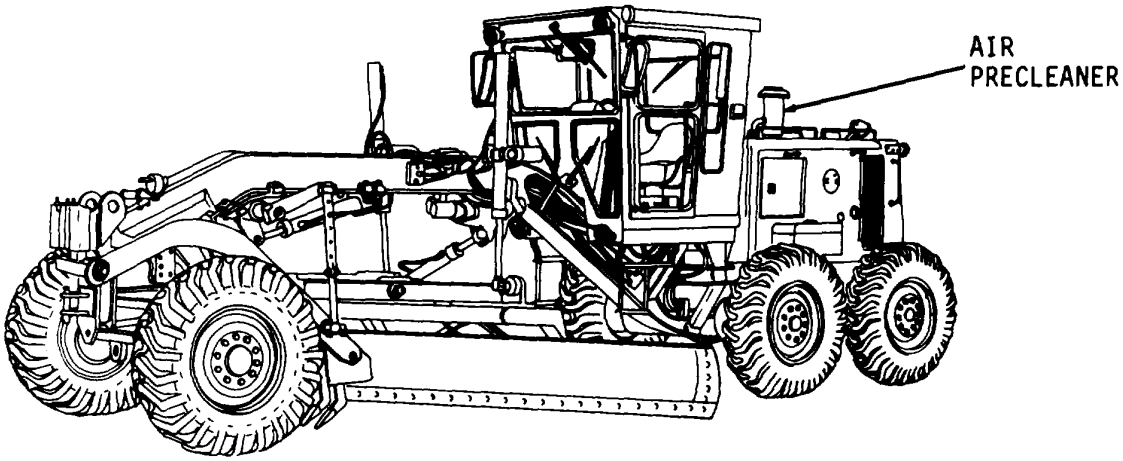
3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. LOSS OF ENGINE POWER.

Step 1. Check to see if air precleaner screen is dirty or if air cleaner indicator is in red zone.

Clean the air precleaner screen if dirty, and if air cleaner indicator is in red zone, notify organizational maintenance.



Step 2. Check to see if accelerator pedal is bent or binding.

If bent or binding, notify organizational maintenance.

Step 3. Check for broken, leaking or kinked fuel lines and hoses.

If fuel lines and hoses are broken, leaking or kinked, notify organizational maintenance.

Step 4. Check fuel tank for moisture and sediment, drain until clean fuel flows from tank. Refer to paragraph 3-6.

If tank has any moisture and sediment, drain until clean fuel flows from tank. Refer to paragraph 3-6.

3-5. TROUBLESHOOTING PROCEDURES.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. LOSS OF ENGINE POWER.

NOTE

Clogged fuel lines, dirty fuel filter, poor quality fuel and/or leaks in the fuel injection system can also cause this problem. Notify organizational maintenance.

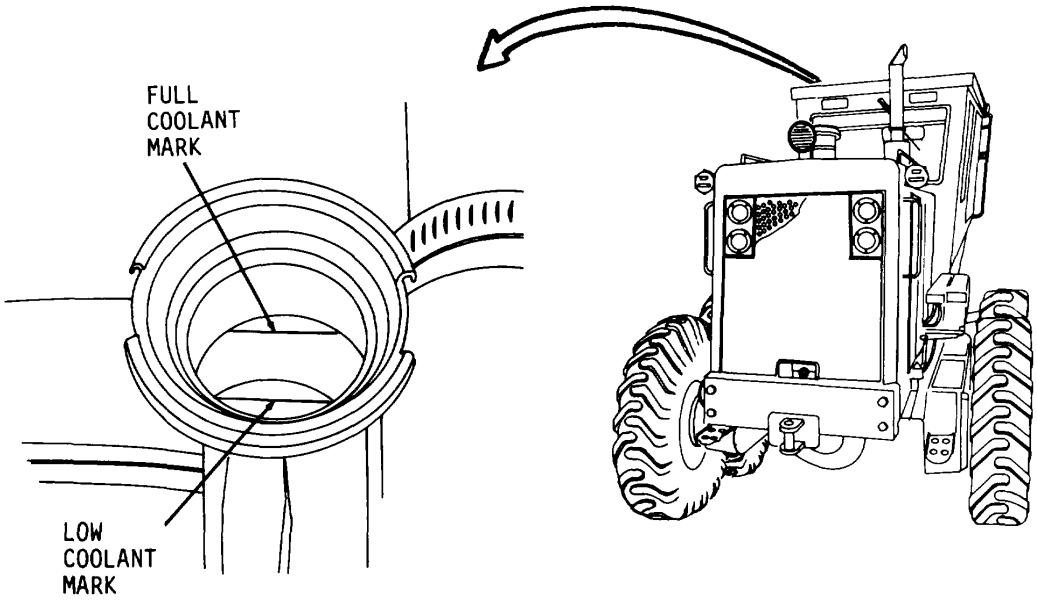
4. ENGINE OVERHEATS (EMS COOLANT TEMPERATURE INDICATOR FLASHES).

WARNING

Never remove radiator cap on an overheated engine. Allow sufficient cooling time, then slowly remove radiator cap.

Step 1. Check to see if engine coolant is low and if any leaks are visible.

If low, fill with approved coolant. Refer to paragraph 3-6. Report leaks to organizational maintenance.



3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. ENGINE OVERHEATS (EMS COOLANT TEMPERATURE INDICATOR FLASHES).-Continued

Step 2. Check cooling fan and belt for damage.

Report damage to organizational maintenance.

Step 3. Check to see if radiator grill is obstructed or damaged.

If obstructed, clean. Report any damage to organizational maintenance.

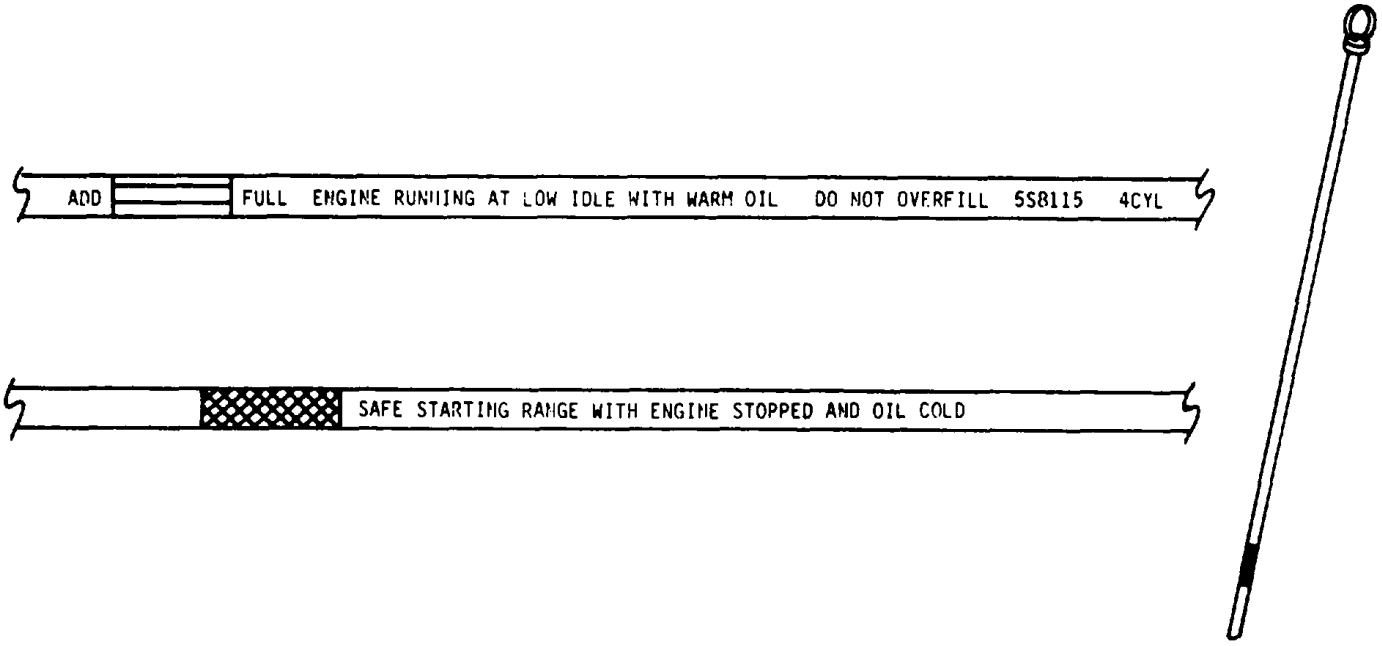
NOTE

Internal blockage of cooling passages or malfunctioning thermostat can also cause this problem. Notify organizational maintenance.

5. LOW OR NO OIL PRESSURE (EMS ENGINE OIL PRESSURE INDICATOR FLASHES).

Check to see if engine oil is low and if any leaks are visible. Refer to paragraph 3-6.

If low, fill with approved engine oil. Report leaks to organizational maintenance.



NOTE

Internal blockage of oil passages or malfunctioning pump can also cause this problem. Notify organizational maintenance.

3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

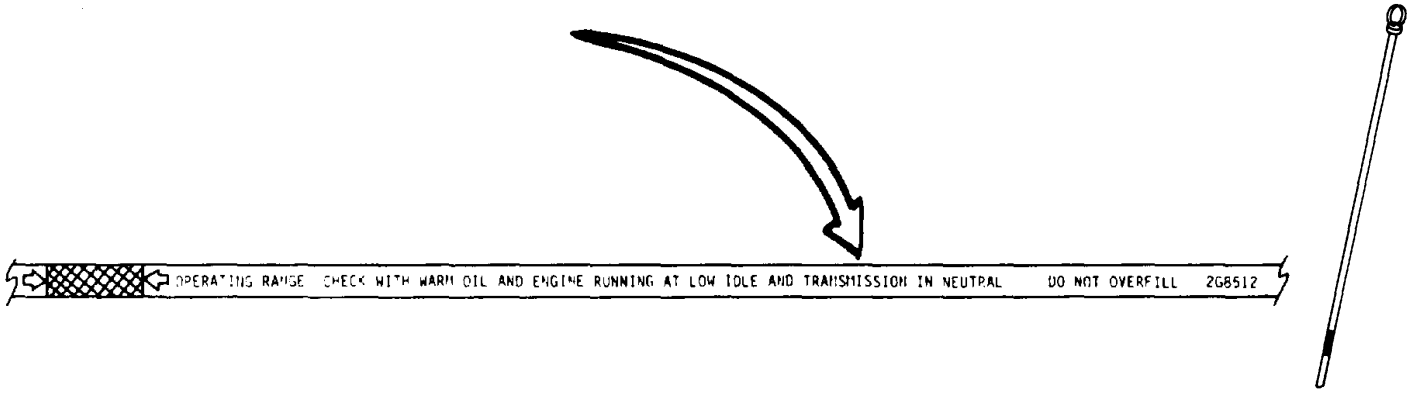
6. TRANSMISSION DOES NOT DRIVE IN ANY RANGE.

Step 1. Check if the engine was started with the transmission in gear.

If the engine was started with the transmission in gear, shift to neutral (N) and then back into gear.

Step 2. Check transmission fluid level.

If low, fill with prescribed transmission fluid. Refer to LO 5-3805-261-12.



NOTE

Malfunctioning valves or transmission can also cause this problem. Notify organizational maintenance.

7. VEHICLE DIFFICULT TO STEER.

Step 1. Check tires for proper inflation. Refer to paragraph 3-6. Check rims for damage.

WARNING

A tire explosion is more violent than a blowout. Stand behind the tread when inflating a tire.

If tires are low, inflate to recommended tire pressure. Refer to paragraph 3-6. If rims or tires are damaged, notify organizational maintenance.

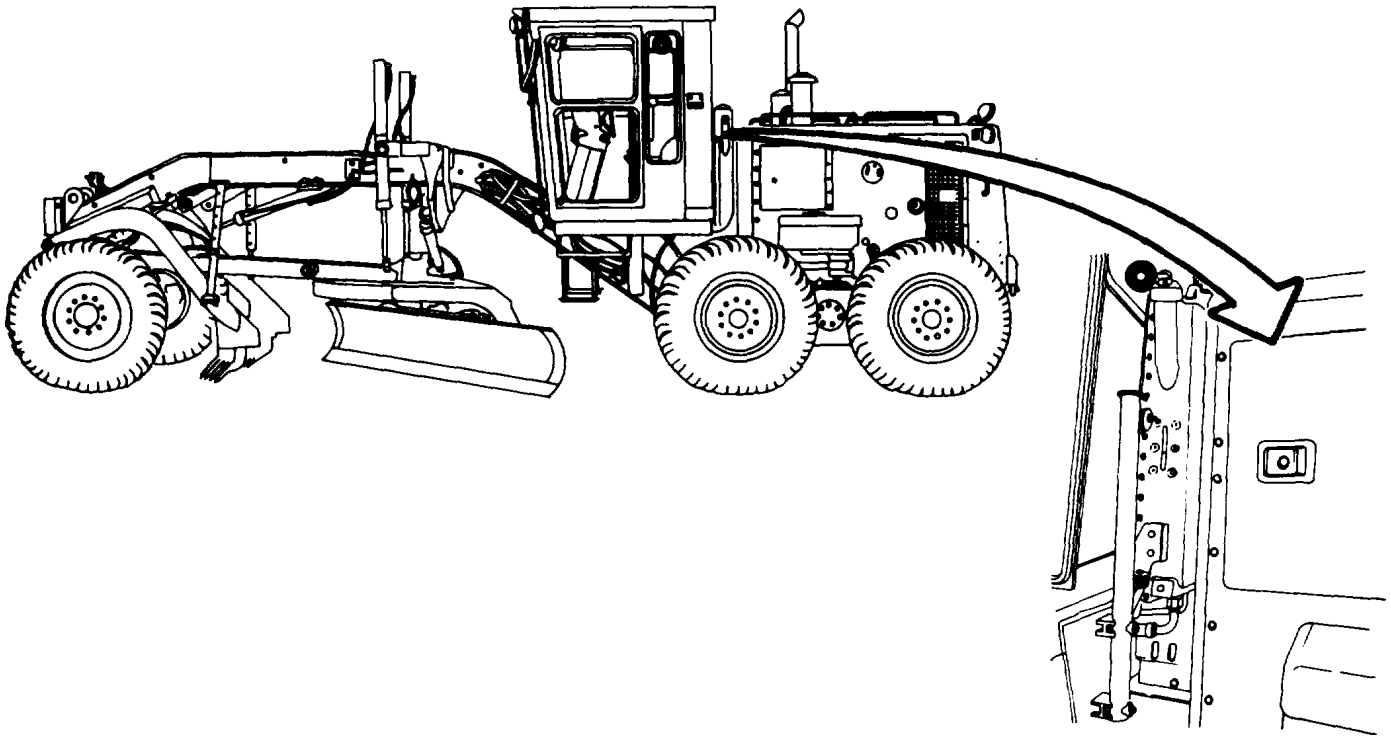
3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

7. VEHICLE DIFFICULT TO STEER.-Continued

Step 2. Check hydraulic reservoir fluid level in the sight gage.

If low, fill to proper level. Refer to LO 5-3805-261-12.



Step 3. Check for damaged steering cylinders.

If damaged, notify organizational maintenance.

8. EMS ALTERNATOR INDICATOR FLASHES.

Step 1. Check battery electrolyte level. Refer to paragraph 3-6.

WARNING

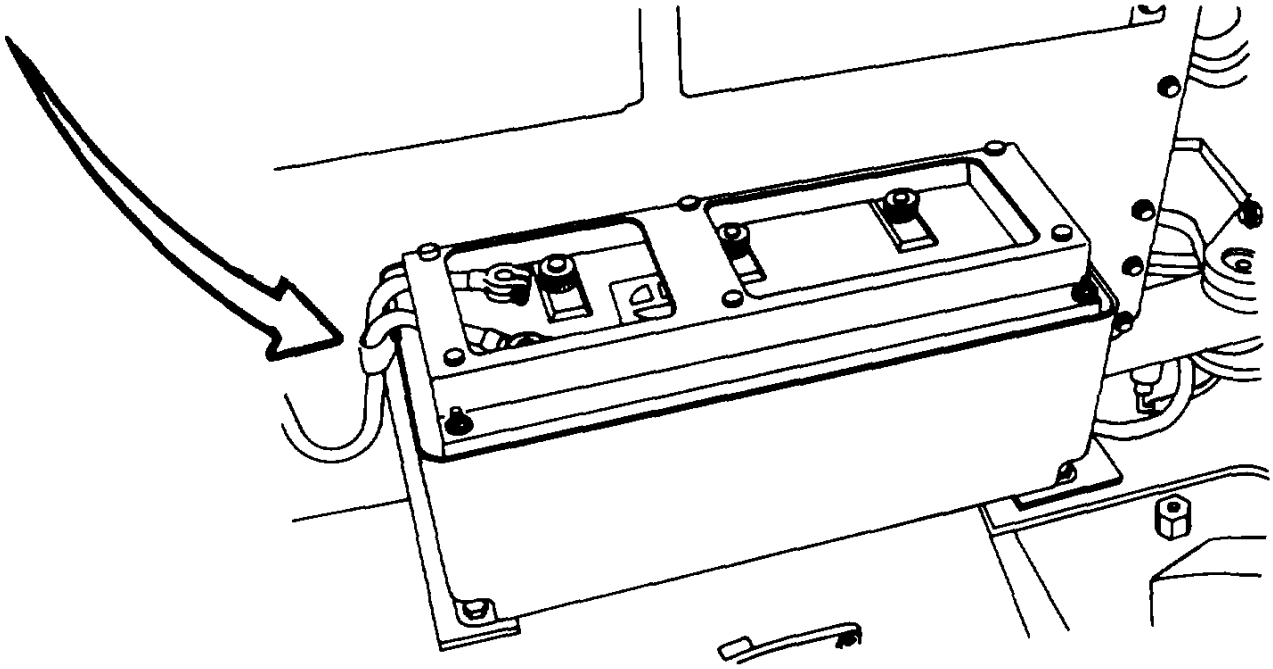
Do not smoke or allow open flame or sparks near the batteries. Battery electrolyte is toxic and corrosive. Use protective goggles and gloves and remove all jewelry. Avoid contact with skin, eyes and clothes. Do not breathe the vapors.

If low, fill to proper level. Refer to paragraph 3-6.

3-5. TROUBLESHOOTING PROCEDURES.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

8. EMS ALTERNATOR INDICATOR FLASHES.



Step 2. Check to see if battery cables are loose, broken or corroded.

If loose or corroded, clean and tighten loose connections at batteries and ground. If cables are broken, notify organizational maintenance.

NOTE

Malfunctions in the charging system can also cause this problem. Notify organizational maintenance.

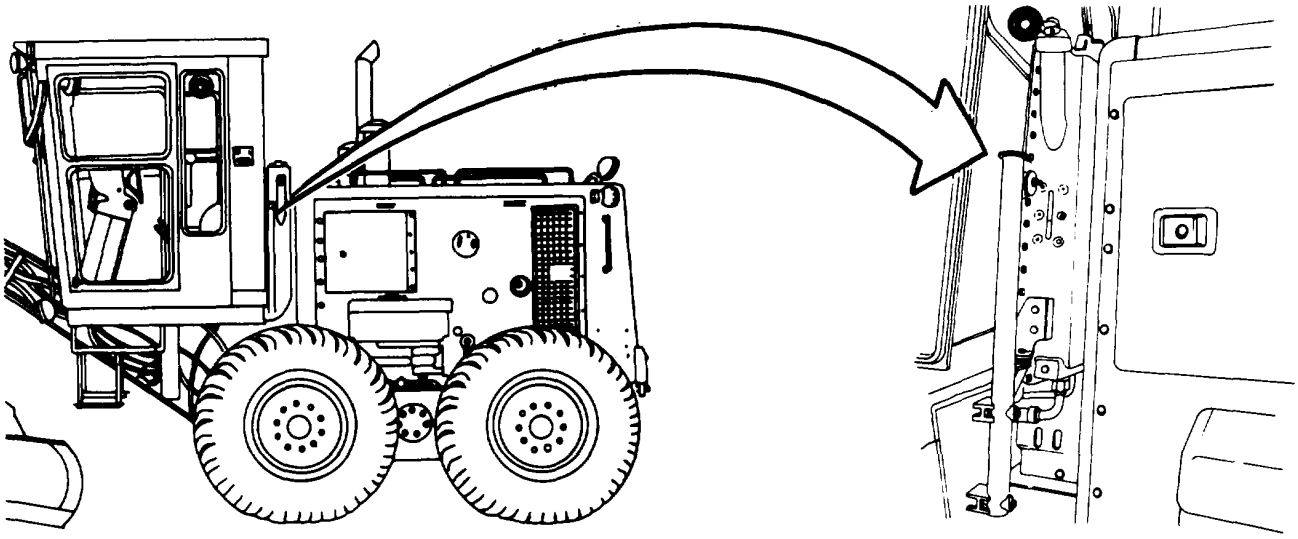
3-5. TROUBLESHOOTING PROCEDURES.-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

9. HYDRAULIC EQUIPMENT DOES NOT OPERATE PROPERLY.

Step 1. Check hydraulic reservoir fluid level in the sight gage.

If low, fill to proper level. Refer to LO 5-3805-261-12.



Step 2. Check for leaks in hydraulic lines and fittings and at cylinders.

Report leaks to organizational maintenance.

Section III. MAINTENANCE PROCEDURES

3-6. MAINTENANCE PROCEDURES.

a. Engine Servicing.

This task covers: Checking engine oil level

INITIAL SETUP

Applicable Configurations
All

Tools
None

Test Equipment
None

Materials/Parts
Clean cloths, Item 39, Appendix C

Personnel Required
Construction equipment repairer MOS 62B

References
LO 5-3805-261-12

Special Environmental Conditions
None

General Safety Instructions
None

Torques
None

Troubleshooting References
None

Equipment Condition

Vehicle parked- on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

3-6. MAINTENANCE PROCEDURES.-Continued

a. Engine Servicing.-Continued

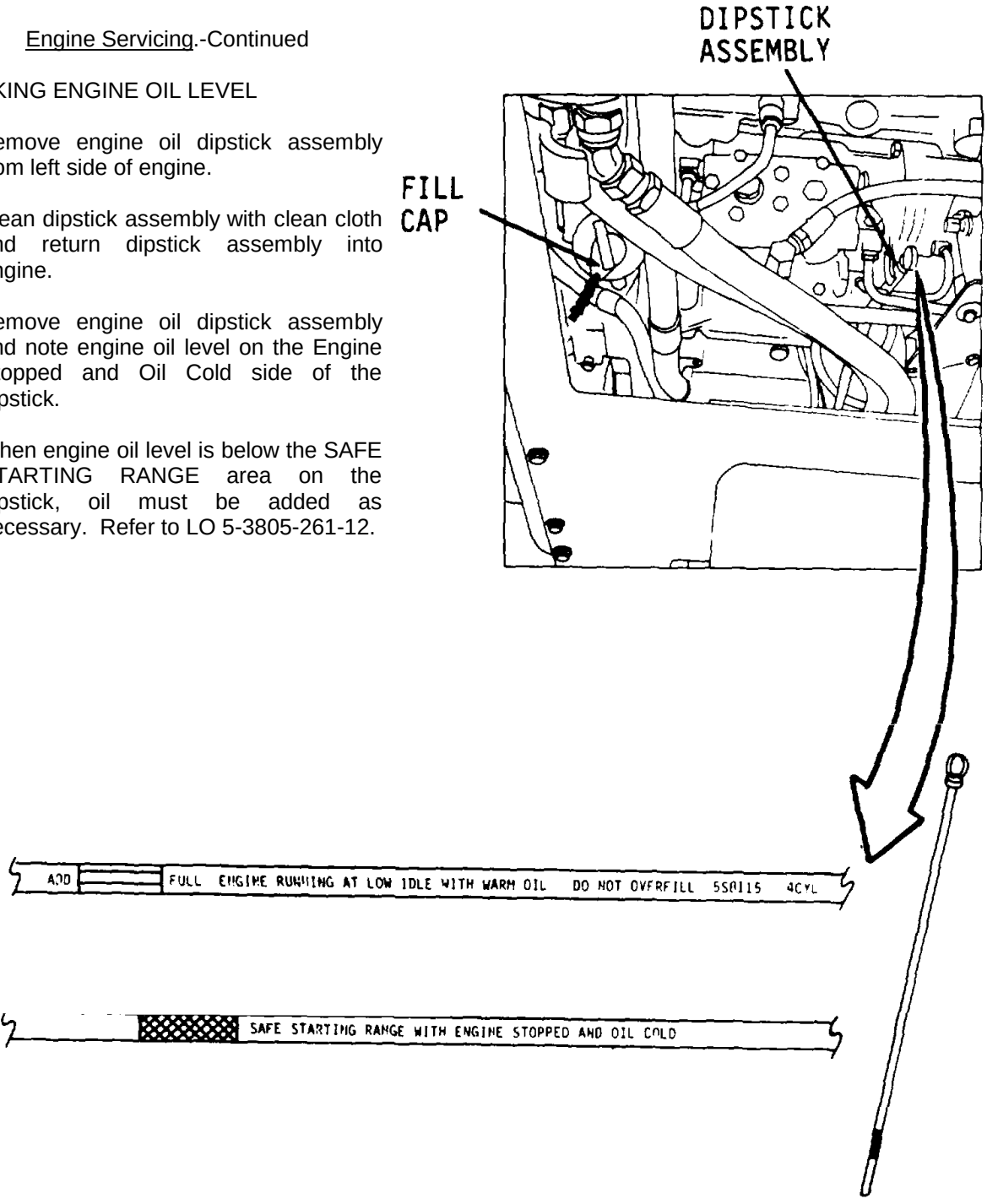
CHECKING ENGINE OIL LEVEL

1. Remove engine oil dipstick assembly from left side of engine.

2. Clean dipstick assembly with clean cloth and return dipstick assembly into engine.

3. Remove engine oil dipstick assembly and note engine oil level on the Engine Stopped and Oil Cold side of the dipstick.

4. When engine oil level is below the SAFE STARTING RANGE area on the dipstick, oil must be added as necessary. Refer to LO 5-3805-261-12.



3-6. MAINTENANCE PROCEDURES.

b. Fuel Tank Servicing.

This task covers: Draining water and dirt, checking fuel level and filling fuel tank.

INITIAL SETUP

Applicable Configurations
All

Tools
None

Test Equipment
None

Materials/Parts
Clean cloths, Item 39, Appendix C
Suitable container

Personnel Required
Construction equipment repairer MOS 62B

References
None

Special Environmental Conditions
None

General Safety Instructions
None

Torques
All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References
None

Equipment Condition

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

3-6. MAINTENANCE PROCEDURES.-Continued

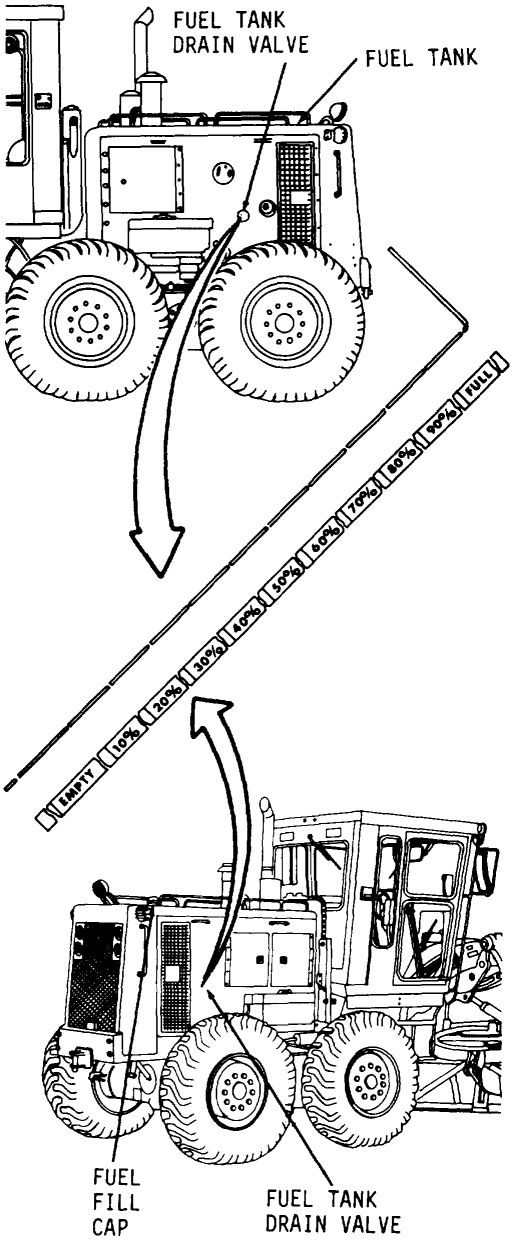
b. Fuel Tank Servicing.-Continued

DRAINING WATER AND DIRT, CHECKING FUEL LEVEL AND FILLING FUEL TANK

WARNING

Diesel fuel is a highly flammable liquid. Do not smoke or allow open flames or sparks near work area. Perform this procedure in a well ventilated area. Failure to follow this warning may cause INJURY. Wear protective goggles and clothing when working with diesel fuel. If contact with eyes or skin is made, flush with large amounts of cold water and seek medical aid immediately.

1. Position suitable container under bleed and drain valve at left side of fuel tank.
2. Open valve and drain water and dirt, close valve.
3. Properly dispose of container.
4. Remove fuel tank fill cap from top of fuel tank.
5. Remove dipstick from fuel tank, clean dipstick and install in fuel tank.
6. Remove dipstick and note fuel level indicated on dipstick.



3-6. MAINTENANCE PROCEDURES.

b. Fuel Tank Servicing.

DRAINING WATER AND DIRT, CHECKING FUEL LEVEL AND FILLING FUEL TANK

NOTE

Fuel tank capacity is approximately 75 gal (2801).

7. Fill fuel tank, allowing for fuel expansion.

8. Install dipstick in fuel tank.

9. Install fuel fill cap.

3-6. MAINTENANCE PROCEDURES.-Continued

c. Radiator Servicing.

This task covers: Checking engine coolant level and filling the radiator

---

INITIAL SETUP

Applicable Configurations
All

Tools
None

Test Equipment
None

Materials/Parts
None

Personnel Required
Construction equipment repairer MOS 62B

References
LO 5-3805-261-12

Special Environmental Conditions
None

General Safety Instructions
None

Torques
None

Troubleshooting References
None

Equipment Condition

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

3-6. MAINTENANCE PROCEDURES.

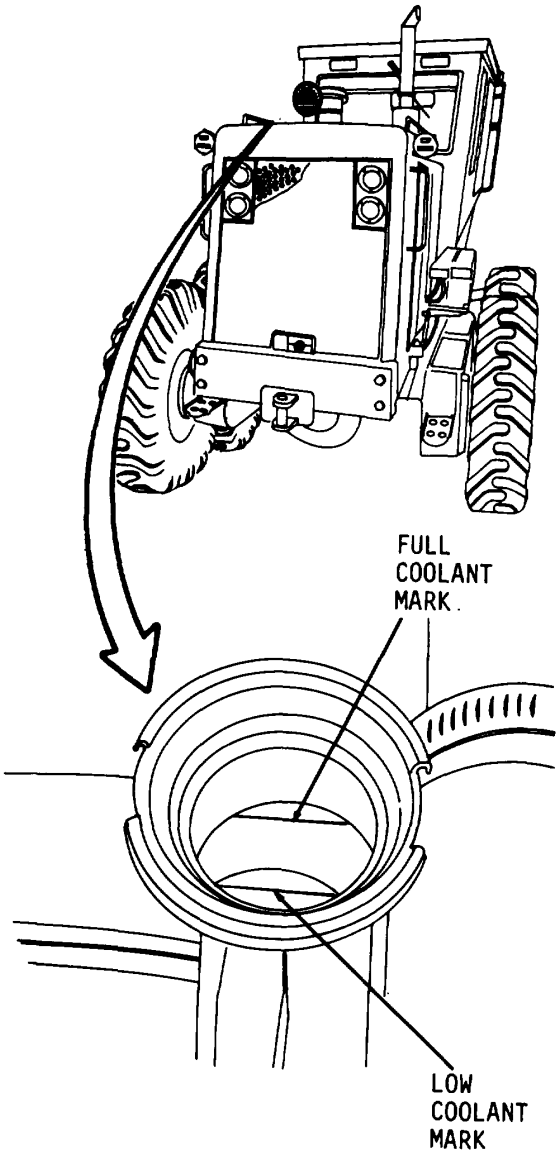
c. Radiator Servicing.

WARNING

STEAM UNDER PRESSURE

Loosen radiator cap slowly to relieve pressure before completely removing when the engine is hot. Failure to follow this procedure may cause INJURY. If you are scalded by steam, seek medical aid immediately.

1. Loosen radiator cap slowly to relieve pressure and remove.
2. Check coolant level.
3. Fill with correct coolant. Refer to LO 5-3805-261-12.
4. Install radiator cap.



3-6. MAINTENANCE PROCEDURES.-Continued

d. Battery Servicing.

This task covers: Cleaning battery terminal and checking battery fluid level

---

INITIAL SETUP

Applicable Configurations
All

Tools
Protective safety goggles
Rubber gloves

Test Equipment
None

Materials/Parts
Clean cloths, Item 39, Appendix C
Water, distilled, Item 5, Appendix C
Petroleum jelly, Item 6 Appendix C

Personnel Required
Construction equipment repairer MOS 62B

References
None

Special Environmental Conditions
None

Torques
None

Troubleshooting References
None

Equipment Condition

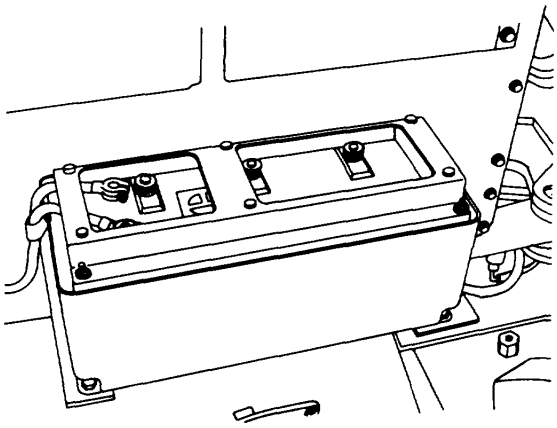
Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

3-6. MAINTENANCE PROCEDURES.

d. Battery Servicing.

WARNING

When handling, servicing or testing batteries, always wear safety goggles and rubber gloves. Failure to do so may cause INJURY. Battery electrolyte causes severe burns. If electrolyte comes in contact with skin or eyes, flush immediately with large amounts of water and seek medical aid.



1. Open two battery box covers on left and right side of engine compartment.
2. Clean battery tops and terminals with clean cloth.
3. Remove battery fill caps and check water level.
4. Proper water level is to the bottom of the fill opening.
5. Add distilled water, if available. If not, use clean water in each fill opening.
6. Install battery fill caps.
7. Coat battery terminals with petroleum jelly.
8. Close and latch each battery box cover.

3-6. MAINTENANCE PROCEDURES.-Continued

e. Tire Servicing.

This task covers: Checking tire pressure

INITIAL SETUP

Applicable Configurations
All

Tools
Tire inflation gage

Test Equipment
None

Materials/Parts
None

Personnel Required
Construction equipment repairer NOS 62B

References
None

Special Environmental Conditions
None

Torques
None

Troubleshooting References
None

Equipment Condition

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

3-6. MAINTENANCE PROCEDURES.

e. Tire Servicing.

WARNING

Proper inflation equipment is necessary to avoid over inflation. Improperly inflated tires can cause excessive heat build-up and blowouts. Always stand behind the tread when inflating a tire.

1. Using inflation gage, check tire inflation pressure of each tire.

2. Inflate tires to 35 psi (240kPa).

NOTE

Notify organizational maintenance if any cut, gouged or damaged tires were noted during tire inflation task.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals and mis. pubs. referenced in this manual.

A-2. FORMS

Accident Identification Card ..... DD Form 518
Equipment Daily or Monthly Log ..... DA Form 2408-1
Equipment Inspection and Maintenance Work Sheet ..... DA Form 2404
Maintenance Request..... DA Form 2407
Quality Deficiency Report ..... SF 368
Operator's Permit ..... SF 46
Recommended Changes to DA Publications ..... DA Form 2028-2
Uncorrected Fault Record ..... DA Form 2408-14
Vehicle Accident Report ..... SF 91

A-5. FIELD MANUALS

Basic Cold Weather Manual ..... FM 31-70

A-4. TECHNICAL MANUALS

Driver Selection and Training (Wheeled Vehicle) ..... FM 55-30
Manual For Wheeled Vehicle Driver ..... FM 21-305
Operator's Organizational, DS and GS Maintenance
Manual: Storage Batteries, Lead-Acid Type ..... TM 9-6140-200-14
Organizational Maintenance Manual: Grader,
Heavy, Road, Motorized: CCE 130G ..... TM 5-3805-261-20
TM 5-3805-261-34
The Army Maintenance Management System (TAMMS) ..... DA PAM 738-750
Transportability Guidance For 130G Grader ..... TM 55-3805-261-14

A-5. MISCELLANEOUS PUBLICATIONS

Lubrication Order: Grader, Heavy, Road
Motorized: CCE 130G ..... LO 5-3805-261-12

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE. This appendix lists Integral Components of End Item (ICOEI) and Basic Issue Items (BII) for the 130G Grader to help you inventory items required for safe and efficient operation.

B-2. GENERAL. This Components of End Item List is divided into the following sections.

a. Section II - Integral Components of the End Item. These items, when assembled, comprise the 130G Grader and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III - Basic Issue Items. These are the minimum essential items required to place the 130G Grader in operation, to operate it and to perform emergency repairs. Although shipped separately packed, they must accompany the 13OCG Grader during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOW/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS.

a. Illustration (Column (1)). This column is divided as follows:

(1) Figure number (sub-column (a)). Indicates the figure number of the illustration in which the item is shown.g

(2) Item number (sub-column (b)). The number used to identify item called out in the illustration.

b. National Stock Number (Column (2)). Indicates the national stock number assigned to the item to be used for requisitioning.

c. Part Number (Column (3)). Indicates the primary number used by the manufacturer which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an item or range of items.

APPENDIX B.-Continued

d. Description (Column (4)). Indicates the federal item name and, if required, a minimum description to identify the item.

e. Location (Column (5)). The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to adjacent area.

f. Usable on Code (Column (6)). Usable on codes are included to help you identify which component items are used on the different models.

g. Quantity Required (Column (7)). This column lists the quantity of each item required for a complete major item.

h. Quantity (Column (8)). This column is left blank for use during an inventory. Under the Rec'd column, list the quantity you actually receive on your major item at a later date, such as for shipment to another site.

APPENDIX B

Section II. COMPONENTS OF END ITEM

The 130G Road Grader is self-contained. No components are separately packed or stored during transport.

Articulation pin must be installed during transport See Operator's manual.

APPENDIX B-Continued

Section III. BASIC ISSUE ITEMS

(1) SMR CODE	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY FURN WITH EQUIP
PFOZZ	7520-00559-9618	Case Maintenance and Operational Manual	Ea	1
PFOZZ	7510-01-065-0166	Binder, Log Book	Ea	1

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists additional items you are authorized for support of the 130G Grader.

C-2. GENERAL. This identifies items that do not have to accompany the 130G Grader and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

C-3. EXPLANATION OF LISTING. National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment.

APPENDIX C-Continued

ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION CAGEC & PART NUMBER	USABLE ON CODE	(3) U/M	(4) QTY AUTH
4210-00-775-0127	EXTINGUISHER: Fire Purple "K" Dry Chem. 5 lb (19207) 7015266		EA	1
4930-00-223-3391	GREASE GUN: Hand, 14 oz. Cartridge (19207) 5644803		EA	1
5120-00-223-7397	PLIERS: Slip Joint (56161) 10510983		EA	1
5120-00-449-8083	WRENCH: Adj 10 in (11083) 1B7536		EA	1
4930-00-288-1511	EXTENSION; Grease Gun, Flex, 14 in (19207) 6300333		EA	1
5140-00-315-2775	BAG: Tool W/Flap 10 x 20 (81337) 5-7-1		EA	1
6230-00-264-8261	FLASHLIGHT: 2 Cell W/O Batteries (21108) MX991-U		EA	1
5120-00-061-8546	HAMMER; 2 lb, Ball Peen (81348) GGG-H-86		EA	1
4930-00-266-9182	OILER; Hand (96906) MS15164-1		EA	1
6545-00-922-1200	FIRST AID KIT; General Purpose (19207) 11677011		EA	1
9905-00-148-9546	WARNING DEVICE KIT: Highway Reflective Triangle Set #3 (80244) RR-W-1817		EA	1

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE. This appendix lists expendable, consumable maintenance supplies you will need to operate and maintain the grader. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts and Heraldic Items).

D-2. EXPLANATION OF COLUMNS.

a. Item Number (Column (1)). This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 11, App. F").

b. Level (Column (2)). This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. National Stock Number (Column (3)). This is the national stock number assigned to the item; use it to request or requisition the item.

d. Description (Column (4)). Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

e. Unit of Measure (U/M) (Column (5)). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

APPENDIX D

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level		(3) National stock number	(4) Description	(5) U/H
1.	Engine	C	9150-00-188-9859 MIL-L-2104C	Oil Lubricating OE/HDO-30 Below 32 F 10W	5 gal
2.	Transmission and Differential Housing	C	9150-00-188-9859 MIL-L-2104C	Oil Lubricating OE/HDO-30 Above 32 F - SAE 30 Below 32 F - SAE 10W	24 gal
3.	Tandem Drive Housing (each	C	9150-00-188-9859 MIL-L-2104B	Oil Lubricating OE/HDO-30 Above 32 F - SAE 30 Below 32 F - SAE 10W	17 gal
4.	Front Wheel Spindle	C	9150-00-577-5844	Oil Lubricating SAE 90W	1 pt
5.	Circle Drive Housing	C	9150-00-577-5844 MIL-L-2105B	Oil Lubricating SAE 90W	2 gal
6.	Cooling System	C	6850-00-243-1992 55 gal drum	Antifreeze: Ethylene Glycol for Spec. 0-A-548	10 gal
7.	Cooling System	C	6850-01-020-3604	Cooling System Conditioner	1/2 qt every 250 hrs
8.	Hydraulic System	C	9150-00-191-2772 MIL-L-2104B	Oil Lubricating SAE 10	
9.	Fuel Tank	C	Spec: VV-F-800	#2 Diesel	75 gal

NOTE: Engine Oil 15W-40 is permissible for starting temperatures over +15 F

1 qt can, NSN 9150-01-178-4725

5 gal can, NSN 9150-01-152-4118

55 gal drum, NSN 9150-01-152-4119

INDEX

☆U.S. GOVERNMENT PRINTING OFFICE: 1991-543-025 40108

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier Genera4 United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for Road Grader, Motorized, Model 130G.

☆U.S. GOVERNMENT PRINTING OFFICE: 1995-396-514/30805

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5825-270-10	23 Jul 81	Radio Frequency R-2176/FRN

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO	TABLE NO.

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

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

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

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches

1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches

1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches

1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet

1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches

1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

5/9 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

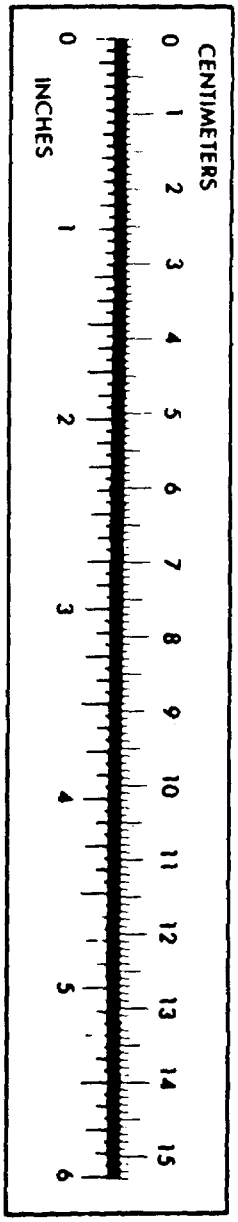
1 Kilogram = 1,000 Grams = 2.2 Lb.

1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

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

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



PIN: 066324-000