RANGER

G67 SKIDDER

OPERATORS MANUAL

PUBLICATION NO.

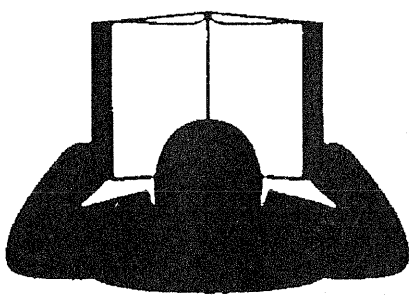
R900142

Allied Systems COMPANY

SHERWOOD, OREGON USA

SAFETY DECALS

THE SAFETY DECALS ON YOUR NEW G67 LOG SKIDDER CONVEY AN IMPORTANT MESSAGE ABOUT YOUR SAFETY. THESE DECALS MUST BE READ AND UNDERSTOOD PRIOR TO OPERATION OR MAINTENANCE. IF FOR ANY REASON THESE DECALS BECOME DAMAGED OR ILLEGIBLE, THEY MUST BE REPLACED!



⚠ WARNING

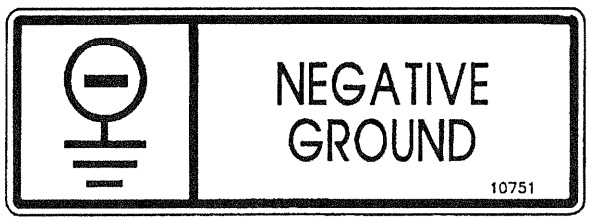
To prevent Serious Injury or Death

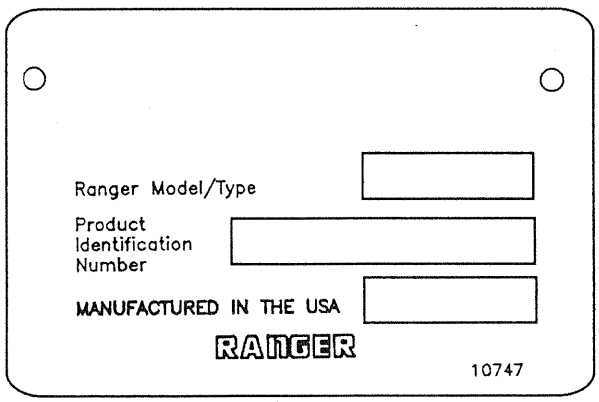
- Avoid unsafe operation or Maintenance.
- Do not operate or work on this machine without reading and understanding the operator's manual.
- If manual is lost, contact your nearest dealer for a new manual.

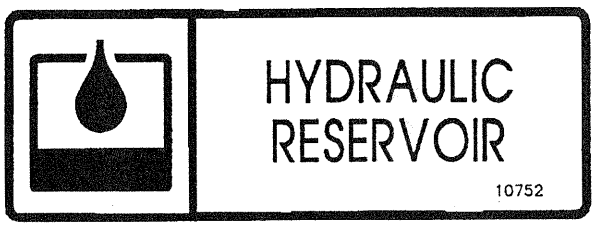
RANGER

G 67

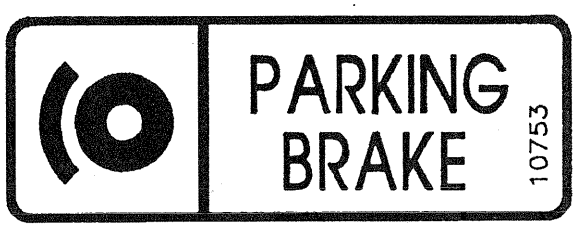

#2 DIESEL FUEL
10750

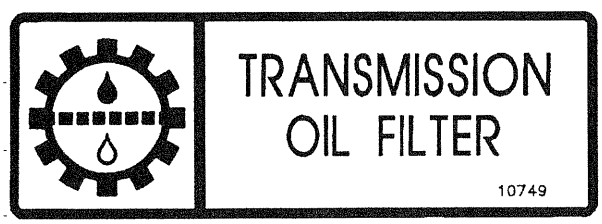

NEGATIVE
GROUND
10751


Ranger Model/Type
Product
Identification
Number
MANUFACTURED IN THE USA
RANGER
10747


HYDRAULIC
RESERVOIR
10752

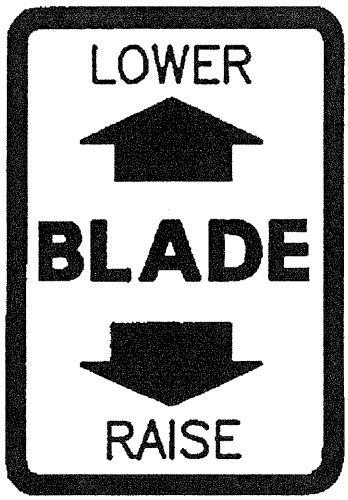

MID-MOUNT
BREATHER & FILL POINT
10748

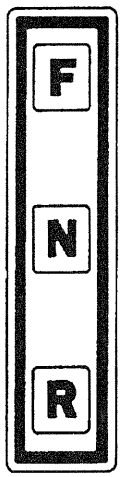

PARKING
BRAKE
10753

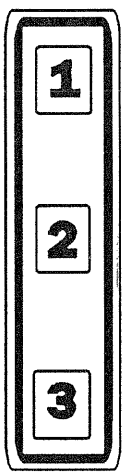

TRANSMISSION
OIL FILTER
10749

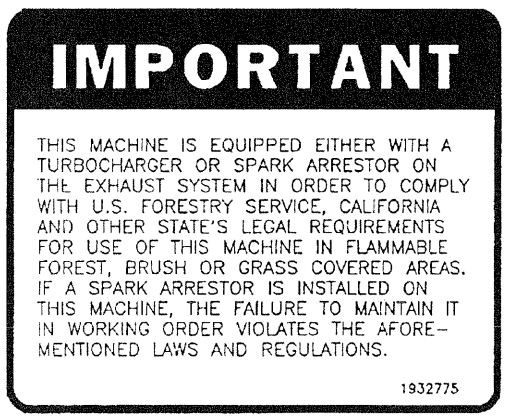

WARNING
DO NOT TURN BATTERY DISCONNECT
SWITCH TO OFF POSITION WHILE THE
ENGINE IS RUNNING.
10754


WINCH
WINCH IN LOCK
FREE SPOOL


LOWER
BLADE
RAISE


F
N
R


1
2
3


IMPORTANT
THIS MACHINE IS EQUIPPED EITHER WITH A TURBOCHARGER OR SPARK ARRESTOR ON THE EXHAUST SYSTEM IN ORDER TO COMPLY WITH U.S. FORESTRY SERVICE, CALIFORNIA AND OTHER STATE'S LEGAL REQUIREMENTS FOR USE OF THIS MACHINE IN FLAMMABLE FOREST, BRUSH OR GRASS COVERED AREAS. IF A SPARK ARRESTOR IS INSTALLED ON THIS MACHINE, THE FAILURE TO MAINTAIN IT IN WORKING ORDER VIOLATES THE AFORE-MENTIONED LAWS AND REGULATIONS.
1932775

INTRODUCTION

This manual was prepared to assist you with the safe and correct operation and maintenance of your Ranger G67 Log Skidder. Study this manual carefully before you start and operate the machine and before attempting any preventive maintenance procedures.

Much care has been taken to design and manufacture the safest and most efficient machine possible for our customers, but all of this effort may be wasted if you do not read, or if you choose to disregard the safety instructions and features of this machine. Machines do not usually cause accidents, people do. A safety-conscious operator and a well-maintained machine are a safe, efficient and profitable combination. Become familiar with all controls and instructions and keep this manual on the machine for handy reference. Some of the features shown in this manual are optional and may not be installed on your Ranger G67. Please disregard any information which is not applicable to your machine.

It is our policy to constantly strive to improve our products. We therefore reserve the right to make design changes and improvements without incurring any obligation to incorporate any of these changes in any product that has been shipped or that is in service. We reserve the right to make changes to prices, specifications and standard or optional equipment at any time without notice. All data given in this manual is subject to production variation and therefore all dimensions and weights are approximate.

The **Allied** Ranger model G67 Log Skidder is available as a Cable Skidder, a single arch Esco Hi-Vis Grapple Skidder with a 100 inch (254 cm) opening Esco grapple, and a dual arch Parallelogram Grapple Skidder with a 105 inch (267 cm) opening Ranger grapple. All units are powered by a 359 cubic inch (5.9 liter) turbocharged and after cooled Cummins diesel engine rated at 177 horsepower (132 kW). The transmission is a three speed, full reversing, powershift design with directional modulation, for use in first gear only. A separate torque converter provides up to 2.73 to 1 torque multiplication. The front and rear drive axles on all G67 units are NoSpin types. Both Cable and Grapple Skidders are equipped with a 40,000 pound (18,182 kg) capacity winch driven from the output of the torque converter through a power-take-off on the transmission. The winch is shaft driven and hydraulically controlled and can be operated with the machine in motion in either direction or standing still in neutral. Brakes are fully enclosed, hydraulic wet disc type, power actuated by a single pedal. Two brake units, one mounted on the rear of the transmission, and the other remote mounted in the rear driveline are actuated by separate, isolated fluid systems. The mechanism of the transmission-mounted brake unit is lever applied for use as a parking brake. Steering is an Orbitrol-type that actuates two hydraulic cylinders to turn the articulated frames. The cab is an ergonomic design that is fully R.O.P.S., F.O.P.S. and O.P.S. certified.

UNAUTHORIZED MODIFICATION OF ROLLOVER PROTECTIVE STRUCTURE

Do not make unauthorized modification to the R.O.P.S. cab such as welding or drilling for fire extinguisher brackets, antenna brackets or fire suppression systems, etc. Unauthorized modifications can affect the structural integrity of the cab and will void its certification. The rollover protective structure has been certified to meet specific test requirements. Among these, is OSHA Regulation 1926.1000 of the United States Department of Labor. Any planned modification must be approved by the engineering department of Valmet Logging Americas, who will determine if the modification can be made within the limits of the certification tests. It is important that every person in your organization, including management, be made fully aware of the rules governing R.O.P.S. structures. Whenever anyone sees a machine R.O.P.S. cab with unauthorized modifications, both the customer and **Allied Systems Company** should be notified in writing.

SPARK ARRESTER MAY BE REQUIRED

Many governments have enacted statutes and regulations requiring that regulation spark arrester devices be installed on any machine that operates on or near forests, brush, or grass covered lands within their jurisdictions. The United States government has such a rule for any machine operating on National lands. Use of machines without such devices in these areas, can subject the owner and/or operator to penal fines and/or civil damages, including the costs of fire suppression. Valmet Ranger, model G67 Log Skidders are factory-equipped with turbocharged engines which are approved as spark arrester devices and do not require additional spark arresting equipment be installed to comply with these regulations.

MAINTENANCE AND INSPECTIONS

Regular, routine maintenance is essential for the long, trouble-free service life of your Ranger G67. Recommended hourly service intervals are given for normal working and environmental conditions. More demanding conditions may require more frequent maintenance. The maintenance procedures listed in this manual are intended to be carried out by a trained operator. More complex adjustments and repairs should be carried out by your authorized Valmet Ranger distributor. Before the machine left the factory, it was thoroughly tested and adjusted, and your distributor has carried out an extensive predelivery inspection procedure according to our instructions. It is important though, that a new machine receive further checks as you operate it. You are entitled to two free service inspections. The first must be completed within the first thirty days of operation, the second must be completed within the first six months of operation.

LUBRICANTS AND CAPACITIES

ENGINE

Refer to your Cummins Engine Operation and Maintenance Manual for recommended engine oils for your specific ambient operating temperature and for recommended oil and filter change intervals.

TRANSMISSION/CONVERTER /WINCH SYSTEM AND MIDMOUNT SERVICE BRAKE

PREVAILING AMBIENT TEMPERATURE	FLUID TO BE USED
+30°F (-1°C) and Above	C-3 Grade 30 Transmission Fluid
-10°F (-23°C) and Above	C-3 Grade 10 Transmission Fluid
-30°F (-34°C) and Above	Dexron IID Transmission Fluid
-65°F (-55°C) to 0°F (-18°C)	MIL-L-46167 or MIL-L-46167A
-65°F (-55°C) and Above	Conoco Polar Start DN-600 Fluid

FRONT AND REAR AXLE DIFFERENTIALS AND PLANETARY HUBS

Extreme Pressure Gear Lubricant Multi-grade Viscosities MS-8 (Factory Fill) or MIL-L-2105C

NOTE: Clark-Hurth Components MS-8 specifications cover a gear lubricant for use in heavy-duty axles. It is a highly refined base stock properly compounded with selected extreme pressure additives. MS-8 meets MIL-L-2105C but is fortified with an additive package that provides added protection during the break-in

PREVAILING AMBIENT TEMPERATURE	LUBRICANT TO BE USED
+10°F (-12°C) and Above	85W-140 MS-8 (Factory Fill)
-15°F (-26°C) and Above	80W-140
-15°F (-26°C) to 100°F (38°C)	80W-90
-40°F (-40°C) and Above	75W-140
-40°F (-40°C) to 100°F (38°C)	75W-90
-40°F (-40°C) to 0°F (-18°C)	75W-80
Below -10°F (-23°C)	Special Polar MIL-L-2105C 75W

CHASSIS AND DRIVESHAFT LUBRICATION

PREVAILING AMBIENT TEMPERATURE	LUBRICANT TO BE USED
0°F (-18°C) and Above	NLGI Grade 2 Lithium-Base Extreme Pressure Multi-Purpose Grease with 3% to 5% Molybdenum Disulfide Added
-25°F (-32°C) and Above	NLGI Grade 0 Lithium-Base Extreme Pressure Multi-Purpose Grease

UNIVERSAL JOINTS

PREVAILING AMBIENT TEMPERATURE	LUBRICANT TO BE USED
0°F (-18°C) and Above	NLGI Grade 2 Lithium-Base Extreme Pressure Multi-Purpose Grease without Molybdenum Disulphide Additive - NOTE that this differs from slip joint lubrication.
-25°F (-32°C) and Above	NLGI Grade 0 Lithium-Base Extreme Pressure Multi-Purpose Grease

MAIN HYDRAULIC SYSTEM (Steer, Blade, Arch, Boom, Grapple and Power Brake Actuating System)

FACTORY FILL	Texaco Rando HD Z-36 HVI (Code 1540)

PREVAILING AMBIENT TEMPERATURE	FLUID TO BE USED
0°F (-18°C) and Above	Factory Fill Oil or Texaco Rando HD Z-36 PREMIUM HVI (Code 1629) are recommended.
0°F (-18°C) and Below	Conoco Polar Start DN-600 Fluid
	Automatic Transmission Fluid can be used only if it meets the following specifications:

A. Contains the types and contents of anti-wear compounding found in API Class SD, SE, CC or CD engine oils or have passed pump tests similar to those used in developing anti-wear type hydraulic fluids.

B. Have enough chemical stability for mobile hydraulic system service.

C. Meets the viscosity requirements of API Class SD, SE, CC, or CD engine oil - Grade 10W.

-30°F (-34°C) and Below	The following should be used as a guide in consultation with a reputable oil supplier. Any fluid may be

used which meets the following requirements:

A. Oil to be used must contain anti-wear properties and rust oxidation inhibitors, plus anti-foam agents equal to that found in API Class SD, SE, CC, or CD engine oils or have passed pump tests similar to those used in developing anti-wear type hydraulic oils.

B. Oil must have a Saybolt Universal Viscosity of 145 to 225 seconds at 100°F (38°C) and viscosity of not less than 42 seconds at operating temperature. The oil selected should have a high shear stability to ensure that the viscosity remains within recommended limits. Viscosity Index should be no less than 90.

C. Have a pour point of 20°F (11°C) below start-up temperature.

D. Diesel fuel, kerosene, transformer oil, etc., MUST NOT BE USED TO DILUTE NORMAL FLUIDS.

Hydraulic fluids must be kept clean. Any fluid added to the main hydraulic reservoir must be filtered through the 10 micron hydraulic return filter using the special quick coupler on the side of the filter. Fluid added through the breather must be filtered through a 10 micron filter to prevent system contamination. It is important to service filters, breathers and vents at the recommended service intervals.

Any time oil is added to a system to top up the fluid level, the same oil that is currently used in the system should be used. If the same fluid is not available, another compatible fluid (for the given temperature range) can be used. If these conditions cannot be met, the system must be drained completely and refilled. When the fluid is changed because of changes in ambient temperature, the system should be completely drained and the system refilled.

Because of the many types and brands of fluids that are available, it is not practical to test each one. Selecting the correct fluid should be done with the help of a reputable oil supplier who is responsible for the quality of the fluid. It is important to change fluids and filter elements at the intervals specified in this manual.

CAPACITIES

Engine:

Crankcase . . . . . 4.2 U.S. Gal. (16 liters)

Cooling System . . . . . 11.8 U.S. Gal. (45 liters)

Transmission/Converter/Winch:

System . . . . . 10.5 U.S. Gal. (40 liters)

Axle Differentials:

Front (Cable Skidder) . . . 6.8 U.S. Gal. (26 liters)

Front (Grapple Skidder) . . 8.9 U.S. Gal. (34 liters)

Rear (Cable Skidder) . . . 6.8 U.S. Gal. (26 liters)

Rear (Grapple Skidder) . 12.1 U.S. Gal. (46 liters)

Axle Planetary Hubs:

Front (Cable Skidder) . . . 2.6 U.S. Gal. (10 liters)

Front (Grapple Skidder) . 1.7 U.S. Gal. (6.6 liters)

Rear (Cable Skidder) . . . 2.6 U.S. Gal. (10 liters)

Rear (Grapple Skidder) . 1.6 U.S. Gal. (6.0 liters)

Main Hydraulic System:

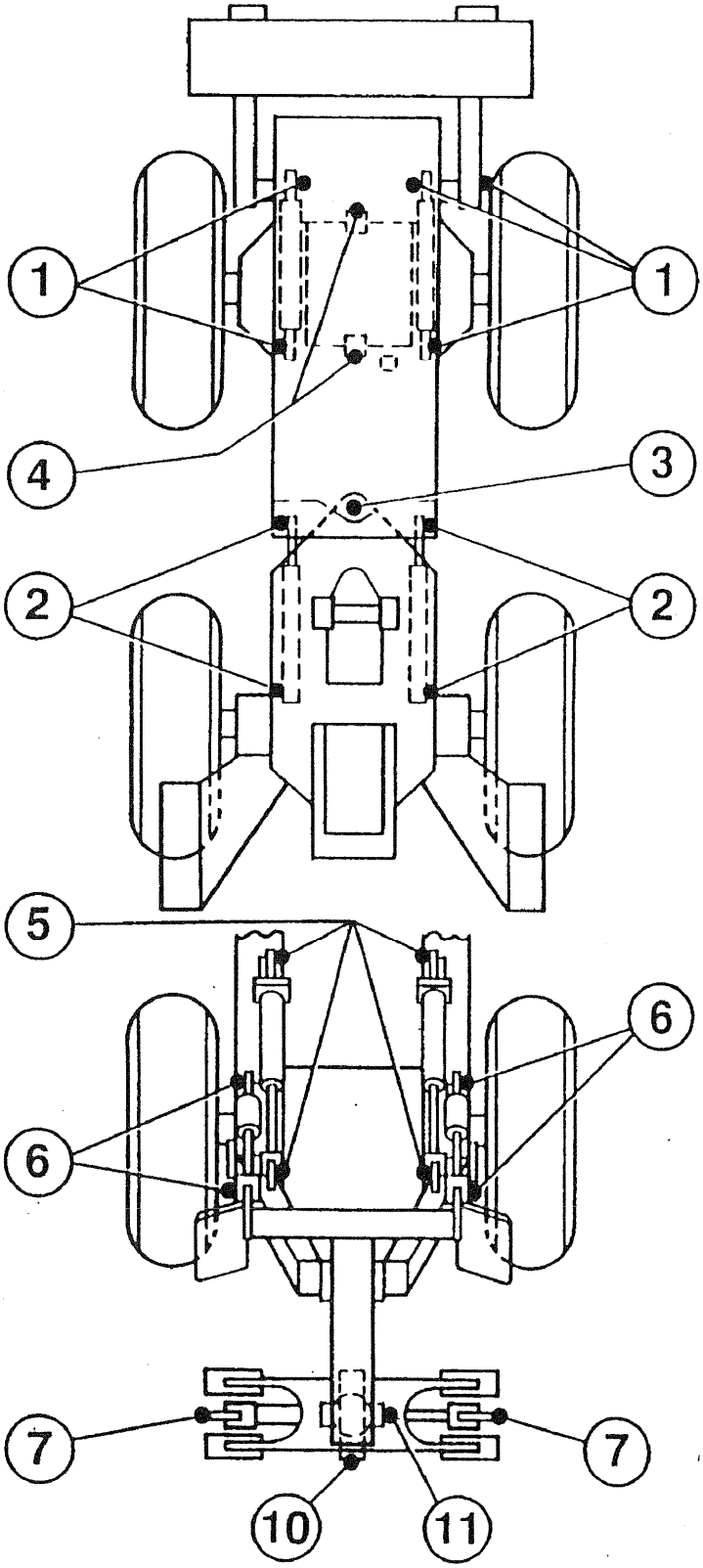
Cable Skidder . . . . . 35 U.S. Gal. (133 liters)

Grapple (Esco Hi-Vis) Skidder . . . . 40 U.S. Gal. (152 liters)
. . . . . .

Grapple (Ranger) Skidder 46 U.S. Gal. (175 liters)

Fuel Tank: No. 2 Diesel Fuel Recommended

All G67 . . . . . 67 U.S. Gal. (255 liters)



GREASE DAILY:

1. Utility Blade and Cylinder Pins
2. Steer Cylinder Pins
3. Center Hinge Pins
4. Axle Cradle Pins
5. Arch and Cylinder Pins
6. Boom and Cylinder Pins
7. Grapple and Cylinder Pins

Lubrication & Maintenance Chart

LUBRICATION AND MAINTENANCE SCHEDULE

SERVICE REQUIREMENTS	SECTION (FIG.)	INTERVAL, HOURS OF OPERATION						
		DAILY	50	100	250	500	1000	AS REQ.
1. Lubrication (See Chart)	Sec. 0							
2. Winch Free Spool Tension	Sec. 1							✓
3. Grapple Snubber Tension	Sec. 1	✓						
4. Engine Oil and Filter	Sec. 2				●			
5. Radiator and Coolant	Sec. 2						FLUSH SYSTEM	
6. Fan Belt Tension	Sec. 2						✓	
7. Air Fitler Elements	Sec. 2							
8. Engine Fuel Filters	Sec. 2	DRAIN WATER						●
9. Engine Performance	Sec. 2				✓			
10. Throttle Contol Linkage	Sec. 2							✓
11. Testing/Changing Batteries	Sec. 3							✓
12. Neutral Start Switch	Sec. 3							✓
13. Transmission Oil and Filter	Sec. 4						●	
14. Transmission System Vent/Breather	Sec. 4							
15. Trans./Converter/Winch Pressures	Sec. 4							✓
16. Drive Axle Lubricant	Sec. 4						●	
17. Drive Axle Breathers	Sec. 4							
18. Tire Inflation Pressure	Sec. 4		✓					
19. Driveshaft Slip Joints	Sec. 4			✓				
20. Driveshaft Universal Joints	Sec. 4							
21. Midmount Brake Breather								
22. Midmoint Brake Lube Oil	Sec. 5		✓			●		
23. Brake Adjustments	Sec. 5							✓
24. Hudraulic Oil and Filter	Sec. 9		1ST				●	

SAFETY REGULATIONS

The following rules are essential for your safety and the safety of your co-workers. These rules, however, do not free the operator from having to obey statutory rules such as traffic regulations and workers' safety regulations. Specific regulations in force at your work site must also be observed. We urge that all operators be thoroughly trained in the operation of the Ranger G67.

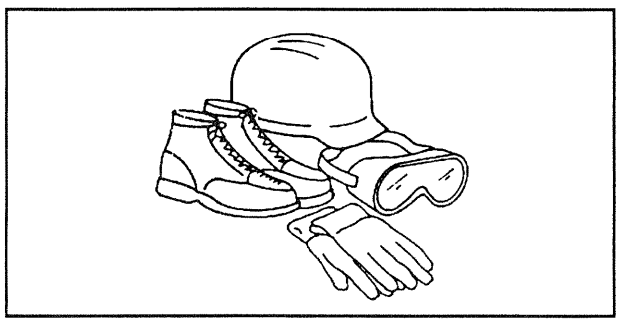
OBSERVE THE FOLLOWING SAFETY RULES

1. Become thoroughly acquainted with all functions of the machine.
2. Never allow untrained personnel to operate the machine.
3. Instruct persons working in the vicinity of the machine to be constantly aware of the skidder's position and direction of movement.
4. Make a thorough visual check around the machine before entering the cab and make sure that others know that you are about to start the machine.
5. ALWAYS USE YOUR SEAT BELT! NEVER jump from an overturning machine. You are much safer in the protection of the R.O.P.S. cab with your seat belt fastened around you.
6. Be aware that the steeper the terrain, the greater the effect on the stability of the machine.
7. After shutting down the engine, always turn the battery disconnect switch to the OFF position.
8. Always stay calm in critical situations. Think first, then act.
9. NEVER operate the machine while under the influence of alcohol or any kind of drug. Even some over the counter medications can impair one's ability to operate the machine safely.
10. ALWAYS wear your hard hat, safety boots and safety work gloves. NEVER wear loose fitting clothing or jewelry.
11. NEVER carry passengers, the Ranger G67 is equipped with one seat and one seat belt.
12. NEVER dismount the machine while it is in motion. Come to a complete stop, put the transmission in NEUTRAL, engage the parking brake, and lower the blade and log grapple before dismounting.
13. NEVER stand or work in the articulation area, behind the blade or under the arch, boom or grapple when the engine is running.
14. Do not do cleaning, maintenance or repairs on the machine with the engine running. If work must be done with the engine running, such as checking the transmission oil level or any pressure checks, be aware of possible hazards and observe the safety notes given with the maintenance procedures in this manual.
15. Try to avoid running over obstructions such as large rocks and stumps. Go around them if possible.
16. NEVER use the transmission as a downhill brake, putting the transmission in REVERSE while traveling FORWARD down a hill. The engine can stall and you will have no steering.
17. Select a lower gear range when traveling down a steep grade to reduce the load on the brakes.
18. Reduce speed when you approach fellow workers or other machines.
19. Make sure that the cab floor is free of oil, water, ice and mud to avoid slip and fall accidents.
20. Keep two fully charged fire extinguishers on board at all times.

21. Clean debris from the belly pans and the front axle cradle as necessary for your operating conditions.

22. Become familiar with IEMC (Industrial Equipment Manufacturers Council) safety recommendations.

SAFETY RULES FOR SERVICING THE MACHINE



"Boots, Gloves, Goggles, Hard Hat"

1. ALWAYS use safety glasses and any necessary protective equipment when servicing the machine.

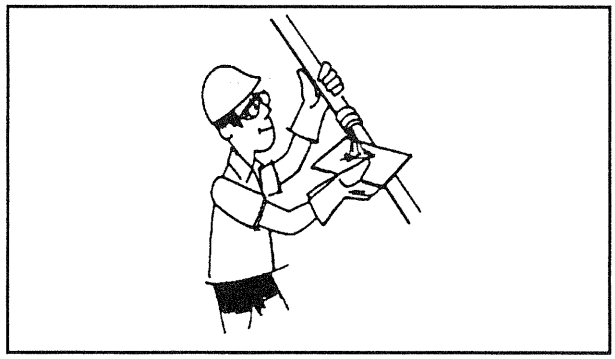
2. Shut down the engine before doing any service unless the procedure requires that the engine be running.

3. The cooling system contains hot fluid under pressure that can cause severe burns. Take care to remove the radiator cap slowly, using a rag to protect your hands, to release the pressure.

4. DO NOT SMOKE WHILE REFUELING OR SERVICING THE BATTERIES! NEVER use an open flame to check fuel or battery electrolyte levels.

5. Take care to avoid sparking when using battery jumper cables. The battery could catch fire or explode.

6. NEVER operate a machine that has a faulty brake or steering system.



"Checking for Leaks"

7. NEVER use your hands to check for leaks. Pressurized fluid escaping from a hose or fitting can penetrate the skin causing serious injury or death. Use a piece of cardboard.

8. Lower the blade and grapple to the ground when doing any service to the machine. If an implement must be raised, it must be secured so that it cannot fall.

9. ALWAYS disconnect the alternator and battery cables before doing any welding on the machine.

10. Be sensitive to the environment. NEVER drain fluids onto the ground, use a suitable container. Take care not to spill oil when changing filters. Use extra care when you are close to lakes, wetlands and waterways.

FIRE PREVENTION

1. Clean debris from the machine daily, especially around the engine, exhaust, and rotating driveline components.

2. Inspect the machine daily for potential fire hazards in the exhaust, electrical, driveline, fuel and hydraulic systems. Look for signs of rubbing, leaks and electrical shorts. Make any required repairs before operating the machine and clean up any spilled fluids.

3. Instruct all operators in the correct operation of the on-board fire extinguisher and any other fire suppression equipment installed on the ma-

chine. Make sure they are competent in the use of this equipment.

4. Daily cleaning of the radiator core will maintain moderate engine operating temperatures and reduce the risk of a fire (as well as prolonging engine life).

5. Recharge (or replace) any fire extinguisher (or other fire suppression system) that has been discharged BEFORE the machine resumes operation.

6. Perform all required periodic maintenance to installed fire suppression systems.

7. Thorough cleaning of any area of the machine that is to be welded or brazed is mandatory and a fully charged fire extinguisher must be on hand during all welding or brazing operations.

8. DO NOT PERMIT smoking or open flame when refueling or when the fuel system is open to the atmosphere.

9. Fire extinguishing and suppression equipment are in no way substitutes for the diligent efforts of an operator to PREVENT fires from starting.

10. In case of fire, shut down the engine, turn the battery disconnect switch to the OFF position, close the fuel shut-off valve, and begin fighting the fire but ONLY if time and conditions permit this to be done safely, and then run for safety and summon assistance.

STARTING AND OPERATING THE MACHINE

⚠ **IMPORTANT: Read and understand the following instructions thoroughly before operating the machine for safe and productive work time. See the CAB section of this manual for complete descriptions of all controls.**

BREAK-IN PROCEDURE

Your new Ranger G67 Log Skidder is designed to provide long, dependable service but it is important to observe a 50 hour break-in period and to perform all recommended maintenance at the scheduled service intervals.

See the Cummins Engine Operation and Maintenance Manual for engine break-in recommendations. Check the engine oil and coolant levels daily. Change the engine crankcase oil and oil filter after the first 50 hours of operation and every 250 hours of operation after under normal operating conditions. Anti-freeze coolant should be changed every 500 hours of operation.

Check the transmission oil level daily. Change the transmission oil filter after the first 50 hours of operation and every 500 hours after. The transmission/converter/winch system fluid should be changed and the transmission suction screen cleaned and inspected every 1000 hours of operation. This should also be done in the case of a component failure (such as a pump) and the filter should be changed within 50 hours of operation after the repair.

The oil level in the hydraulic reservoir should be checked daily. The hydraulic oil return filter should be changed after the first 50 hours of operation and every 250 hours after. The hydraulic oil should be changed every 1000 hours of operation and the reservoir and reservoir magnet should be thoroughly cleaned. This should also be done in the case of a component failure (such as the pump) and the filter should be changed within 50 hours of operation after the repair.

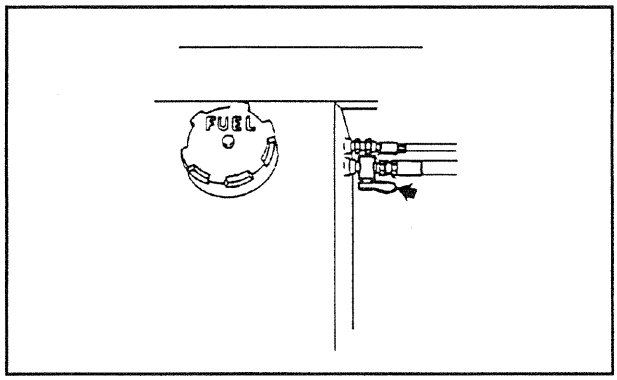
WARM WEATHER STARTING

1. Check all fluid levels on level ground, adding fluid as required. Do not overfill.

NOTE: See the appropriate systems' section in this manual for instructions on checking fluid levels.

2. Do a thorough visual inspection of the machine for any safety hazards, leaks or faults.

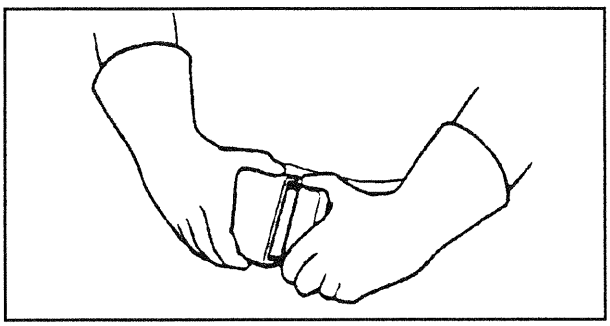
3. Clean any debris as described earlier in this section.



"Fuel Shutoff Valve"

4. Turn the fuel shutoff valve to the OPEN position.

5. Turn the battery disconnect switch to the ON position.



"Seat Belt"

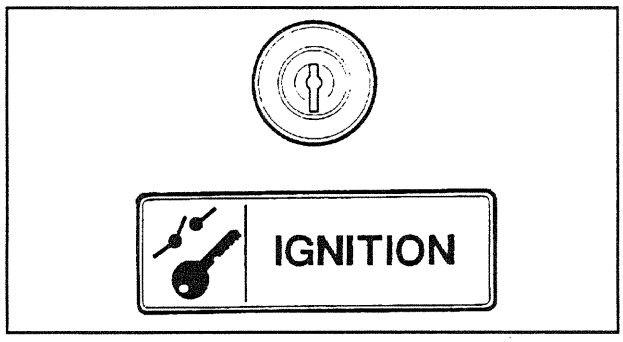
6. Sit in the operator's seat and fasten your seat belt. Adjust the seat to your operating comfort.

7. Put the direction control lever in the NEUTRAL position.

8. Check to see that the parking brake is applied.

9. If the machine is equipped with a hand throttle, it should be pushed all the way in to its idle position.

10. Apply and hold the service brake pedal.



"Ignition Key Switch"

11. Insert the ignition key into the ignition switch and turn it clockwise to the START position until the engine starts, and release the key. Check that all indicator and warning systems are functioning and check the reading on the engine oil pressure gauge, if it is less than 10 PSI (0.69 bar), shut down the engine immediately and determine the cause BEFORE you operate the machine. Note that it is normal for the voltage indicator to glow and the voltmeter to read low until the engine RPM is raised slightly.

NOTE: DO NOT crank the engine for longer than 30 seconds if it fails to start promptly, the starter motor can overheat. Allow the starter enough time to cool before resuming starting attempts. Wait until the starter stops turning before you turn the key again, serious damage to the starter motor and the engine flywheel can result.

12. Allow the engine coolant temperature gauge to reach a temperature of 150°F (66°C) before operating the machine at full power.

NOTE: Operate the engine at Low Idle RPM for three to five minutes, then at one quarter throttle for three minutes, then at one half throttle for three minutes to warm the engine before operating it at full power. Note any abnormal noises from the machine at this time and take corrective action as required.

COLD WEATHER STARTING

Other than the use of a suitable low temperature engine oil and a suitable anti-freeze mixture in the engine cooling system, extensive preparation is not required for cold weather starts. For operation at temperatures below 0°F (-18°C), changing the oil in the main hydraulic system to one listed earlier in this section for the prevailing ambient temperatures, will aid starting by reducing resistance in the main hydraulic pump. Choose a good quality brand of winter diesel fuel. It may be necessary to change the lubricant in the drive axle differentials and planetary hubs and/or the fluid in the transmission/converter/winch hydraulic system also. It is important that the batteries and charging system be in peak working order for trouble-free cold weather starts.

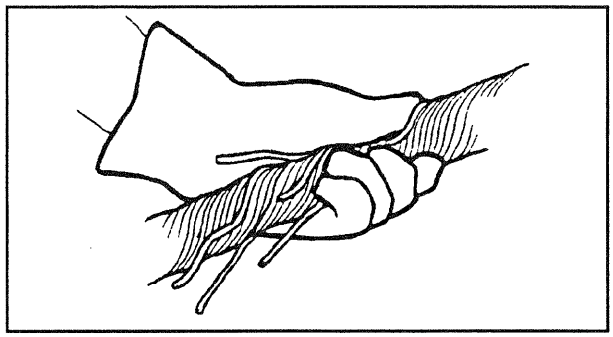
NOTE: See your Cummins Engine distributor for recommended cold starting aids.

⚠ WARNING: If jumper cables are used, be sure to follow the instructions in the ELECTRICAL section of this manual.

OPERATING A CABLE SKIDDER

⚠ IMPORTANT: Don't try and work too fast. Know your capabilities and the capabilities of your machine. Choose a skid path that is clear of large rocks, stumps and debris that could overturn or damage the machine.

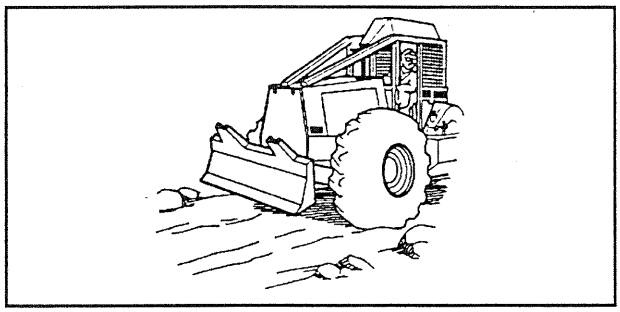
⚠ WARNING: NEVER ENTER OR LEAVE THE CAB WHILE THE MACHINE IS MOVING. OPERATE THE MACHINE AND ITS IMPLEMENTS FROM THE OPERATOR'S SEAT. NEVER CARRY PASSENGERS. USE CAUTION WHEN OPERATING THE MACHINE NEAR OTHER WORKERS, MACHINES AND VEHICLES. TAKE EXTRA CARE ON STEEP HILLSIDES OR NEAR CLIFFS AND WATER. ALWAYS USE A THREE-POINT METHOD OF MOUNTING OR DISMOUNTING THE CAB (TWO HANDS AND ONE FOOT OR TWO FEET AND ONE HAND AT ALL TIMES). NEVER JUMP FROM THE MACHINE!

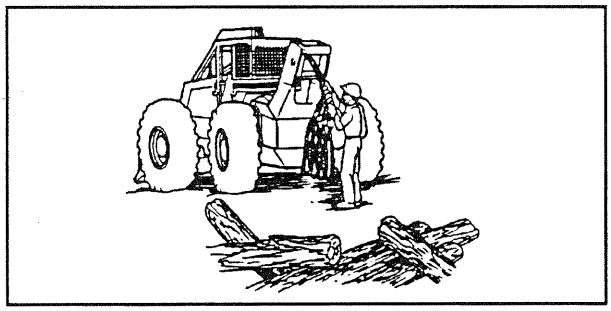


"Damaged Cable/Protective Gloves"

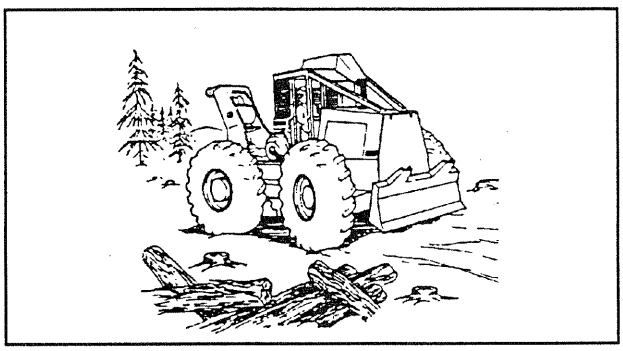
⚠ WARNING: CHECK THE CONDITION OF THE WINCH CABLE MAINLINE AND CHOKERS. A WORN OR DAMAGED WINCH CABLE CAN BREAK UNDER STRESS CAUSING SERIOUS INJURY OR DEATH TO YOURSELF OR TO A FELLOW WORKER. REPLACE WORN OR DAMAGED CABLES PROMPTLY. ALWAYS USE PROTECTIVE WORK GLOVES WHEN HANDLING WINCH CABLES.

1. Raise the blade high enough to clear any objects on the ground but not high enough to restrict airflow through the radiator.
2. Put the direction control lever in the FORWARD position, and choose the appropriate transmission speed range.
3. Release the parking brake lever and the service brake pedal.
4. Depress the accelerator pedal to put the machine in motion.
5. Check all gauges to see that all systems are operating correctly, and continue to make frequent checks as you operate the machine.





6. As you travel, watch for any obstructions that could overturn or damage the machine. Check to see if there is an easier route to return to the landing. The machine will behave much differently when skidding a load, this change in mobility can make it necessary to change your return route.



7. When you enter the cut area, make a slow turn to see the best position to approach the logs with the least amount of effort and time. Avoid obstructions that can snag or tangle the load.

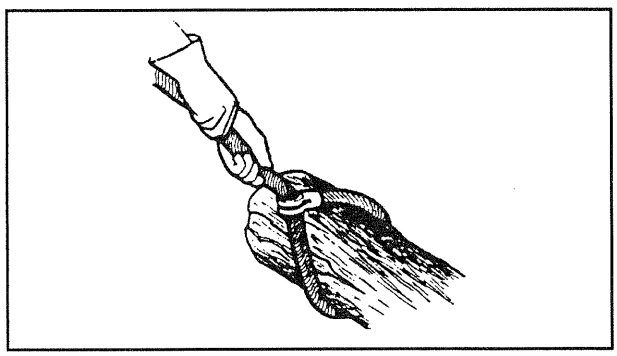
8. Bring the machine to a complete stop, put the direction control lever in the NEUTRAL position, lower the blade to the ground and apply the parking brake.

9. Put the winch control lever in the FREE-SPOOL position. Unfasten your seat belt and exit the cab.

⚠ **WARNING: NEVER ENTER OR EXIT THE CAB WHEN THE MACHINE IS MOVING.**

10. Go to the rear of the machine and pull the winch mainline and chokers from the winch drum far enough to reach the butts of the logs to be skidded.

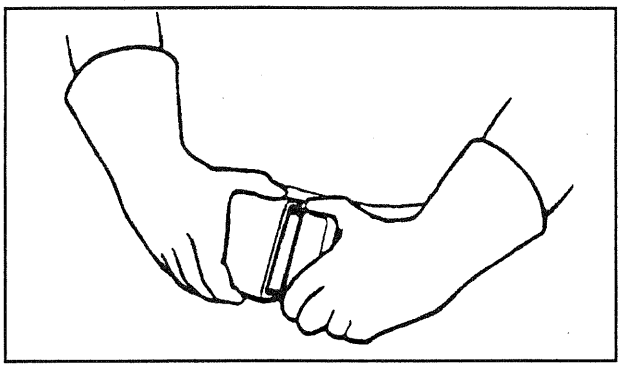
⚠ **IMPORTANT: Remember your protective work gloves when you handle winch cables.**



"Chokers"

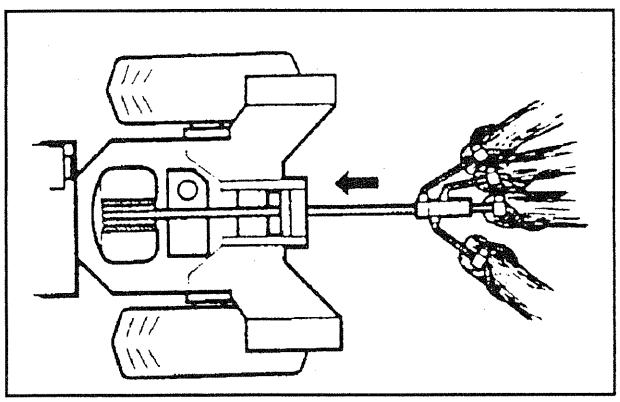
11. Attach the chokers around the butt ends of the logs approximately 24 inches (60 cm) from the ends, pulling the cables snug.

NOTE: The size and number of logs you can skid at one time will depend on the terrain and ground conditions and the size and species of the wood itself. Experience and common sense will help to know the size of load that you can most safely and efficiently skid. DO NOT OVERLOAD THE MACHINE.



"Seat Belt"

12. After all the chokers are set, remount the cab, sit in the operator's seat and fasten your seat belt.



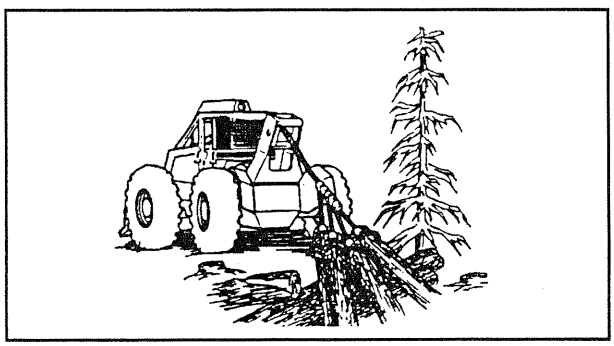
13. Before you winch the logs, make sure that the machine is pointing in the same direction as the logs so that the load can be pulled (in a straight line with the length of the machine) toward the rear of the machine. This is especially important for stability when working on a grade.

⚠ **IMPORTANT: Watch for nearby workers on the ground and warn them to stand clear.**

14. Hold the service brake applied and put the winch control lever in the WINCH-IN position to pull the load to the rear of the machine. Winch drum speed is determined by the speed the engine is running and any load on the torque converter. Increase engine speed as required to winch the load. As the logs are winched, they will bunch together. Make sure the load is tightly bunched and carefully pulled snug against the butt pan of the machine. Allow the engine to return to low idle RPM and put the winch control lever in the center HOLD position. Return to the landing.

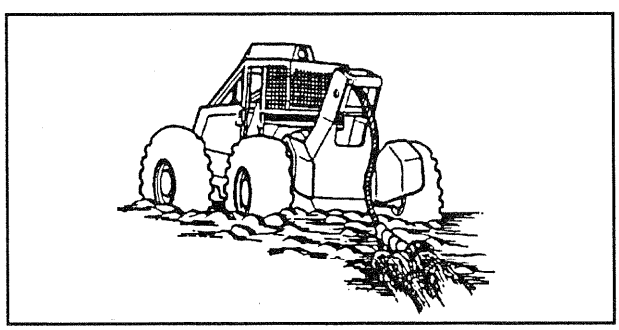
WINCHING TECHNIQUES

BUNCHING



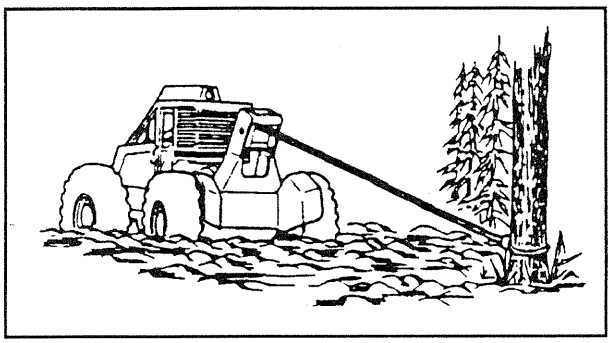
Increasing the speed of the winch can help to bunch the logs. You must use common sense to avoid snagging and breaking the cables or overturning the machine. Bunching can also be performed with the machine in motion if necessary. This can help to bunch the logs under certain conditions but will result in less power because engine power will be shared by the winch and drive axles.

DROP-WINCHING



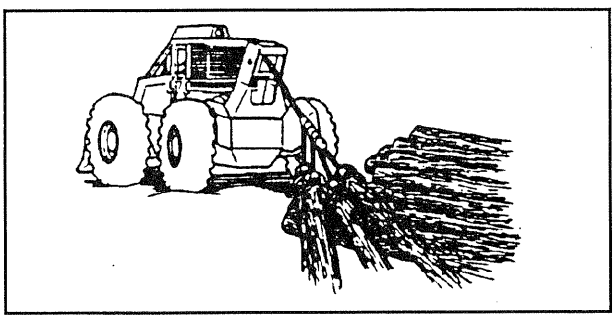
If the machine loses traction in soft or muddy ground, or because of an obstruction, quickly put the winch control lever in the FREE-SPOOL position to drop the load until the machine reaches firmer or clearer ground. Remember not to out run the length of the mainline. When you reach better conditions, winch in the load again, put the winch control lever in the HOLD position and proceed to the landing.

REVERSE-WINCHING



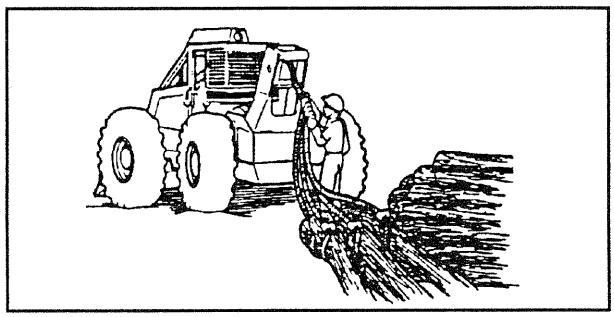
If the machine becomes stuck and cannot be freed in either direction, the winch cable can be fastened to a stationary object such as a large tree and with the transmission in reverse, winch in the cable under power to attempt to free the machine. Under certain conditions this may not be effective, depending on how badly the machine is stuck.

AT THE UNLOADING AREA

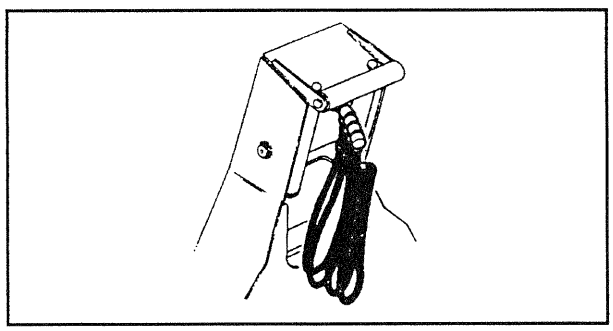


1. When you reach the landing, pull the logs onto the unloading area and put the winch control in the FREE-SPOOL position while the machine is slowly moving to drop the logs into position.

2. Put the transmission in neutral, lower the blade to the ground and apply the parking brake BEFORE you dismount the machine. Unfasten your seatbelt and exit the cab.

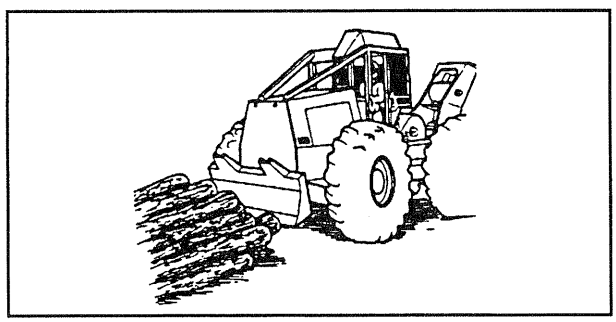


3. Pull the mainline from the cable drum so that chokers are loose enough they can be removed easily and remove all of the chokers from the logs.



"Chokers in Fairlead"

4. Remount the machine, fasten your seatbelt and winch the mainline until the chokers are on the fairlead main roller and have cleared the ground to avoid snags.



5. To make a pile and even up the log ends, release the parking brake and put the transmission in the first speed range. This will allow you to use the directional modulation feature described in the TRANSMISSION SECTION of this manual. Raise the utility blade from the ground slightly and use the blade to even and piled the logs.

OPERATING A GRAPPLE SKIDDER

⚠ **IMPORTANT: Don't try and work too fast. Know your capabilities and the capabilities of your machine. Choose a skid path that is clear of large rocks, stumps and debris that could overturn or damage the machine.**

⚠ **WARNING: NEVER ENTER OR LEAVE THE CAB WHILE THE MACHINE IS MOVING. OPERATE THE MACHINE AND ITS IMPLEMENTS FROM THE OPERATOR'S SEAT. NEVER CARRY PASSENGERS. USE CAUTION WHEN OPERATING THE MACHINE NEAR OTHER WORKERS, MACHINES AND VEHICLES. TAKE EXTRA CARE ON STEEP HILLSIDES OR NEAR CLIFFS AND WATER.**

ALWAYS USE A THREE-POINT METHOD OF MOUNTING OR DISMOUNTING THE CAB (TWO HANDS AND ONE FOOT OR TWO FEET AND ONE HAND AT ALL TIMES). NEVER JUMP FROM THE MACHINE!

1. Raise the blade high enough to clear any objects on the ground but not high enough to restrict airflow through the radiator.

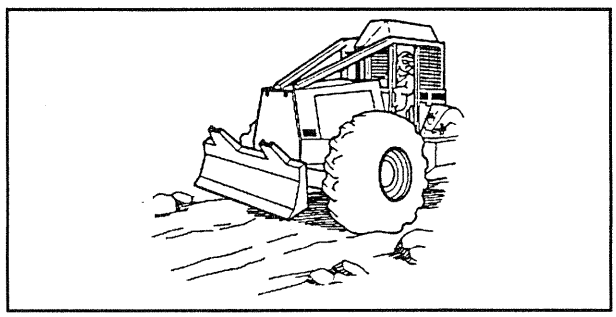
2. Put the direction control lever in the FORWARD position and choose the appropriate transmission speed range.

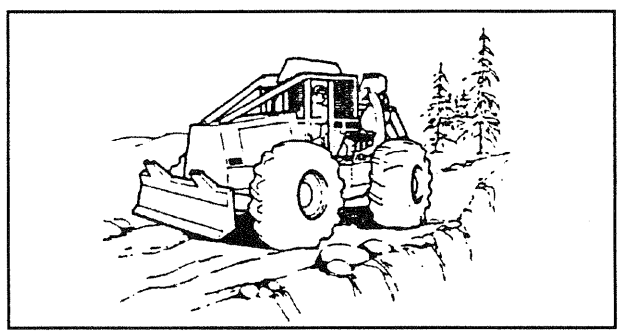
3. Release the parking brake lever and the service brake pedal.

4. Depress the accelerator pedal to put the machine in motion.

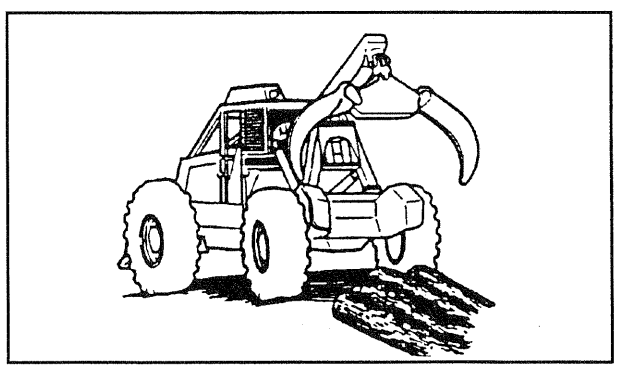
5. Check all gauges to see that all systems are operating correctly and continue to make frequent checks as you operate the machine.

6. As you travel, watch for any obstructions that could overturn or damage the machine. Check to see if there is an easier route to return to the landing. The machine will behave much differently when skidding a load, this change in mobility can make it necessary to change your return route.

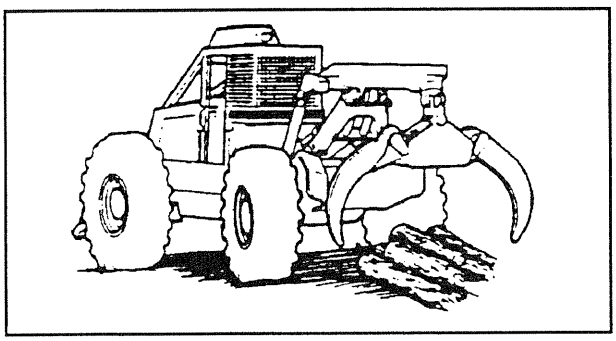




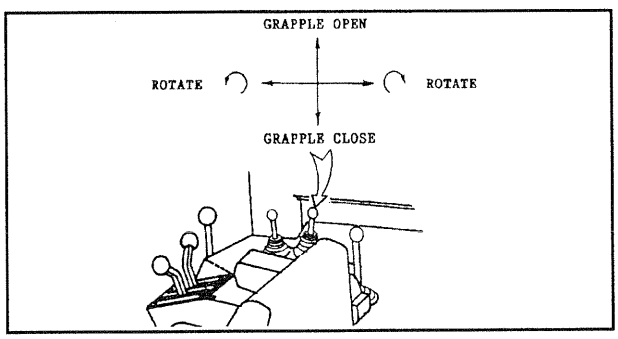
7. Back up to the log pile with the grapple fully forward, raised and open.



NOTE: The Ranger G67 Grapple Skidder is equipped with a reverse de-clutch feature (see the CAB section for operation) that disengages the transmission when the service brake pedal is depressed (in the reverse direction). This allows maximum hydraulic pump flow to the hydraulic system for faster grappling. Become familiar with the operation of the declutch before using it in hilly conditions.

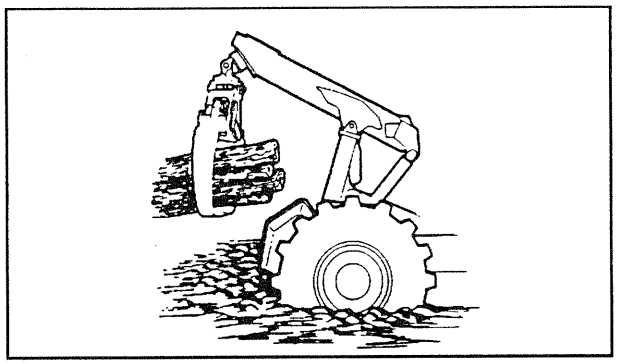


8. Lower the grapple by moving the arch back (and lowering the boom on the Parallelogram grapple skidder) so that it will pick up the logs approximately three feet (one meter) from the ends of the butts. This will help to ensure that less evenly bunched logs will not fall out when skidding.



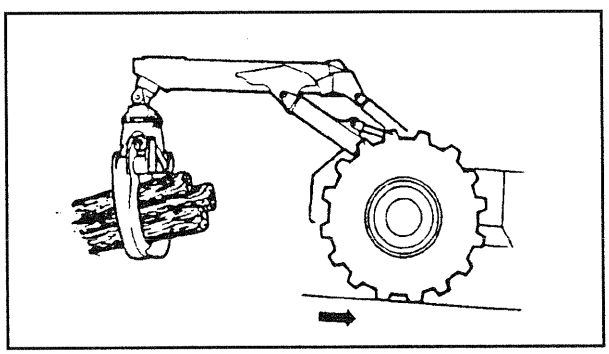
9. Put the grapple control lever in the detented CLOSE position to close the grapple around the log bunch with the transmission in neutral or the reverse declutch actuated to squeeze the load in the grapple. This will help to ensure that individual logs will not fall out when skidding. The detented CLOSE position of the grapple control valve maintains constant hydraulic pressure to the grapple cylinder(s) to compensate for the bunching of the logs as they are skidded.

NOTE: If the service brake is applied with the transmission in the NEUTRAL or REVERSE modes with the reverse de-clutch selected, when FORWARD is selected, the transmission will not engage until the service brake pedal is released.



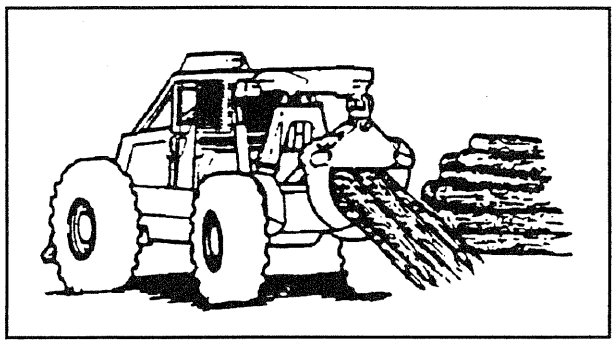
"Raised Grapple/Logs"

10. Raise the grapple (and the load) by pulling the arch fully forward (and raising the boom on the Parallelogram grapple skidder) to center the logs in the butt pan.



"Lowered Grapple/Logs"

11. Proceed to the landing. Under normal skidding conditions, the load should be centered in the butt pan. The load should be carried as low as possible when traveling down steeper grades for extra stability, especially when turning.



12. If you are to add to a pile, move along side it with the load as high as possible to pull the load onto the pile. Open the grapple fully and release the logs onto the pile. Drive away from the pile and close the grapple tynes. Lower the boom about halfway and return to the cut area.

NOTE: The Ranger G67 Grapple Skidder is equipped with a winch that can be fitted with a winch cable just as the cable skidder can. Arch fairlead rollers are also provided so that the grapple skidder can cable skid logs. Pull the arch fully forward to keep better control of the winch mainline. See the WINCHING TECHNIQUES described earlier in this section of the manual.

⚠ **IMPORTANT: Ranger Log Grapples are equipped with snubber assemblies to prevent the grapple from swinging when traveling empty. See the ATTACHMENTS section of this manual for adjustment information. See your Esco Maintenance manual for instructions on adjusting the grease snubbers on the Hi-Vis grapple assembly.**

PARKING THE MACHINE

The machine can be brought to a complete stop regardless of the transmission mode selected. Remove your foot from the accelerator pedal, depress the service brake pedal, and bring the machine to a complete stop on level ground. Put the transmission control lever in the NEUTRAL position, and apply the parking brake. Lower the blade and log grapple to the ground. Allow the engine to run at low idle RPM for approximately 5 minutes to allow it to cool down. Turn the ignition switch to the OFF position and remove the key from the switch. Turn the battery disconnect switch to the OFF position and close the fuel shutoff valve. Lock the cab doors.

⚠ **IMPORTANT: Machines should be parked far enough apart that if a fire should start on one, it will not spread to other machines.**

LONG TERM STORAGE

Observe the previous instructions for PARKING THE MACHINE. Check all fluid levels, adding fluid as required. Engine system fluids should be changed at this time. Check the freezing point of the anti-freeze coolant and adjust it as required by the prevailing ambient temperatures. Thoroughly clean the machine and do paint touch-ups as required to prevent rust. Cover the muffler opening. Fill the fuel tank and the hydraulic reservoir to prevent rusting of the tops and sides of the tanks. Apply grease to exposed and unpainted cylinder rods, driveshaft splines, valve spools and linkages. Apply anti-rust spray to exposed pin ends and bolt heads. DO NOT use grease, oil or anti-rust spray around the dry grapple snubber friction plates. Disconnect the battery ground cables and thoroughly clean the outsides of the batteries. Check the tire pressures, adding air as required. Check for any signs of fluid leaks and make repairs as required. Thoroughly grease all lubrication points. Check the air cleaner and connections for leaks and check the condition of the fan and fan belt. Remove the ignition key and close and lock the cab doors. Store the machine in a position that will allow forward and reverse movement for maintenance every 30 days of storage.

EVERY 30 DAYS OF STORAGE

Check the air cleaner and connections for leaks and check the condition of the fan and fan belt. Check all fluid levels, adding fluid as required. Check the tire pressures. Reconnect the battery ground cables and turn the battery disconnect switch to the ON position. Make sure the batteries are fully charged (see the ELECTRICAL SYSTEM section of this manual). Remove any hardened grease on cylinder rods. Remove the cover from the muffler. Start the engine and bring it to operating temperature (see STARTING AND OPERATING THE MACHINE earlier in this section). Release the parking brake and check the operation of the service brakes. Operate the machine, in both directions and all speed ranges at least one complete tire revolution. Cycle all hydraulic implements and operate the winch in all modes. Run the engine at low idle RPM for three minutes, shut down the engine and return the machine to storage as instructed above.

TRANSPORTING THE MACHINE

Always load and unload the machine on a level, non-slippery surface. Use adequate chains, blocks and cables to securely fasten the machine on the trailer no matter how short the distance to be transported. Measure the overall height, width and weight of the loaded trailer and the truck driver should have this information in his possession. Use extreme caution if you must transport the machine in foggy, dusty or stormy conditions. Know the laws that are in force regarding the transportation of heavy equipment in your area.

MOVING DISABLED MACHINES

⚠ **IMPORTANT: THE ENGINE CANNOT BE STARTED BY TOWING THE MACHINE. ATTEMPTING THIS CAN CAUSE SERIOUS DAMAGE TO THE TRANSMISSION.**

Without the engine running to drive the torque converter charging pump, the transmission will receive no lubrication if it is driven by the wheels. In any case, the torque converter fluid coupling to the engine flywheel will not turn the engine over. If the machine must be towed, remove the transmission to front axle driveshaft and the transmission to mid-mount brake driveshaft. Note that this will render the driveline brakes inoperative. Fasten the steering frame lock between the front and rear frames and use a solid tow bar or raise one end of the machine. With the engine inoperative, their will be no steering. Indicate that the frames are locked by tying a red warning flag to the steering wheel. When you reinstall the driveshafts, use only the special bolts provided and tighten them to the specified torque.

ATTACHMENTS

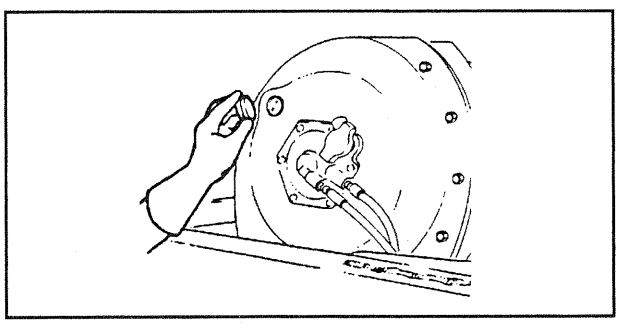
ATTACHMENTS

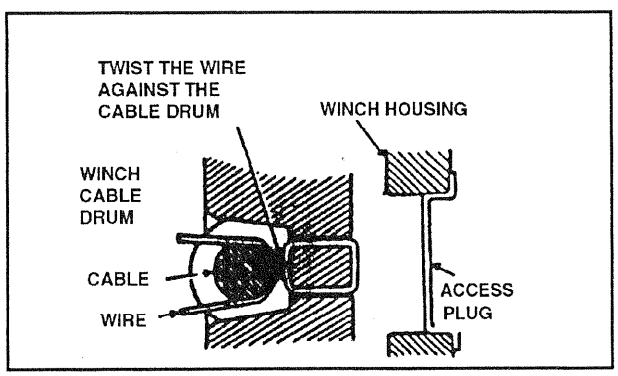
WINCH

INSTALLING THE WINCH MAINLINE

⚠ **IMPORTANT: Installing the winch mainline as follows will provide a safety break-away feature. If the load should fall down a hillside, the operator should IMMEDIATELY put the winch control lever in the FREE-SPOOL position. This will allow the cable to unwind freely from the cable drum and break away from the winch, preventing the machine from being pulled over.**

1. Start the engine and rotate the winch cable drum so that the cable and ferrule groove in the inside, left hand wall of the drum is at the top and shut down the engine.

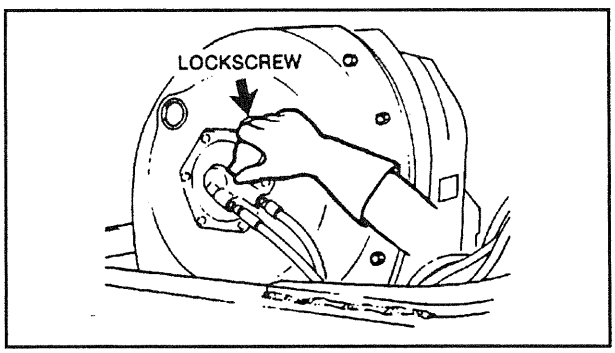




2. Remove the cable retainer plate cap screws and retainer plate from the cable drum.
3. Insert the cable ferrule into the groove in the drum and hold the cable against the drum.
4. Install the retainer plate and cap screws to hold the cable in place.
5. Start the engine and winch in the cable onto the drum.

ADJUSTING THE WINCH FREE-SPOOL TENSION

The drag on the cable drum can be adjusted to increase or decrease the effort required to pull the cable from the drum in the FREE-SPOOL mode. A lesser tension will make it easier to pull the cable but may not allow enough cable control and too much can spool out. Increasing the tension will better control the cable but will require more effort to pull the cable. Adjust the drag to suit the operator's preference as follows:



"Free-Spool Adjustment" - Remove "Lockscrew"

1. Loosen the setscrew at the top of the free-spool adjusting knob on the right hand side of the winch.
2. Tighten the knob to increase the free-spool drag or loosen it to decrease the tension.
3. Tighten the setscrew to maintain the adjustment.

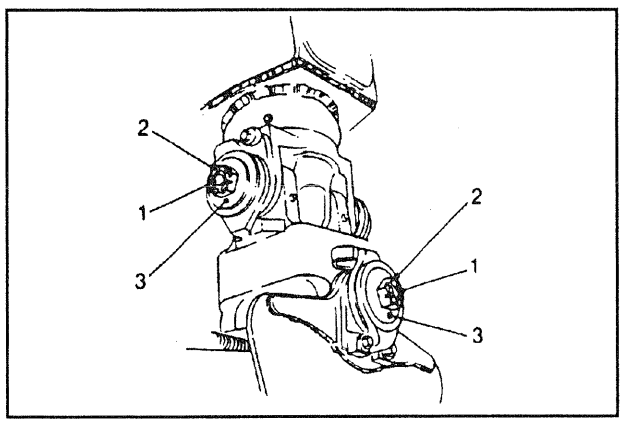
NOTE: The winch shares a hydraulic fluid system with the transmission and torque converter. It uses hydraulically actuated clutches in FREE-SPOOL and WINCH-IN modes and a hydraulically applied pinion brake which utilize regulated transmission clutch pressure. See the TRANSMISSION / TORQUE CONVERTER section of this manual for system service and pressure check information.

RANGER 105 INCH LOG GRAPPLE

CHECKING AND ADJUSTING THE GRAPPLE SNUBBERS

Ranger log grapples are equipped with snubbers to prevent them from swinging freely when traveling without a load. Check their operation at the beginning of each work shift as follows:

With the grapple tynes raised enough to clear the ground, pull back on the grapple approximately twelve inches (30 cm) and release it. It should stop just before the bottom of its swing. If the grapple swings farther than this, adjust the snubbers as follows:



1. Remove the cotter pins from the top snubber adjusting nuts and tighten the castle nuts (on both sides equally) to a torque of 35 to 40 foot pounds (45 to 55 N.m).

NOTE: Overtightening the snubber nuts will cause the snubber pins to break. Slight increases or decreases in snubber tension may be desired for certain operating conditions. In these cases, each snubber pair should be tightened to the same torque.

2. Recheck the swing and install the cotter pins. It may be necessary to loosen the castle nut(s) slightly to locate the cotter pin hole in the snubber pin(s).

3. Check the adjustment of the lower snubbers by pulling the grapple twelve inches (30 cm) to each side and releasing it. The lower snubbers are adjusted the same way as the top.

NOTE: Keep oil and grease away from the snubber discs so they will work at maximum efficiency.

NOTE: See your Esco grapple Maintenance Manual for information on adjusting the Esco Hi-Vis grease snubbers.

ENGINE SYSTEM

ENGINE SYSTEM

ENGINE

Make . . . . . Cummins Diesel

Model 6BTA-5.9

Configuration . . . . . Inline Six Cylinder, Turbocharged, Aftercooled

Gross Power @ 2500 RPM . . . 177 hp (132 kW)

Maximum Torque @ 1500 RPM . . . . 447 lbf.ft (605 N.m)

Bore . . . . . 4.02 in (102 mm)

Stroke . . . . . 4.72 in (120 mm)

Displacement . . . . . 359 cu.in (5.9 liter)

Low Idle RPM . . . . . 700 to 750

High Free Idle RPM . . . . . 2650 to 2750

Oil Pressure @ Low Idle . . . . . 10 to 30 PSI (0.7 to 2 bar)

Oil Pressure @ Operating RPM . . . 30 to 60 PSI (2 to 4 bar)

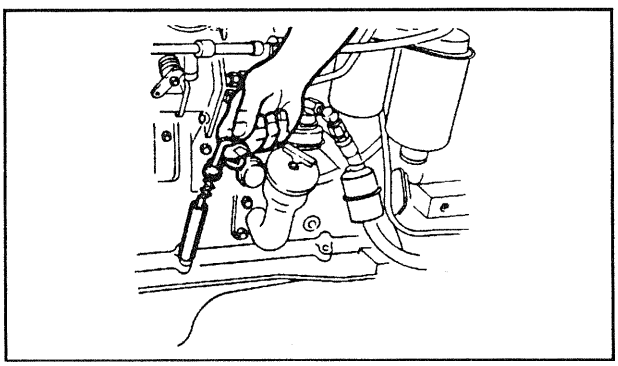
Standard Fan . 28 in (711 mm) dia. Blower Type

Radiator . . . . . Inline Core Type

Air Cleaner . . . . Dry Type with Safety Element and Restriction Indicator

CHECKING ENGINE OIL LEVEL

⚠ **WARNING: Be careful if the engine is hot. Hot oil can cause severe burns.**



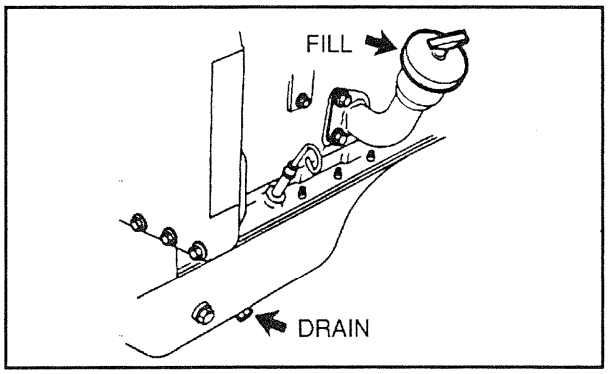
"Checking Engine Oil Level"

Check the oil level daily. The level should be between the "H" (High) and "L" (Low) marks on the dipstick. Add oil as required. See your Cummins Engine Operation and Maintenance Manual for the recommended engine oil for your ambient operating temperature.

CHANGING ENGINE OIL

See your Cummins Engine Operation and Maintenance Manual for the recommended oil and filter change intervals and recommended engine oils. Oil changes should be done with the engine system at its operating temperature. Hot oil drains more freely and carries more contaminants with it.

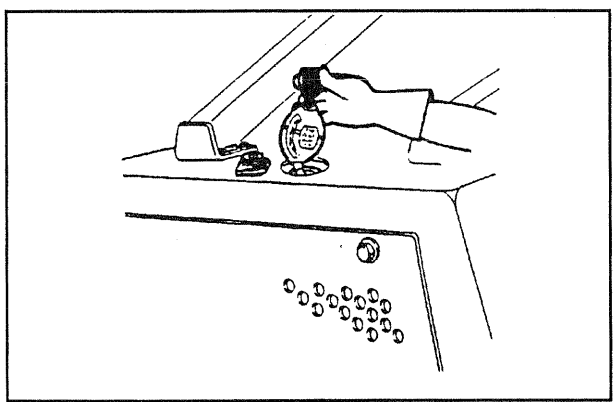
⚠ **WARNING: Be careful removing the oil drain plug from the engine. Hot oil can cause severe burns.**



"Engine Drain/Fill"

1. Open the drain valve on the bottom of the engine oil pan and drain the oil into a suitable container. The engine lube oil capacity is 4.4 U.S. gallons (16 liters). Dispose of the used oil properly.
2. Remove the engine lube oil filter, dispose of it properly, and replace it with a new one as specified in your Ranger G67 Parts Manual.
3. Close the oil pan drain valve and refill the engine crankcase with to the correct level on the dipstick.

COOLING SYSTEM



"Anti-Freeze Tester"

The engine cooling system is factory-filled with a high quality 50% antifreeze and 50% water solution, containing a chemical inhibitor (Specification WSN-M97B18-D). This inhibitor increases and extends the protection offered by the additives already present in the coolant. It provides increased rust prevention, reduced scale formation, minimized cylinder pitting and reduced coolant foaming. If ambient temperatures below freezing are expected, the freezing point of the coolant should be checked with an antifreeze tester and adjustments should be made as required.

CHECKING THE COOLANT LEVEL

The coolant level should be checked daily at the radiator filler cap. The coolant level must visible at engine operating temperature. Add coolant as required.

⚠ **WARNING: The cooling system is pressurized and their is a risk of scalding when removing the cap. Remove the cap slowly using protective work gloves. Avoid contact with the skin and eyes, wear safety glasses. In case of contact, flush eyes with water for at least 15 minutes, wash skin with soap and water. Antifreeze coolant is poison. Keep out of reach of children.**

COOLING SYSTEM MAINTENANCE

With the engine shut down, check the cooling system hoses and clamps. Replace any worn or cracked hoses. Tighten any loose clamps. Do not overtighten. Check the radiator core for leaks and fin damage. Check for gasket leaks at the top and bottom tanks.

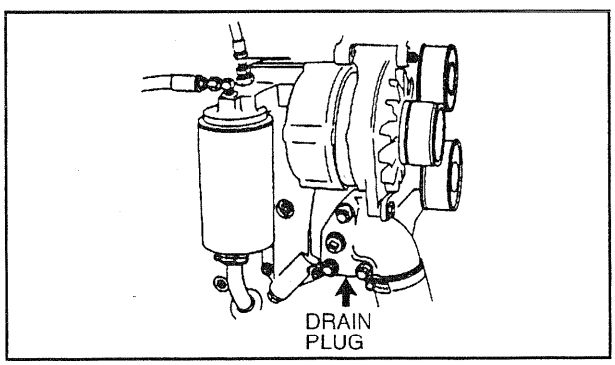
Clean the radiator core daily to prevent engine overheating caused by reduced airflow through the core. Also, it is important to keep the hydraulic oil cooler in front of the radiator clean to maintain air flow through the cooler and the radiator core. Remove the top grill mounting bolts and lower the grill until it rests on top of the utility blade. Remove as much debris as possible by hand from the radiator and then use a pressure washer (or fire hose), in the opposite direction to the airflow, to clean the core. Direct the water through the front of the radiator when the standard blower fan is installed and through the rear of the radiator for the optional suction fan.

⚠ **IMPORTANT: Take care not to damage the radiator core while cleaning.**

CHANGING THE COOLANT

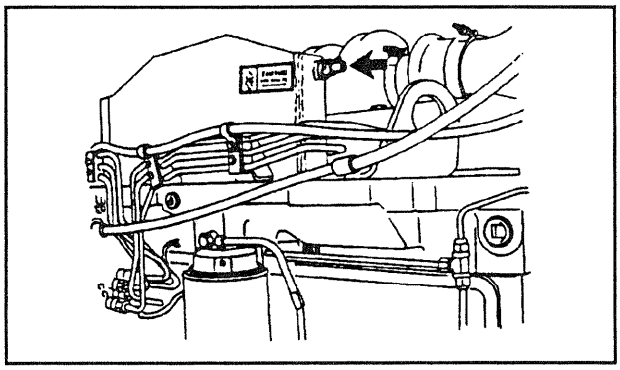
The chemical inhibitor in the antifreeze coolant gradually weakens as it works. Flush the cooling system and change the coolant every 1000 hours of operation as follows to ensure maximum engine protection and to prevent clogging of the engine cooling passages. This should be done when the engine is cool.

1. Slowly remove the radiator cap.
2. Open the drain cock at the bottom of the radiator and drain the old coolant into a suitable container. The cooling system has a capacity of 12 U.S. gallons (45 liters).



"Drain Plug on Elbow"

3. Remove the drain plug from the bottom of the coolant inlet elbow on the right hand side of the engine.



"After-Cooler Drain Cock"

4. Open the bleeder cock on the rear of the engine aftercooler.

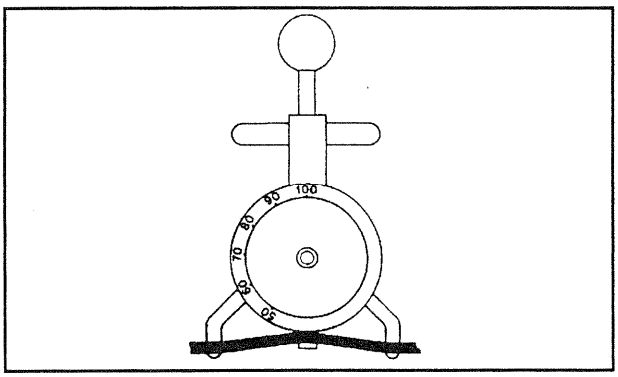
NOTE: See the Cummins Engine Operation and Service Manual for their recommended cooling system flushing instructions.

5. Flush the cooling system by running clean water through it.
6. Close the radiator drain cock and install the drain plug in the coolant inlet elbow BUT LEAVE THE AFTERCOOLER BLEEDER COCK OPEN.
7. Add antifreeze coolant to the radiator filler neck until the level reaches the correct level and close the aftercooler bleeder cock when a continuous flow of air-free coolant flows from it and then close the bleeder cock.
8. Pressure test the cooling system and the radiator pressure cap to ensure there are no leaks. The cooling system is pressurized to 15 PSI (1 bar).
9. Start the engine and add coolant until the level in the radiator is correct.

⚠ **IMPORTANT: DO NOT add cold coolant to a hot engine. Serious damage to the cylinder head and engine block can occur.**

10. Check the coolant level when the engine reaches its operating temperature.

FAN BELT



"Belt Tension Gauge"

Make regular checks of the fan belt for looseness and wear. Replace the belt if it shows signs of wear or damage. The Cummins engine comes equipped with an automatic fan belt tensioner but the tension should be checked every 1000 hours of operation or if the belt appears loose. Use a belt tension gauge to ensure that the tensioner is working properly. See your Cummins Engine Operation and Maintenance Manual.

AIR CLEANER

The air cleaner is critical to the life of the engine, it prevents dust and debris from entering the engine air intake system causing premature engine wear and possible failure. A two-stage, dry type air cleaner is used on all Ranger Log Skidders. Air passes through the outer, primary filter element and then through the inner, safety element. NEVER operate the engine with only one of these elements installed, BOTH are required to fully protect the engine from contamination. Service the air cleaner and its connections regularly as follows:

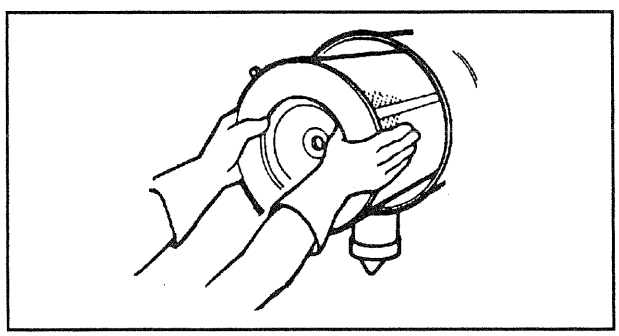
AIR CLEANER CONNECTIONS

Check the intake tubes between the air cleaner outlet and the turbocharger for cracks or wear and check that all clamps are in place and tight. Replace any worn or damaged tubes and tighten any loose clamps.

SERVICING THE AIR CLEANER

A rubber air cleaner housing evacuator is installed on the bottom of the air cleaner to allow daily removal of debris from the air cleaner. Squeeze the evacuator to allow the debris to fall out. An indicator located on the instrument dash panel is provided to alert the operator that the air filter elements are plugged and in need of service. Air cleaner service requirements will vary greatly with your operating conditions. In extremely dusty conditions, this gauge should be constantly monitored, as frequent air cleaner service will be necessary.

1. Loosen the wing nut in the center of the air cleaner end cap and remove the end cap.



2. Remove the outer, primary air filter element and clean the inside of the air cleaner hosing thoroughly. Remove the evacuator and clean the evacuator tube and the evacuator.

⚠ **IMPORTANT: DO NOT remove the inner, safety element UNLESS you are replacing it. It should be replaced each time the primary element is changed for the third time. The safety element should not be cleaned or disturbed in any way.**

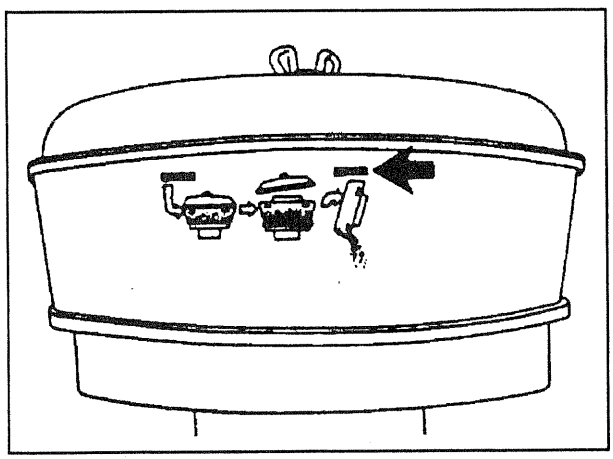
3. Examine the primary filter element. If dust is present on the inside surface, or if it shows signs of damage, it MUST be replaced.

4. Blow compressed air through the element, from the inside outward, to remove any particles from the element.

5. Wash the primary element in a non-sudsing detergent for approximately fifteen minutes and then rinse the element with warm tap water from the inside outward until the water that passes through the element is clear.

6. Allow the primary element to air dry then examine its condition using a bright light, shining through the element from the inside outward. If any signs of pit holes, pleat ruptures or thin spots are found, the element MUST be replaced.

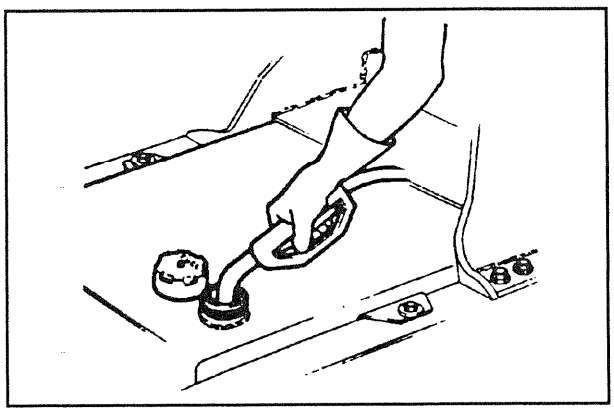
SERVICING THE OPTIONAL AIR PRE-CLEANER



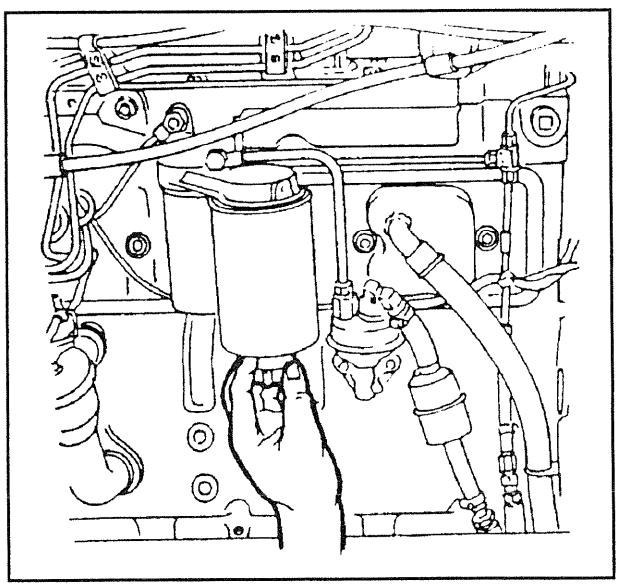
"Pre-Cleaner"

When the level of debris in the pre-cleaner bowl reaches the full line, remove the pre-cleaner, empty it and reinstall the bowl.

FUEL SYSTEM



"Refuelling"



"Draining Fuel Filter"

Clean fuel is essential for trouble-free operation of the engine. Clean the area around the fuel tank filler cap before you remove it. Avoid spilling fuel when refueling to reduce the risk of fire and the buildup of dirt. Fill the fuel tank at the end of each work shift to inhibit condensation in the tank. Make sure the vent hole in the filler cap is clear of debris. Open the

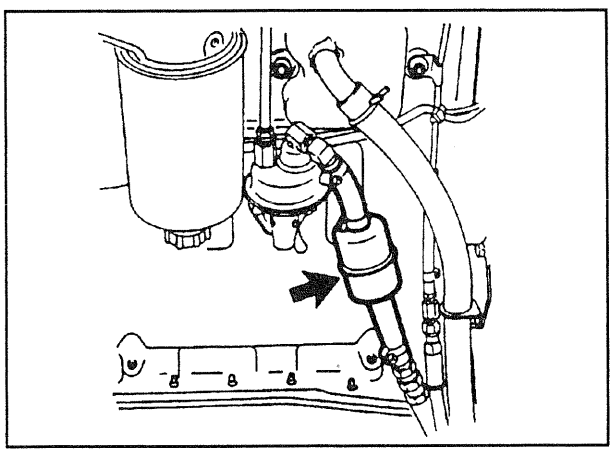
drain cock on the bottom of the fuel tank weekly, drain any water and sediment into a suitable container, and dispose of it safely. Likewise, drain any water and sediment from the engine fuel/water separator on the left hand side of the engine at the beginning of each work shift.

⚠ **WARNING:**
DO NOT SMOKE while refueling!

Use a quality brand of No. 2 diesel fuel (with a minimum cetane rating of 40). At very low ambient temperatures, and/or at high altitudes, a fuel with a higher cetane rating should be used.

⚠ **WARNING: NEVER add gasoline, gasohol or dieselhol (a mixture of diesel fuel and alcohol) to diesel fuel. These mixtures are more explosive than pure gasoline in an enclosed container such as a fuel tank. There is a great risk of fire and explosion. In addition, dieselhol does not provide adequate lubrication of the fuel injection system.**

SERVICING THE FUEL FILTERS



"Fuel Strainer Screens"

Remove the inline fuel strainer at the fuel lift pump inlet and remove any build-up of debris. Do not use compressed air as this can damage the fine screen. Tap the strainer on a hard surface to dislodge any particles and flush the screen with diesel fuel opposite to the direction of fuel flow. If the screen is damaged or heavily contaminated, it should be replaced to prevent damage to the lift pump. Install the strainer in the correct flow direction and tighten the clamps.

See your Cummins Engine Operation and Maintenance Manual for instructions on replacing the engine fuel filters.

CHECKING ENGINE PERFORMANCE

Engine performance should be checked every 250 hours of operation to verify that the engine and torque converter are operating efficiently.

Check the Low Idle RPM with the engine at its operating temperature and no load on the engine. Use a photo-tachometer for accurate results. The acceptable value is 700 to 750 RPM. Check the High Free Idle RPM under the same conditions. The acceptable value is 2650 to 2750 RPM.

Check the torque converter stall RPM with the engine and the torque converter at their operating temperatures. With the blade lowered, the transmission in FORWARD and THIRD modes, the parking brake OFF, and the service brake fully applied, accelerate the engine to full throttle. The acceptable converter stall value is 2280 to 2400 RPM.

⚠ **IMPORTANT: DO NOT hold the engine/converter in this stall condition for more than 30 seconds or if the converter oil temperature gauge enters the red zone. SERIOUS DAMAGE to the torque converter can result.**

NOTE: If any of the above checks are not within the acceptable ranges, further troubleshooting will be required.

CHECK AND ADJUST THE THROTTLE CONTROL LINKAGE

The accelerator pedal must be free to travel through Low and High Idle positions with no binding in the linkage and be able to return freely to Low Idle RPM when the pedal is released. If the throttle lever is not halfway through the breakover position with the accelerator pedal fully depressed, adjust the linkage as follows:

1. Unhook the throttle return spring from the throttle lever on the fuel injection pump.
2. Disconnect the ball joint from the engine throttle lever.
3. With the accelerator fully depressed, and the throttle lever halfway through the break-over travel, adjust the ball joint so it is aligned with the hole in the throttle lever with no force applied.
4. If the cable adjustment cannot be made, reposition the cable using the outer cable adjusting nuts.

ELECTRICAL

ELECTRICAL SYSTEM

CHECKING THE BATTERIES

Two maintenance-free batteries are located under the floorboard on the right hand side of the transmission. They are connected in parallel in a twelve volt, negative ground system.

⚠ **WARNING: Lead-acid batteries generate highly flammable hydrogen gas. A spark or flame can cause a violent explosion causing acid to spray and the battery to fragment. Serious injury can result. Battery acid is highly corrosive, keep away from skin and eyes. Always wear protective eyewear when servicing the batteries.**

ANTIDOTE: INTERNAL - Drink large quantities of water or milk followed by milk of magnesia, beaten egg or vegetable oil ... CALL PHYSICIAN IMMEDIATELY. EYES - Flush with water for at least fifteen minutes and consult a physician. EXTERNAL - Flush with water.

Check to see that the battery cable terminals and the battery posts are clean, tight, and coated with an anti-corrosive dressing. Replaced damaged parts as required. When removing or installing batteries, the battery disconnect switch must be in the OFF position.

IN FREEZING WEATHER

It is important to keep the batteries fully charged. Discharged batteries will freeze and the electrolyte will expand, causing the battery to rupture. Add distilled water to a battery only if it is to be immediately recharged to prevent it from freezing.

⚠ **WARNING: NEVER attempt to charge or load test a frozen battery. It can explode. Allow the battery to warm to 60°F (16°C) before charging.**

TESTING THE BATTERIES' STATE OF CHARGE

⚠ **WARNING: Shorting the battery terminals with a metal object to test the state of charge can spark and the battery can explode.**

Disconnect the battery ground terminals and use a digital voltmeter to test each battery's state of charge. See the following chart:

VOLTAGE	STATE OF CHARGE
12.60	100%
12.40	75%
12.20	50%
12.00	25%

CHARGING THE BATTERIES

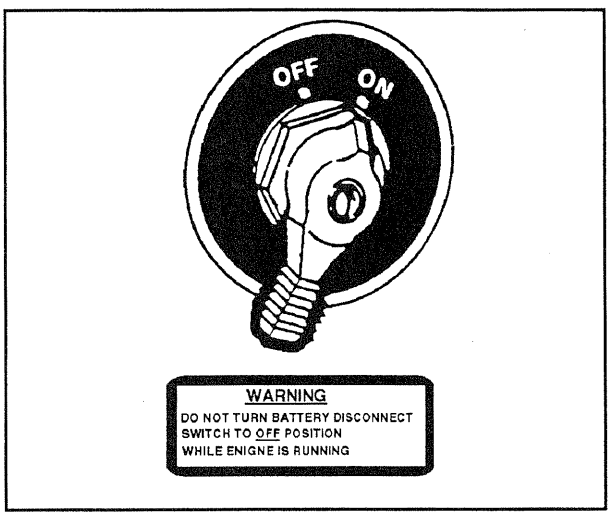
⚠ **WARNING: Charging batteries generates explosive gases. A spark or flame can cause a serious explosion. Provide good ventilation, especially when charging batteries indoors. Make sure that the battery charger is turned OFF before you make connections to the battery. Make sure that the positive (+) lead on the charger is connected to the positive (+) battery post and that the negative (-) lead on the charger is connected to the negative (-) battery post. NEVER let the battery temperature exceed 125°F (52°C). NEVER allow fluid to be expelled from the battery. If either condition occurs, stop charging for twenty minutes and then resume charging at a lower amperage. High temperature will impede a battery's ability to hold a charge.**

STARTING THE MACHINE WITH AUXILIARY BATTERIES

Do not connect jumper cables to the battery terminals of the machine to be jump started. Connect the positive jumper cable to the positive starter terminal and connect the negative jumper cable to the machine frame.

⚠ **WARNING: Failure to follow this procedure can result in personal injury and/or damage to the electrical system.**

BATTERY DISCONNECT SWITCH



Battery Disconnect Switch

NEVER turn the battery disconnect switch to the OFF position with the engine running. Damage to the electrical system can result. The battery switch is not sufficient to protect the batteries from damage when arc-welding, the battery cables should be disconnected as well.

CHECKING THE NEUTRAL START SWITCH

The ignition switch should only actuate the engine starter motor with the transmission in NEUTRAL. If the starter can be actuated in either FORWARD or REVERSE, replace the neutral start switch.

TRANSMISSION SYSTEM

TRANSMISSION / TORQUE CONVERTER SYSTEM

The Ranger G67 Log Skidder utilizes a Clark, full-reversing powershift transmission with directional modulation provided in the FIRST speed range, and a separate, engine-mounted, offset drive Clark torque converter.

⚠**IMPORTANT: Full power directional changes in the SECOND or THIRD speed ranges are not recommended. Damage to the transmission can result.**

HYDRAULIC SYSTEM

The fluid in the transmission/converter/winch hydraulic system serves several purposes. It lubricates and cools the transmission, torque converter and winch and it transmits power through the torque converter.

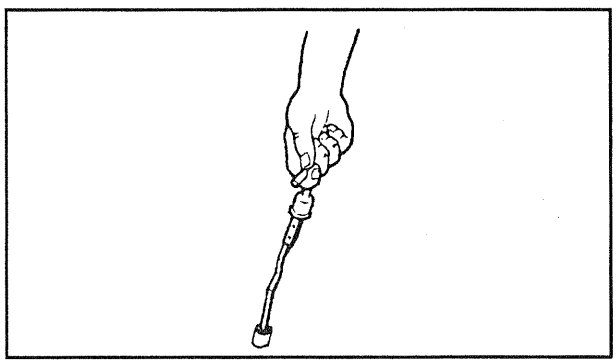
Fluid level and cleanliness is important to the service life of these components and to their efficient operation. Too low a fluid level can result in power loss and component damage due to lack of lubrication. Too high a fluid level can result in foaming and system overheating. Fluid contamination can cause premature component failure. For these reasons, daily fluid level checks and oil and filter changes at recommended intervals are a must.

NOTE: Operating in very steep conditions may require a higher transmission oil level to prevent power loss. Under these conditions, add one U.S. gallon (4 liters) to the full level on the dipstick.

SYSTEM WARM-UP PROCEDURE

Firmly block the tires and hold the service brake pedal firmly applied. Release the parking brake lever (to release the de-clutch), and put the transmission in FORWARD and THIRD modes. Operate the engine at two-thirds throttle until the torque converter temperature gauge reaches the system operating temperature of 180°F to 200°F (82°C to 93°C).

CHECKING FLUID LEVEL



Check the fluid level in the transmission/converter/winch hydraulic system daily with the machine on level ground for accuracy. The engine has to be running at low idle RPM for this check but the transmission must be in neutral, the parking brake must be applied, and the blade must be lowered to the ground. The fluid must be between the marks on the dipstick with the fluid at its operating temperature - see SYSTEM WARM-UP PROCEDURE above. Add the recommended fluid through the winch vent hole as required - see NOTE: above for further fluid level information.

NOTE: Be careful not to introduce contamination to the system. Use a clean fluid container and funnel. Clean the fill area to keep debris from entering.

CHANGING THE FLUID IN THE SYSTEM

Change the fluid in the transmission/converter/winch hydraulic system every 1000 hours of operation with the oil at its operating temperature. This is also necessary in the event of a component or converter charging pump failure.

1. Remove the plug at the bottom of the transmission case, and drain the fluid into a suitable container and dispose of it properly. The system capacity is 10.5 U.S. gallons (40 liters).

2. Remove the transmission filter and dispose of it properly.

⚠ **WARNING: Be careful working with hot fluids. They can cause severe burns.**

3. Remove the transmission suction screen from the bottom of the transmission case, clean it thoroughly and inspect it for damage.

4. Replace the suction screen (with a new one if necessary) using a new gasket.

5. Install a new transmission filter - see CHANGING THE TRANSMISSION FILTER below.

6. Disconnect the oil cooler return hose at the oil cooler and connect a hose to the cooler port that can be directed into a suitable container with a capacity of at least 10.5 U.S. gallons (40 liters).

7. Overfill the system to the transmission breather level.

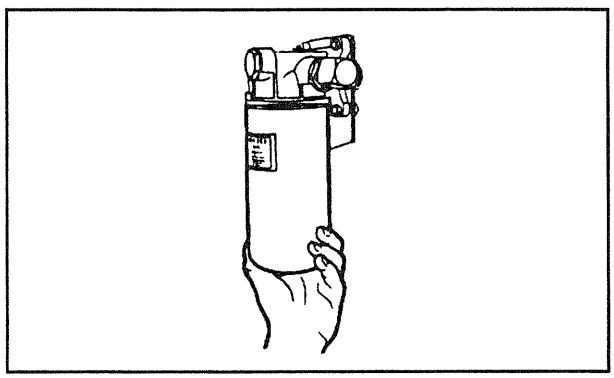
8. Start the engine and run it at low idle RPM until clean oil flows from the return hose. Shut down the engine and reconnect the return hose. Dispose of the flushed fluid properly.

⚠ **IMPORTANT: Shut down the engine immediately if oil stops flowing from the return hose or damage to the system can result.**

9. Add fluid to bring the oil level to the LOW line on the dipstick. Start the engine and recheck the level, again adding fluid to bring the level to the LOW line. When the system has reached its operating temperature, again recheck the level and bring it to the FULL line on the dipstick.

10. Check the system for leaks, making required corrections and clean up any spilled fluid.

CHANGING THE TRANSMISSION FILTER



Change the transmission/converter/winch hydraulic filter after the first 50 hours of operation of a new machine and every 250 hours of operation thereafter (four filter changes for every fluid change). The filter is located behind the right hand rear engine side panel. Apply a thin coat of clean transmission fluid to the gasket of the new filter and tighten the filter. Start and operate the engine for five minutes at 1500 RPM and check the top of the filter for leaks. If a leak is found, remove and replace the filter, further tightening will not likely correct the problem.

NOTE: These recommended service intervals are for normal duty-cycle and environmental conditions. Severe or sustained high temperatures and/or extremely dusty operating conditions will necessitate more frequent fluid and filter changes.

SYSTEM VENT AND BREATHERS

Every 250 hours of operation, the breather on top of the transmission, and the vents on top of the torque converter and winch, should be removed, cleaned in

solvent. Inspect them for damaged or missing parts and reinstall them.

CHECKING TRANSMISSION/TORQUE CONVERTER PRESSURES

NOTE: The service brake pedal must be released to obtain accurate pressure readings and the system must be at its operating temperature. Disconnect the ground wire from the parking brake declutch switch on the parking brake handle and ensure the parking brake lever is applied.

Check the torque converter IN and OUT and the system lube pressure with a 150 PSI (10 bar) capacity gauge. The converter pressure ports are located on the diagnostic panel under the left hand floorboard. The maximum acceptable torque converter IN pressure is 120 PSI (8.3 bar) at maximum engine RPM. The minimum acceptable torque converter OUT pressure is 25 PSI (1.7 bar) at 2000 RPM and the maximum converter OUT pressure is 70 PSI (4.8 bar) at maximum RPM. The maximum acceptable system lube pressure is 25 PSI (1.7 bar) at maximum RPM.

Check the transmission and winch clutch pressures with a 300 PSI (20.7 bar) capacity gauge. The clutch pressure ports are also located on the diagnostic panel.

NOTE: It is imperative that the SAME pressure gauge be used for ALL clutch pressure checks to ensure accuracy. Different gauges are likely to yield differing readings, and the allowable clutch pressure variance is small.

REGULATED clutch pressure should be between 240 PSI and 300 PSI (16.5 and 20.7 bar) at low idle RPM. Regulated clutch pressure must be checked in all transmission speed ranges AS WELL AS in winch FREE-SPOOL, WINCH-IN and HOLD positions to be meaningful. There should be no more that 5 PSI (0.34 bar) difference between the highest and lowest the readings.

FORWARD and REVERSE clutch pressures are checked at separate ports because of the effect of directional modulation. The clutch pressure specification is the same as for regulated clutch pressure (using the same gauge). Directional clutch pressures can be as much as 30 PSI (2 bar) below regulated clutch pressure.

NOTE: There will be a delay of about two seconds before full directional clutch pressure is shown on the gauge due to the action of the directional modulation.

Reconnect the ground cable to the parking brake declutch.

NOTE: If any of the transmission, torque converter, or winch pressures are not within the above specifications, further troubleshooting will be required.

DRIVE AXLES

The Ranger G67 Log Skidder utilizes an all wheel drive Clark powertrain. The front and rear drive axles employ outboard planetary hubs and NoSpin differentials. Remote-mounted axle breathers are provided to keep water from entering the axles in swampy conditions. Double sealed input flanges and metallic face hub seals also help to provide protection from contamination.

CHECKING AXLE LUBRICANT LEVELS

The lubricant levels in the front and rear drive axles should be checked every 50 hours of operation, with the machine on level ground for accuracy. The axle housing levels are checked at the plug beside the differential. The planetary hub check plugs are located at the outside of each planetary hub. The arrow on each planetary hub should point straight down for accurate level readings. Oil levels should be up to the bottom of each check plug hole. Add lubricant as required.

NOTE: **The lubricant level will equalize between the planetary hubs and the axle/differential housing so for routine level checks, the lubricant level in the differential housings will be the same as the levels in the planetary hubs. When the axles are refilled, however, the axle housings and planetary hubs should be filled and checked individually because the lubricant level will take a long time to equalize and incomplete refilling and/or inaccurate levels will result if checked at only one or two locations.**

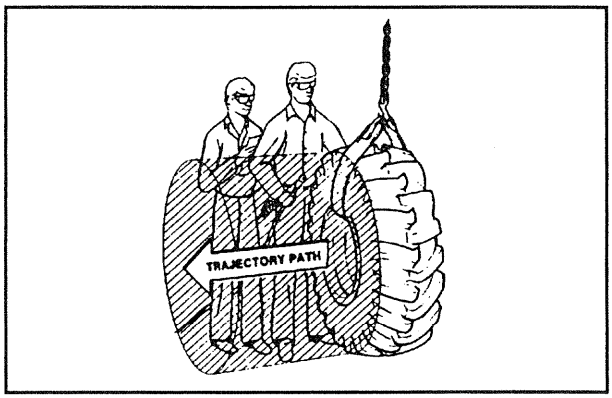
CHANGING AXLE LUBRICANT

The lubricant in the drive axles should be changed every 1000 hours of operation, or yearly, more frequently in very dusty conditions or if the axles are routinely submerged in water or mud. A large change in ambient operating temperature will require a change of lubricant. The axle housing drain plugs are located on the bottoms of each differential housing. The planetary drain plugs are located at the outer edges of the hubs and should be at the bottom of the hub's rotation for complete draining. Remove each drain plug separately, drain the lubricant into a suitable container, and dispose of the lubricant properly. Draining both drive axles entirely will collect approximately 28 U.S. gallons (105 liters) of lubricant (for the largest axle combination). Install the drain plugs, using new o-rings and refill the axle housings and planetary hubs to the correct levels.

SERVICING THE AXLE BREATHERS

Rotate the breather caps every 50 hours of operation to break away any blockage and free the passages. The breather hoses should be checked for wear or damaged and replaced, if necessary, to prevent contamination from entering the axles. Every 500 hours of operation, the breathers should be removed, cleaned with compressed air to completely remove any debris and reinstalled.

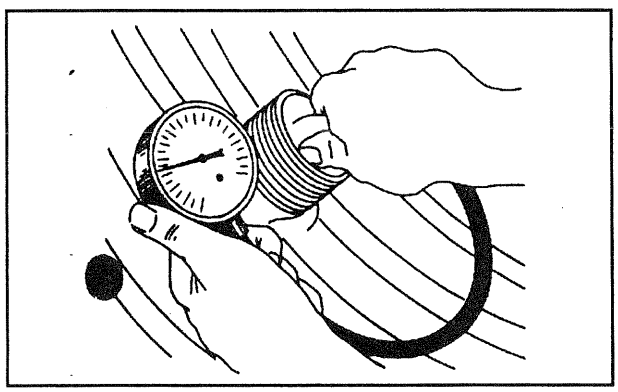
WHEELS AND TIRES



"Trajectory Path"

⚠ **WARNING: NEVER STAND IN THE TRAJECTORY PATH of a tire when doing tire service, ESPECIALLY INFLATION. Serious injury or death can result if a tire should explode. Use a self attaching air chuck with a long enough hose to allow you to stand well clear of an inflating tire. Use a tire inflation cage, or safety cables or chains when inflating to contain a possible tire explosion. NEVER inflate a tire using a compressed air system that uses alcohol as antifreeze.**

CHECKING TIRE PRESSURES



"Tire Pressure Check"

Check tire pressures weekly with the machine unloaded, adding or removing air pressure as required - see the TIRE INFLATION PRESSURE chart be-

low. Examine the inflation valves and make sure all valve caps and covers are in place.

CHECKING TIRE CONDITION

Check the condition of the tires daily with the machine unloaded and report any wear or damage that could cause a tire to deflate. It is easier to repair a flat tire at a shop or at a landing than it is in the woods.

⚠ **WARNING: NEVER remove debris from a tire bead, sidewall or tread when the tire is inflated. THE TIRE MUST BE FULLY DEFLATED. Even a slight amount of air pressure in a tire is sufficient to cause a violent explosion. Serious injury or death can result. Keep your fingers out of tire beads and away from bead breakers, and stay out of the trajectory path when removing debris from a tire. A bead breaker can disengage with enough force to cause serious injury or death.**

FOR COMPLETE INFORMATION ON MOUNTING AND DISMOUNTING TIRES, REFER TO THE TIRE MANUFACTURERS OFF-HIGHWAY TIRE MAINTENANCE MANUAL OR A QUALIFIED LOCAL TIRE REPAIR COMPANY.

TIRE INFLATION PRESSURE

TIRE SIZE	PLY	MINIMUM PSI (kPa)	MAXIMUM
24.5 - 32	12	15 (105)	25 (170)
24.5 - 32	16	15 (105)	30 (205)
28L - 26	10	15 (105)	20 (140)
28L - 26	14	15 (105)	25 (170)
28L - 26	18	15 (105)	30 (205)
30.5L - 32	12	15 (105)	20 (140)
30.5L - 32	16	15 (105)	25 (170)

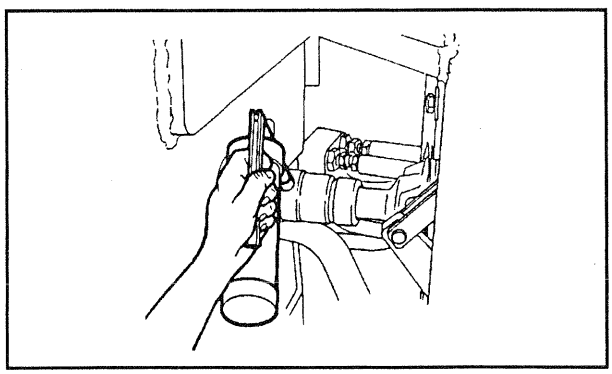
WHEEL NUT TORQUE

Wheel nuts will loosen for the first few days after they are installed. New machine wheel nuts should be retorqued daily until they are fully seated and the torque is maintained. This should also be done if a wheel is removed for any reason (such as to repair a puncture). Wheel nuts on 19 stud wheels should be tightened to a torque of 350 to 380 lbf.ft (475 to 515 N.m). Wheel nuts on 10 stud wheels should be tightened to a torque of 425 to 475 lbf.ft (575 to 645 N.m).

DRIVESHAFTS

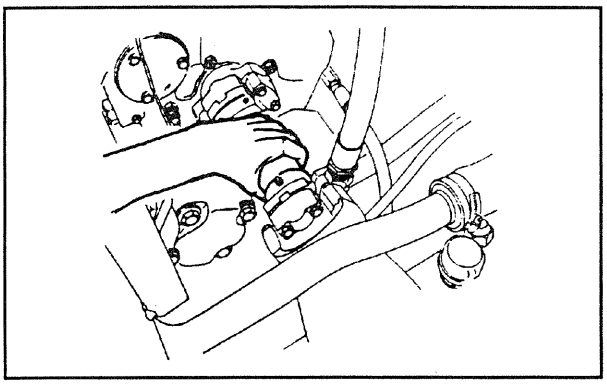
SERVICING THE DRIVESHAFTS

⚠ **IMPORTANT: Driveshaft slip joints and universal joints use different types of grease to ensure maximum service life. See the LUBRICANTS AND CAPACITIES CHART in Section 0 of this manual.**



"Greasing Prop Shaft"

Grease the driveshaft slip joints every 100 hours of operation using a hand grease gun. Articulate the machine a few times and regrease the center hinge driveshafts to ensure complete lubrication.



"Checking Prop Shaft"

At this time, the slip joints and universal joints should be inspected for play that would indicate excessive wear that could result in failure. Check also for loose, missing or damaged driveshaft mounting bolts. Make repairs as required in advance of a failure to prevent progressive damage to surrounding components.

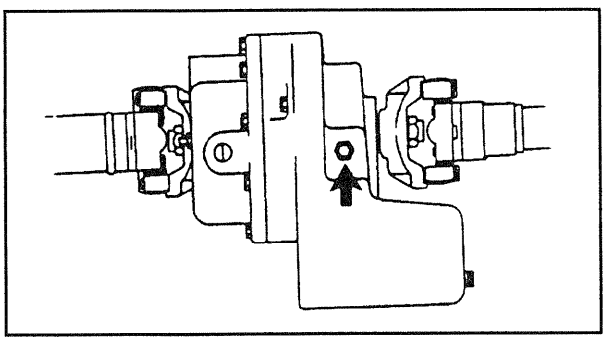
The center hinge driveshaft universal joints should be greased every 1000 hours of operation. Other lubricable universal joints should also be greased at this time. Non-relubricable type universal joints can be identified by the presence of a hole in the center of their crosses (and the absence of grease nipples). A needle type grease gun adapter, may be required to facilitate greasing some universal joints.

BRAKES

BRAKE SYSTEM

The service brake system of the Ranger G67 utilizes two sealed, wet disc brake units. One is mounted on the rear of the transmission unit, that also is lever actuated as a parking brake, the other is remote mounted in the rear frame in the driveline and also acts as a midmount bearing. Both are power actuated by a single brake pedal. Hydraulic power for the brake system is supplied by the main hydraulic pump. Dead engine braking is provided by two brake accumulators.

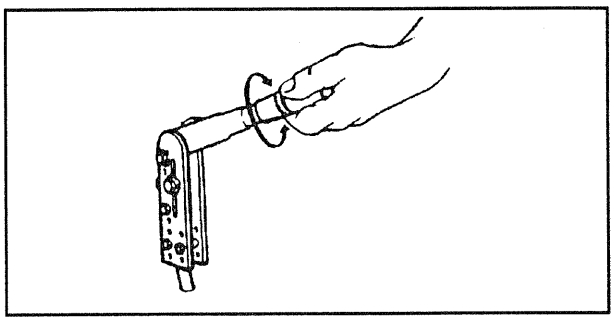
SERVICING THE MIDMOUNT BRAKE UNIT



"Midmount Brake Level"

The midmount brake unit is located in the rear frame below the winch. It is remote mounted and has its own lube sump. The level of fluid in the midmount brake unit should be at the bottom of the check plug hole on the left hand side of the brake housing. The level can be lowered one inch (2.5 mm) if the machine is roaded long distances and experiences midmount brake heating. The fluid in the midmount brake housing should be changed every 500 hours of operation. Remove the drain plug, located at the rear of the housing, drain the fluid into an appropriate container, and dispose of it in an appropriate manner. The midmount brake unit contains approximately 11 U.S. quarts (10 liters) of fluid. Replace the drain plug and add approved automatic transmission fluid to the breather hose on the side of the winch to the correct level. The midmount brake breather should be cleaned in solvent every 250 hours of operation.

ADJUSTING THE PARKING BRAKE LEVER



If slack develops when the parking brake lever is applied, release the lever and turn the knob on the end clockwise to tighten the cable.

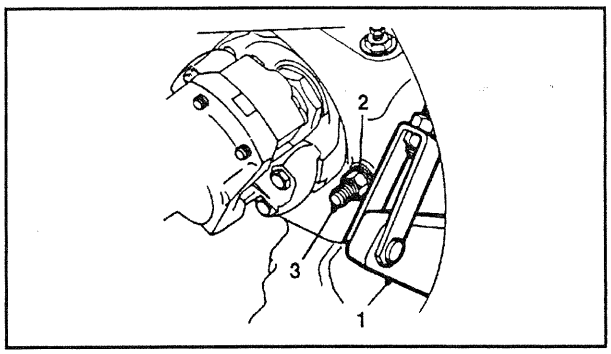
ADJUSTING THE BRAKE UNITS

Both the transmission mounted and the midmount hydraulic brake units can be adjusted easily through the center hinge as follows:

1. Securely block the tires.

2. Remove the transmission brake guard plate from the rear of the front frame.

3. Disconnect the parking brake clevis from the arm (1) on the side of the transmission mounted brake.



"Brake Adjustments"

4. Loosen the locknut (2) on the brake adjusting screw (3).

5. Tighten the adjusting screw to fully compress the brake discs.

6. Loosen the adjusting screw one to one and one quarter full turns.

7. Hold the adjusting screw in this position and tighten the locknut to maintain the adjustment.

8. Hold the parking brake arm in its fully released position (all the way down) and adjust the clevis so that the clevis pin can be inserted freely and install the cotter pin.

9. Adjust the parking brake cable if necessary as shown above.

10. Install the transmission brake guard plate.

11. Adjust the midmount brake unit using steps 4 thru 7.

⚠ **IMPORTANT: Check the service brake pedal to see that it returns completely when released. Any amount of pedal application will actuate the brake valve and cause the brake units to drag causing premature brake wear.**

STEERING SYSTEM

STEERING SYSTEM

The steering system of the Ranger G67 Log Skidder receives hydraulic priority over other functions for safety reasons. An Orbitrol-type steering valve controls two hydraulic cylinders to turn the articulated frames to steer the machine. No routine maintenance is required for the steering system. Since the main hydraulic pump powers the system, it is important to remember that the engine must be operating for the steering system to be functional.

FRAME SYSTEM

FRAME

Ranger Log Skidders use articulated front and rear frames for steering. The front axle is mounted on an oscillating cradle for stability in rugged terrain. Frame components are designed and built using the highest quality steel for maximum durability. If welding must be performed on a frame component, make sure correct welding materials are used and that the welding ground clamp is connected to the same frame component you are welding on to prevent pin damage from arcing.

STEERING FRAME LOCK

A steering frame lock is provided to fasten the frames together for servicing or when the machine must lifted, transported or towed.

CAB SYSTEM

CAB SYSTEM

SAFETY CAB / R.O.PS., F.O.P.S., O.P.S.

The operator's cab of the Ranger model G67 Log Skidder is fully certified to protect the operator from machine rollover (R.O.P.S.), falling objects (F.O.P.S.), and injury from being struck by limbs or other outside hazards (O.P.S. - Operator Protective Structure). This last feature is either in the form of wire mesh screen windows and screened doors, or Lexan windows/windshield on the fully enclosed cab.

DAMAGE TO THE SAFETY CAB / R.O.P.S.

If the skidder has rolled over, or if the cab has been damaged (for example by collision with an overhead object or structure such as a bridge during transport), IT MUST BE REPLACED to ensure certifiable protection.

⚠ **WARNING: NEVER fasten chains, ropes or cables to the R.O.P.S. cab for pulling. This can disturb the structural integrity of the R.O.P.S. construction.**

⚠ **WARNING: If the R.O.P.S. cab is removed or replaced, ALWAYS use ALL the correct mounting hardware, tightened to the correct mounting torques. Two front mounting bolts are located under the floormat, two rear mounting bolts are located in the post. These four bolts must be tightened to a torque of 600 lbf.ft (812 N.m). Two bolts in the door sill use Loctite on the threads and must be tightened to a torque of 100 lbf.ft (135 N.m). In addition, all seat plate mounting bolts must be installed and kept tight.**

⚠ **IMPORTANT: The top canopy skin encloses the cab pressurizer / filter air intake. Cutting, drilling, or welding the metal skin can damage the intake and interfere with its operation.**

CAB INTERIOR

OPERATOR CONTROLS AND SWITCHES

Clockwise from the left hand rear of the cab:

1. Air Recirculation Knob

Rotate the knob to control the mix of filtered, outside air and recirculated cab air.

2. Air Conditioner Switch

Push the switch (so that it is illuminated) to switch the cab air conditioning ON to cool the interior of the operator's cab. Push it again to switch it OFF.

3. Cab Temperature Control Knob

Rotate the knob clockwise to select a warmer interior temperature and counterclockwise to select a cooler temperature.

4. Fan Switch

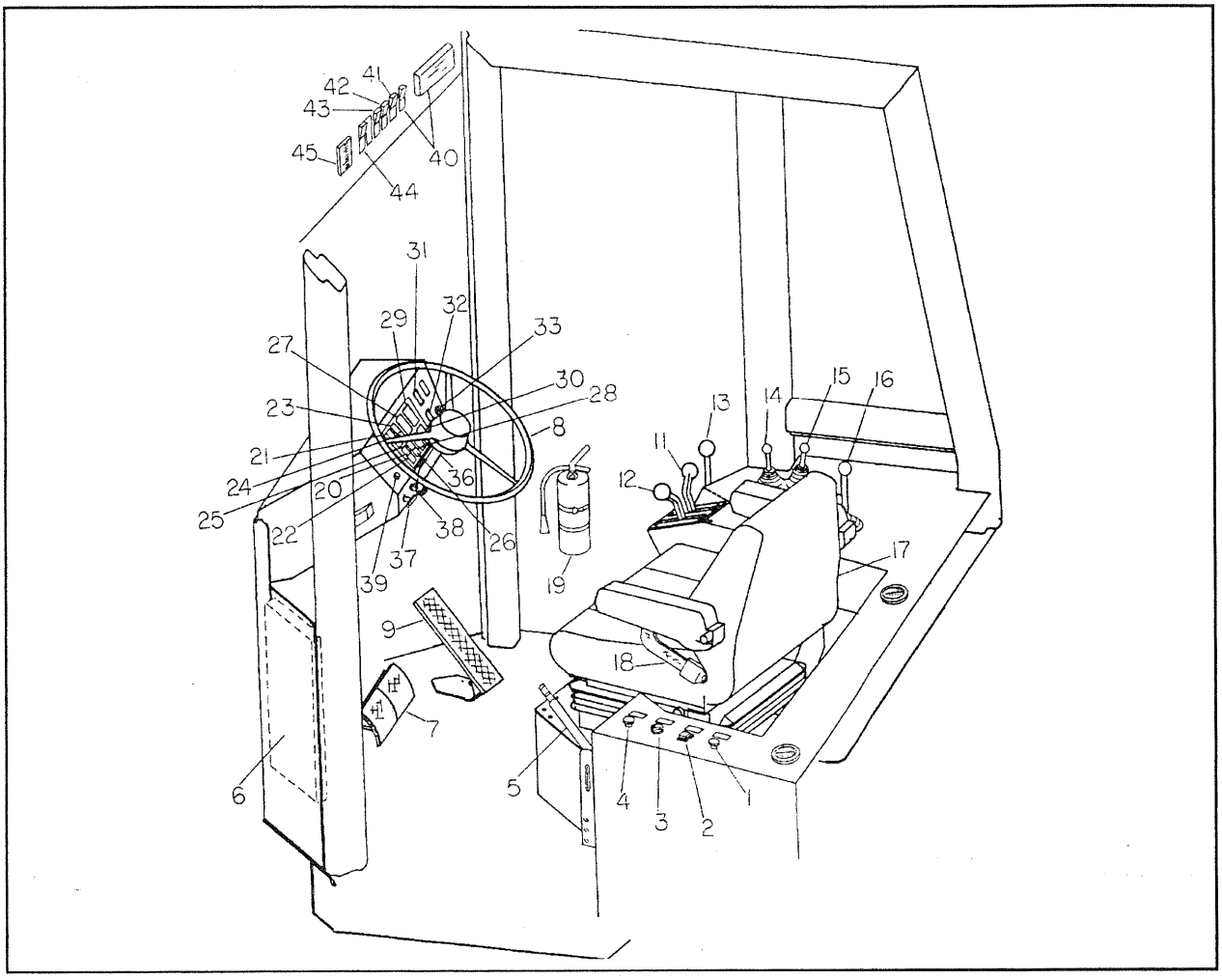
Rotate the switch to the "I", "II", or "III" position to select or increase the amount of heated or cooled air (or filtered outside air with the heater and air conditioner switched OFF) blown into the cab. Turn the switch to the "0" position to turn the fan OFF.

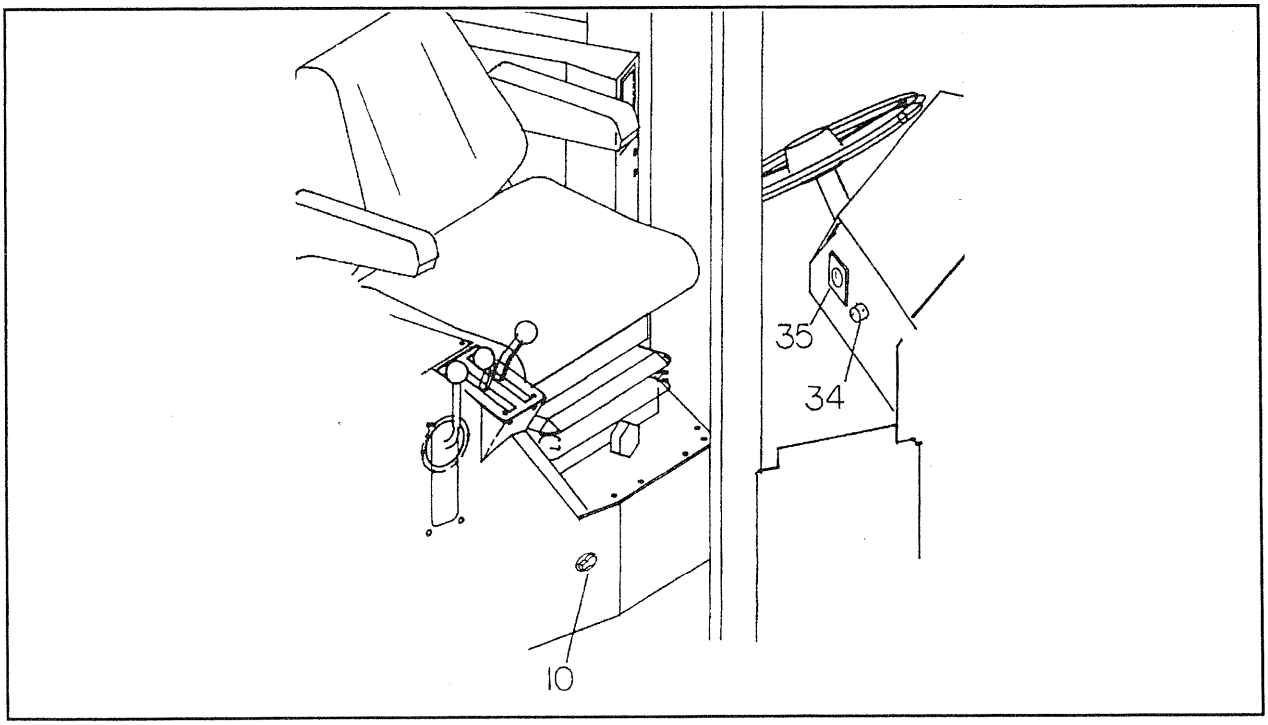
5. Parking Brake Lever

Pull the lever up and back to actuate the parking brake mechanism. This automatically declutches the transmission to prevent driving through the parking brake.

6. Operator's Manual Box

Keep this manual (and any other important instructional material for this machine) in the box for ready reference when operating the machine.


42
41
43
40
45
44
31
32
29
33
27
30
28
23
8
21
24
20
36
25
22
38
26
39
37
19
9
7
6
5
4
3
2
1
13
14
15
16
11
12
17
18


35
34
10

7. Service Brake Pedal

Depress the pedal to actuate the power brake system of the G67 to decrease the speed of the machine or to bring the machine to a complete stop.

⚠ **IMPORTANT: Two brake accumulators provide dead engine braking for a limited number of brake applications (limited by the state of charge of the accumulators). An audible and visual warning system on the dash panel alerts the operator to brake system problems - see DASH CONTROLS, GAUGES AND SWITCHES in this section.**

8. Steering Wheel

Turning the steering wheel to the left turns the machine to the left, and turning the wheel to the right turns the machine to the right.

9. Accelerator Pedal

Depress the pedal to increase the speed of the engine (and the speed of the machine) and release it to decrease the speed.

10. Battery Disconnect Switch

Turn the switch to the OFF position to disconnect the current supply from the batteries to the electrical system.

⚠ **IMPORTANT: Turn the battery disconnect switch to the OFF position at the end of each workshift or whenever the machine is not to be operated. NEVER turn the switch to the OFF position with the engine running; serious damage to the alternator and electrical system can result.**

11. Transmission Direction Control Lever

This lever is connected to the transmission control valve and selects the transmission's forward "F", neutral "N", and reverse "R" direction modes.

NOTE: The Ranger G67 is equipped with directional modulation that allows the operator to change directions IN FIRST GEAR under power with the machine in motion without damaging the transmission. Damage can occur, however, if this is done in the second or third speed range.

12. Transmission Speed Range Control Lever

This lever is connected to the transmission control valve and selects the transmission's first "1", second "2", and third "3" speed ranges. The lower the range selected, the less strain is put on the engine when pulling a load, and the cooler the transmission / torque converter operates. DO NOT downshift the transmission at high speeds.

13. Blade Control Lever

Pull up and back on the lever to raise the blade and push it down and forward to lower it.

14. Arch and Boom Control Lever (G67 Grapple Skidders Only)

Move the lever forward to pull the arch forward, and back to move the arch back. Move the lever away from the operator to lower the boom (and the grapple and load), and toward the operator to raise the boom.

NOTE: This lever serves as the arch control only on the G67 Esco Hi-Vis Grapple Skidder.

15. Grapple Control Lever (G67 Grapple Skidders Only)

Move the lever forward to rotate the grapple to the left, and back to rotate the grapple to the right. Move the lever away from the operator to open the grapple, and toward the operator to close the grapple.

16. Winch Control Lever

Move the lever toward the operator to the detented FREE-SPOOL position to allow the winch cable to be pulled from the cable drum. Move the lever fully away from the operator to the WINCH-IN position and hold it (no detent) to pull the load to the rear of the machine, then IMMEDIATELY release the lever to the center HOLD position to transport the load.

⚠ **WARNING: Operate the winch from the operator's seat ONLY. The safety cab will protect the operator from injury in the event that the cable should snap under tension.**

⚠ **IMPORTANT: Release the lever immediately when the load has been winched to the rear of the machine.**

17. Operator's Suspension Seat

Seat Height Adjustment (3 Positions)

Raise the seat by pulling up on the seat cushion (Item 1) to the desired click stop position. Lower the seat by pulling the seat cushion to its highest click stop position the releasing the seat to fall to its lowest position; then adjust the cushion to the desired height.

Weight Adjustment

Turn the weight adjustment knob (Item 2) to the operator's weight (shown in kilograms - note that 1 kg = 2.2 lb) in the indicator window (Item 3) for a more stable and comfortable ride. The window can only be seen with no load on the seat. The seat can be set for operators between 110 and 287 lb (50 and 130 kg). For maximum suspension life, the seat should be adjusted so that it does not bottom out during normal operation.

Forward / Backward Slider Adjustment

Lift and hold the lever (Item 4) and slide the seat to the desired position for the operator, then release the lever.

18. Seat Belt

Always fasten your seat belt when you operate the machine. Adjust the belt so that it fits snugly around the hips. Inspect the seat belt regularly for fraying, cuts or tears, and check that the buckle operates correctly. NEVER operate a machine with a damaged or worn seat belt, buckle, anchor straps or mountings. Replace unfit seat belts and/or anchor straps BEFORE operating the machine.

19. Fire Extinguishers

Ranger Log Skidders are equipped with two 5 lb (2.3 kg) hand operated fire extinguishers, one mounted in each cab door. Read and understand the instructions printed on the canisters and learn how to operate them. Learn how to remove them from their mounting brackets in the shortest possible time.

DASH PANEL INDICATORS, GAUGES AND CONTROLS

20. Alternator (VOLTS) Indicator

The indicator glows to alert the operator that the electrical system is not charging correctly. Shut down the engine and determine the cause. It is normal for this indicator to glow when the engine is started and remain lit until engine speed is increased slightly.

21. Engine Oil Pressure Indicator

The indicator glows and an alarm sounds to alert the operator that the engine lubricating oil pressure has fallen below acceptable limits. Shut down the engine IMMEDIATELY and determine the cause.

22. Hydraulic Filter Restriction Indicator

The indicator glows and an alarm sounds to alert the operator that the main hydraulic filter element is dirty and should be replaced as soon as possible.

⚠ **IMPORTANT: Operating the machine in this condition will result in unfiltered oil returning to the hydraulic reservoir with the filter in by-pass mode. This can result in system component damage from contaminated oil.**

23. Hand (Parking) Brake Indicator

The indicator glows to alert the indicator that the parking brake lever (and the transmission declutch) is actuated.

24. Engine Coolant Temperature Indicator

The indicator glows and an alarm sounds to alert the operator that the engine cooling system is operating at a higher than acceptable operating temperature. Shut down the engine immediately and determine the cause.

25. Power Brake System Warning Light

This light glows and an alarm sounds to warn the operator that pressure in the power brake actuating system has dropped below safe operating limits. Stop the machine as soon as it is safe to do so and determine the cause. Dead engine braking, for a limited number of brake applications is provided by two brake pressure accumulators (limited by the state of charge of the accumulators) but this system warns of a brake system malfunction.

26. Transmission / Converter Temperature Indicator

This indicator glows and an alarm sounds to alert the operator that the transmission / converter / winch hydraulic system is operating at a higher than acceptable temperature. Shut down the engine and determine the cause.

27. Engine Coolant Temperature Gauge

This gauge allows the operator to monitor the operating temperature of the engine cooling system. Normal operation is in the green range between 160° and 185°F (71° and 85°C).

28. Transmission / Converter Temperature Gauge

This gauge allows the operator to monitor the operating temperature of the transmission / converter / winch system. Normal operation is in the green range between 180° and 250°F (82° and 121°C).

29. Engine Oil Pressure Gauge

This gauge allows the operator to monitor the operating pressure of the engine lubricating system. Normal operation is in the green range between 40 and 60 PSI (2.76 to 4.14 bar), slightly lower at Low Idle RPM..

30. Voltmeter

This gauge allows the operator to monitor the operating condition of the electrical charging system. Under normal conditions, the needle should be in or near the black center section of the green range. If the needle stays in either the shaded area (below 12 V.), or above 15 V. for an extended period of time, the system should be serviced.

31. Dash Light Switch

This switch allows the dash lights to be independently switched on or off.

32. Reverse Declutch Selector Switch

This switch actuates the reverse declutch function to disengage the transmission when the service brake pedal is depressed with the transmission in reverse mode.

33. Power Brake Pressure Audible Warning Alarm

This alarm sounds and a warning light on the dash glows to warn the operator that pressure in the power brake actuating system has fallen below safe operating limits. Stop the machine as soon as it is safe to do so and determine the cause.

34. Air Cleaner Service Indicator

The window in the indicator shows red to alert the operator that the air cleaner is restricted with debris. Service the element(s) promptly.

35. Hourmeter

The hourmeter indicates the time, in hours, that the machine has been operated. Monitor the hourmeter closely to enable periodic lubrication and maintenance to be performed at the recommended intervals. This will contribute to longer, trouble-free operation of your Ranger Log Skidder.

36. Ignition Switch

Insert the key into the switch and turn it fully clockwise to start the engine, and release it when the engine starts. The transmission must be in NEUTRAL to start the engine. If the engine stops cranking while starting, or it will not crank, push the circuit breaker reset button on the right hand side of the engine (beside the starter), and attempt to start the engine again. If this fails to correct the problem, further troubleshooting will be required.

NOTE: A 20 amp blade fuse is located in the main wiring harness near the starter to protect the ignition switch.

37. Hand Throttle Control

This control is for use during machine warm-up and when doing maintenance checks at specified engine speeds. Pull the knob until the engine reaches the desired speed, and push the center button to release it. More precise speed adjustments can be made by rotating the knob (clockwise to increase the speed and counterclockwise to decrease it).

38. Cigarette Lighter

Push the lighter into the dash and wait for a few seconds for the lighter to return to its normal position, then remove it.

⚠ **WARNING: Be careful to avoid burning yourself with the cigarette lighter.**

39. Ether Quick-Start Button

Push and hold the button while cranking the engine to dispense a metered amount of ether to aid starting at cold temperatures.

OVERHEAD PANEL

From Right to Left:

40. Dome Light / Dome Light Switch

The dome light is provided to illuminate the interior of the cab when the machine is stationary.

41. Rear Light Switch

This switch illuminates the lights mounted on each side of the cab and on the grapple boom.

42. Front Light Switch

This switch illuminates the lights mounted over the windshield.

43. Windshield Washer Switch

This switch activates the windshield washer to pump washer solution onto the windshield to clean it. The washer reservoir is located inside the engine compartment on the right hand side of the engine.

44. Front Windshield Wiper Switch

This two position switch activates and selects the speed of the front windshield wiper. The first position selects the slowest speed, and the second selects the fastest.

45. Fuse Panel

If any of the overhead panel controls do not work, check the corresponding fuse and replace it if it is blown. Use only a fuse of the same amperage rating when replacing fuses. If a fuse continues to blow, further troubleshooting will be required.

HYDRAULICS

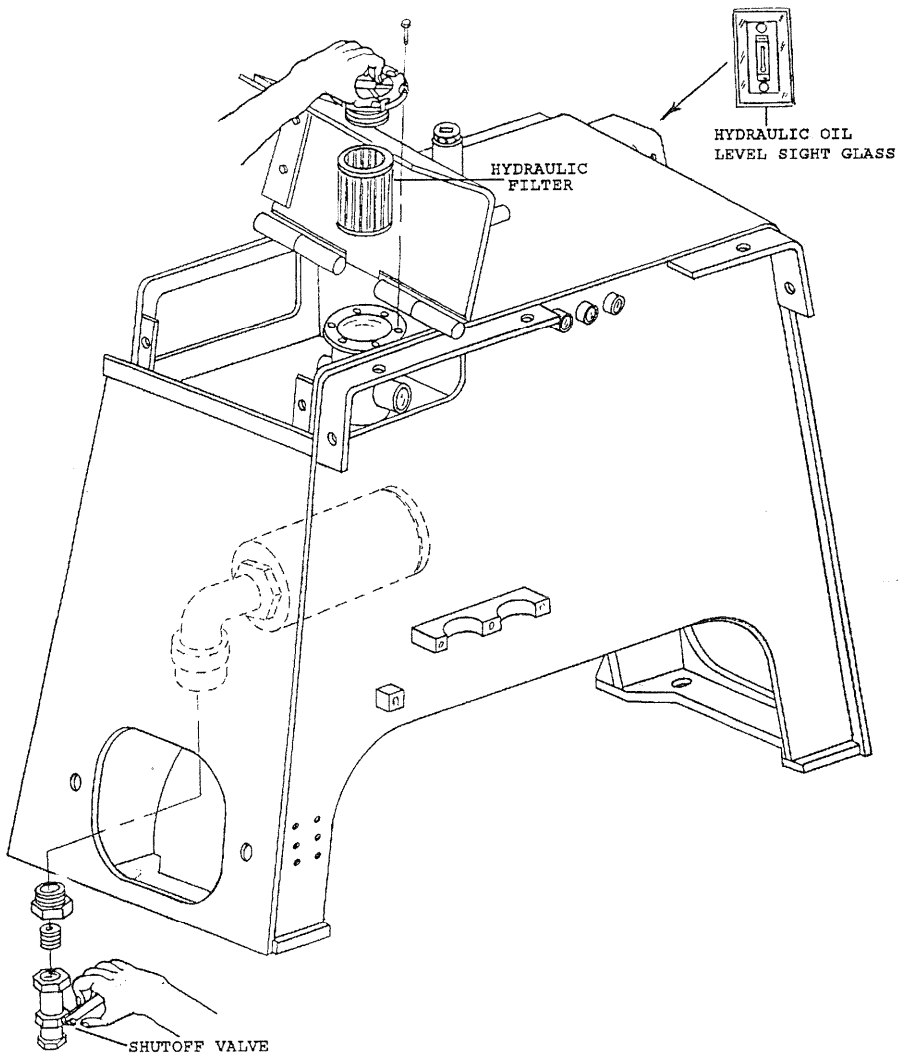
HYDRAULIC SYSTEM

The hydraulic system is a vital part of the Ranger G67 and must be serviced correctly to avoid costly repairs and downtime. The heart of the system is a pressure compensated, axial variable displacement piston pump. While this design provides excellent performance, it is extremely sensitive to contamination. While the hydraulic system demands little service, strict cleanliness, and regular oil and filter changes are a must. Most system contamination is generated by dirty oil containers and installing uncapped hoses.

⚠ **IMPORTANT: Do not adjust hydraulic pressures, contact your Valmet Ranger distributor. NEVER rearrange hoses to change control operation. Personal injury and/or equipment damage can result.**

HYDRAULIC RESERVOIR SHUTOFF VALVE

⚠ **IMPORTANT: A valve is provided to shut off the oil supply from the hydraulic reservoir to the main hydraulic pump in case the pump must be removed or the supply hose must be replaced. NEVER start the engine if this valve is in its OFF position. Serious damage to the pump will result.**



CHECKING THE HYDRAULIC OIL LEVEL

NOTE: Lower the blade to the ground, pull the arch fully forward, open the grapple, and on the Ranger parallelogram grapple, the boom cylinders should be at mid-stroke for an accurate level reading.

Check the hydraulic oil level at the beginning of each work shift. The level should be between the 1/2 and LOW marks on the sight glass on the left hand side of the reservoir. The warm oil level should be between the 1/2 and FULL marks. Add hydraulic oil as required through the return filter, using the quick-connect filler adapter, to the correct level on the sight gauge. This gauge also has a thermometer to monitor the temperature of the hydraulic system. Operating temperatures that exceed 200°F (93°C) can indicate a system or operation problem that should be corrected. Consult an authorized Valmet Ranger servicing dealer for assistance.

CHANGING THE HYDRAULIC FILTER

Change the main hydraulic filter element, located under the hinged cover on the right hand side of the reservoir, after the first 50 hours of operation and every 250 hours thereafter. Also, in the case of a contaminating component (such as a pump) failure, the filter should be changed at the time of repair and again no more than 50 hours later. Loosen the six filter cap mounting bolts and remove the filter cap. Remove the filter element and dispose of it in a proper manner. Install a new element, making sure to lubricate the seals on each end with clean hydraulic oil and ensuring that the element is fully seated in the filter bowl. Install the filter cap and tighten the cap mounting bolts.

CHANGING THE HYDRAULIC OIL

Change the oil in the hydraulic system every 1000 hours of operation or whenever a contaminating component failure occurs. With the system at its operating temperature, change the oil as follows:

1. Turn the hydraulic reservoir shutoff valve to its OFF position and remove the hydraulic tank breather.

2. Direct the drain hose on the bottom of the hydraulic reservoir into a suitable container. Open the drain valve to drain the oil into the container and dispose of the waste oil in a proper manner. The Ranger G67 Cable skidder has a hydraulic system capacity of 35 U.S. gallons (133 liters). The Ranger G67 Grapple Skidder has a system capacity of 46 U.S. gallons (175 liters). The G67 Esco Hi-Vis Grapple Skidder has a system capacity of 40 U.S. gallons (152 liters).

3. Remove the hydraulic reservoir filter and cover assembly and clean the inside of the reservoir thoroughly using diesel fuel as a solvent.

4. Remove the magnet and the suction screen from the reservoir and clean them, inspecting the screen for damage. Replace the screen if it is damaged or if it cannot be adequately cleaned.

5. Install the magnet, suction screen, the new filter and cover assembly, close the drain valve and refill the reservoir with approved hydraulic oil.

6. Open the hydraulic reservoir shutoff valve, start the engine and run it at low idle RPM for a few minutes, and recheck the hydraulic oil level.

INTENTIONALLY BLANK