Technical Manual

⚠ CAUTION: Many of the components of the 49-RII drill are heavy, bulky items. Extreme caution should be used when lifting. Personnel should be certain of the weights of components before attempting to lift them, either manually or with some lifting device. Follow all applicable safety rules when using cranes or other lifting equipment. Be sure of the load, lifting height and radius, and capacity of the lifting device before lifting. Failure to follow all applicable safety rules when lifting can cause serious or fatal injury to personnel.

⚠ CAUTION: When removing certain machine parts for maintenance or replacement purposes, it may be a practice to loosen these parts by striking them with a sledge-hammer. Use extreme caution when striking metal parts as chips may fly off with great force and possibly cause serious injury. Wear adequate protective clothing including a face shield. Alternate methods of removal might involve using a soft metal hammer or a hydraulic jack with applicable fixtures.

9. Separate the first stage planetary gear assembly as follows:
   a. Remove the gear snap ring and slide the gear assemblies from the carrier shafts.
   b. Remove the bearings, stay rings and snap rings from the gears.
   c. Remove the sun shaft snap ring and remove the sun shaft from the carrier.
10. Remove the 24 hex head bolts that secure the twin ring gear to the back-up plate and remove the twin ring gear. The second stage planetary gear assembly front bearing cage will remain in the twin ring gear. Remove it, if required.
11. Remove the 8 hex head bolts that secure the tumbler sprocket hub retainer to the second stage planetary gear assembly. Separate the retainer, hub, face seal and back-up plate from the second stage planetary gear assembly. Remove the o-rings from the retainer and planetary gear assembly.
12. Separate the second stage planetary gear assembly as follows:
   a. Remove the front bearing inner race if required.
   b. Remove the gear pin snap ring and remove the pins. Remove the gear assemblies from the carrier.
   c. Use a puller to remove the rear spherical bearing from the carrier.
   d. Separate the bearings, snap rings, spacer ring and locating rings from the gears.
13. Clean and inspect all parts. Replace all damaged or worn parts. Reassemble in reverse of disassembly noting the following:
   a. Replace all o-rings, wipers, seals and back-up rings.
   b. Use Loctite® on housing inner socket head bolt and spur gear coupler socket head bolts. Be sure to follow manufacturer's instructions when using Loctite.
   c. Lightly oil all items during assembly.
   d. There should be a 1-2 mm clearance between the spur gear ball bearing and the housing.
   e. Torque all bolts as follows:

Shift fork bolt	(8.6 da Nm)	63 ft. lbs.
Shift shaft bolt	(4.8 da Nm)	36 ft. lbs.
Motor mount bolt	(4.8 da Nm)	36 ft. lbs.
Retainer bolt	(100 da Nm)	737 ft. lbs.
Twin ring gear bolt	(41 da Nm)	302 ft. lbs.
Housing bolt	(8.6 da Nm)	64 ft. lbs.
Spur Gear Bolt	(29.5 da Nm)	218 ft. lbs.

CRAWLER FRAMES

Inspect the crawler frames for cracks or damage (figure 1-2-11). Pay particular attention to the axle attachment points and the bottom flange plate. Any cracks, wear or damage should be repaired immediately, following the repair welding procedure listed in the APPENDIX of this manual.

REPAIR

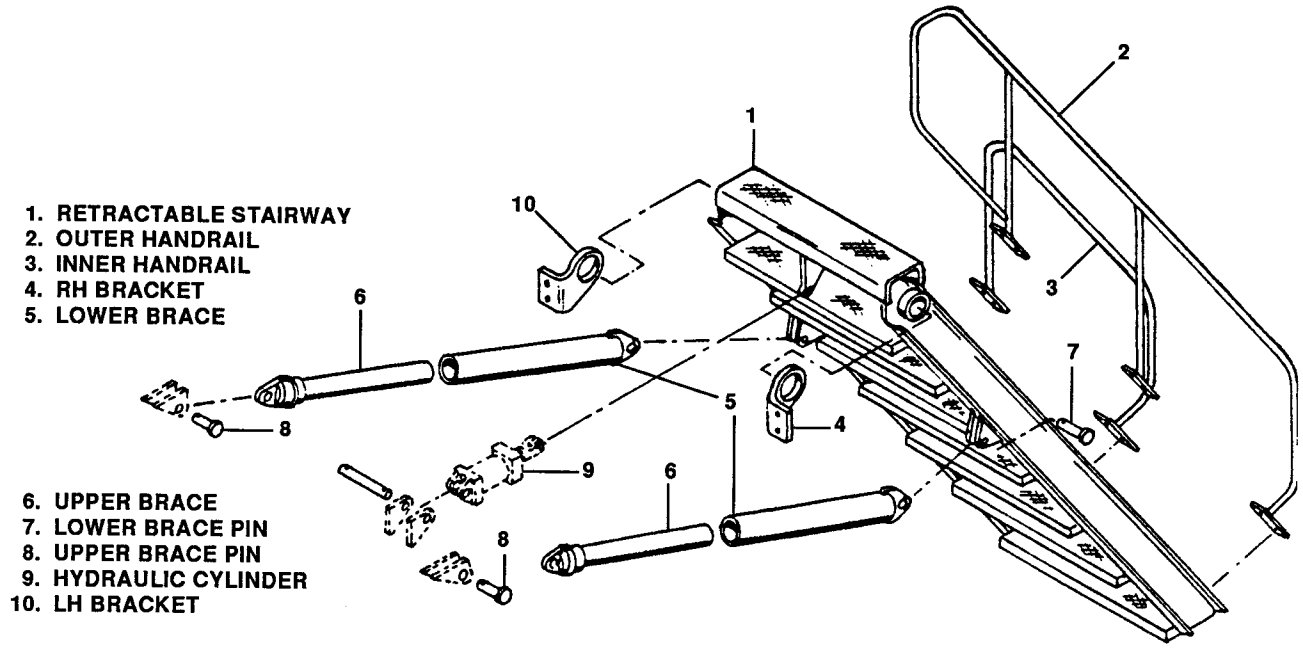
Repair of the crawler frames may be accomplished while the crawler frames are attached to the drill or the crawler frames may be removed to facilitate repair.

To remove the crawler frames from the machine proceed as follows:

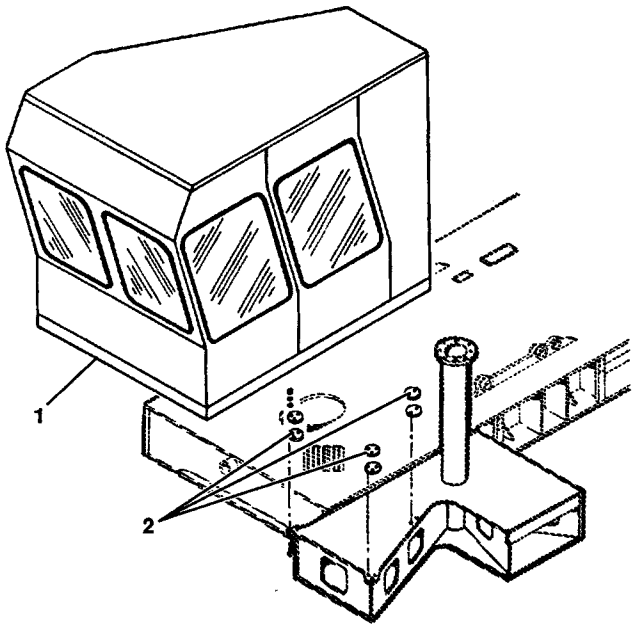
1. Disconnect all hydraulic and lubrication lines connected to the crawler frame. Be sure all joints are clean and all lines and ports are plugged.
2. Using the machine leveling jacks, raise the machine sufficiently to allow blocking to be placed under the crawler belts and extending 6 to 8 feet from the crawler frame. Blocking material should be selected to facilitate the sliding of the crawler frame away from the machine.
3. Slowly lower the machine until there is no weight on the rear axle or equalizer axle. Securely block the machine in this position.
4. From this point either one or both crawler frames may be removed from the machine.

NOTE: Steps 5 through 14 describe the procedure for removing and reinstalling one crawler frame. If both frames are to be removed, repeat steps 5 through 14 for the other crawler frame.

5. Remove rear axle retainer capscrews and remove the retainer.
6. Remove the equalizer axle pin retaining pin cotter pins, retaining pins and pin.
7. Using suitable rigging and suitable vehicle(s), pull the crawler frame straight away from the machine. Pull the crawler frame to a position to be repaired or handled with lifting equipment.
8. Repair the crawler frame and components as necessary.
9. To replace the crawler frame, first position the crawler in-line with the rear equalizer axle.



RETRACTABLE BOARDING STAIRWAY
FIGURE 1-3-7



1. CAB
2. CAB FABRICA PAD

OPERATOR'S CAB
FIGURE 1-3-8

OPERATOR'S CONTROLS

Inspect all of the operator's controls (figure 1-3-9) daily for wear or damage. Verify the correct operation of all controls daily. Repair or replace malfunctioning controls immediately. Clean all nameplates and markers and maintain all markers and signs in a legible condition including warning signs.

VENTILATION UNIT

Inspect the ventilation unit (figure 1-3-10) on the operator's cab roof for proper operation, structural integrity and sealing. All permanent side panels should be in place and adequately sealed and secured. Monitor the filter clogged indicator and replace the filter cartridge when the indicator comes on.

HYDRAULIC PUMP DRIVE

The hydraulic system pumps are driven by the main air compressor motor through a gearbox (figure 1-3-11). The gearbox is mounted to the compressor base.

The oil level in the gearbox should be checked weekly and oil added if required. Daily check the gearbox for oil leaks and repair as required.

To remove and disassemble the gearbox, proceed as follows:

CHAPTER 1
MECHANICAL MAINTENANCE
SECTION 4 — MAST

MAST STRUCTURE

The 49-RII drill mast (figure 1-4-1) is a fabricated structure made of steel tubes and formed plates. The structure is formed by four vertical tubes tied together on three sides with tubular lacing. The fourth side is open to allow the rotary drive unit to be raised and lowered the length of the mast.

Inspect the structure daily for wear or damage. Inspect all mast ladders and platforms for loose hardware and structural integrity. Inspect the racking on the outside of the rear mast tubes for proper lubrication and any wear or damage. Inspect the mast hinge pins and the structure surrounding the pins for wear or damage. Verify that the hinge pin keepers are in place and tight. Inspect the mast hoist cylinder attachments for wear or damage. Lubricate the pins weekly with the appropriate lubricant. Inspect the mast lock pins for wear and damage. Verify that the lock pin hydraulic cylinders and hydraulic line are not leaking.

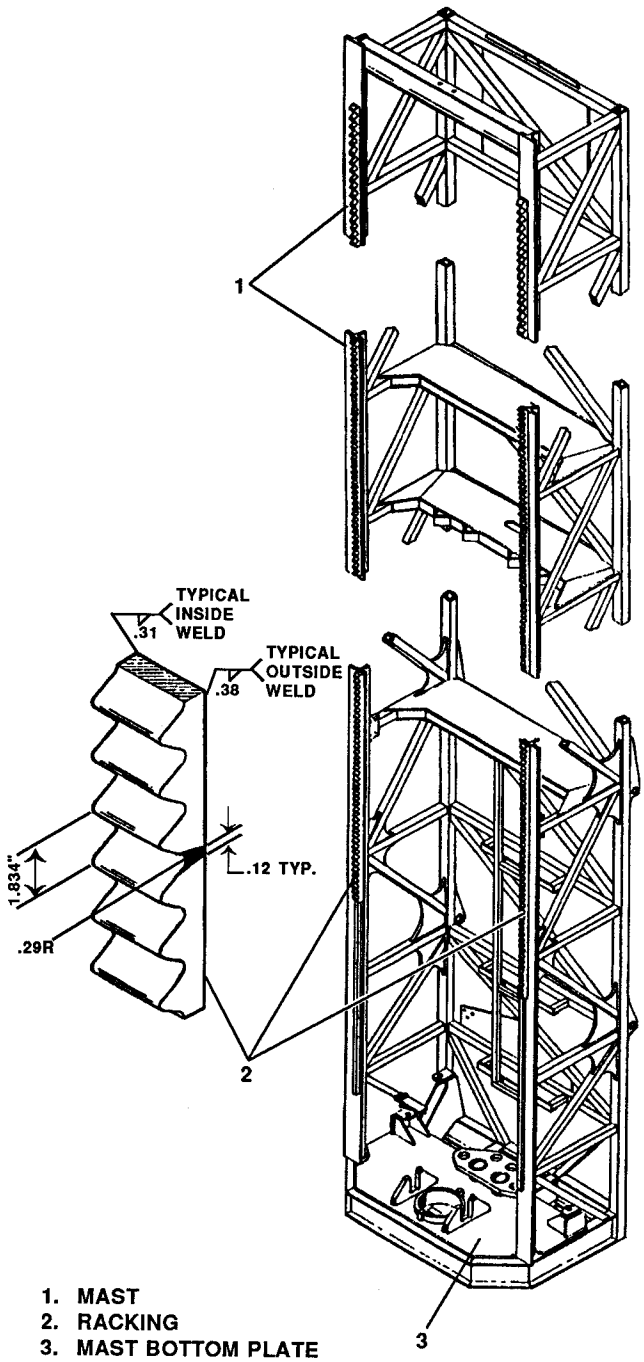
Every 80 operating shifts lower the mast and inspect all welds thoroughly for cracks or damage. Clean the racking on the outside of the two rear mast tubes and check the welds securing the racking to the tubes.

REPAIR

Repair of the mast structure is limited to repair welding of cracked or broken welds or components or replacement of severely damaged structures. Refer to the REPAIR WELDING topic in the APPENDIX for the exact procedures involved in repair welding of the mast.

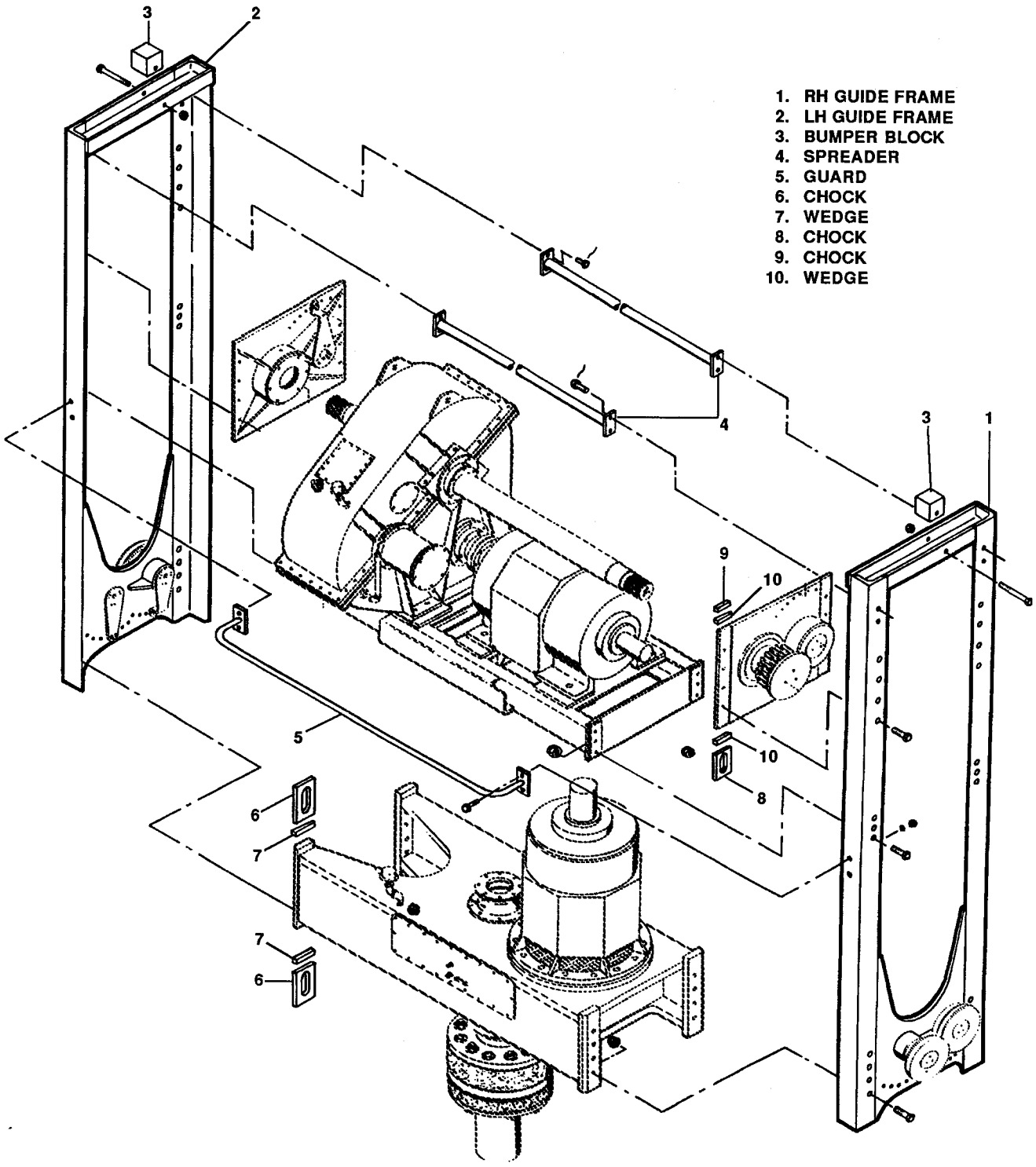
When repairing mast structures by welding it is important to keep in mind that the repair should return the structure to its original condition. All welds should be smooth and any notches or undercuts should be welded and ground. Do not add reinforcing material or change the geometry of the structure. Replace any damaged components with material of the same strength and cross section.

For mast lock pins see MAST A-FRAME in Section 3.



1. MAST
2. RACKING
3. MAST BOTTOM PLATE

MAST
FIGURE 1-4-1



ROTARY/PULLDOWN GUIDE FRAME
FIGURE 1-4-9

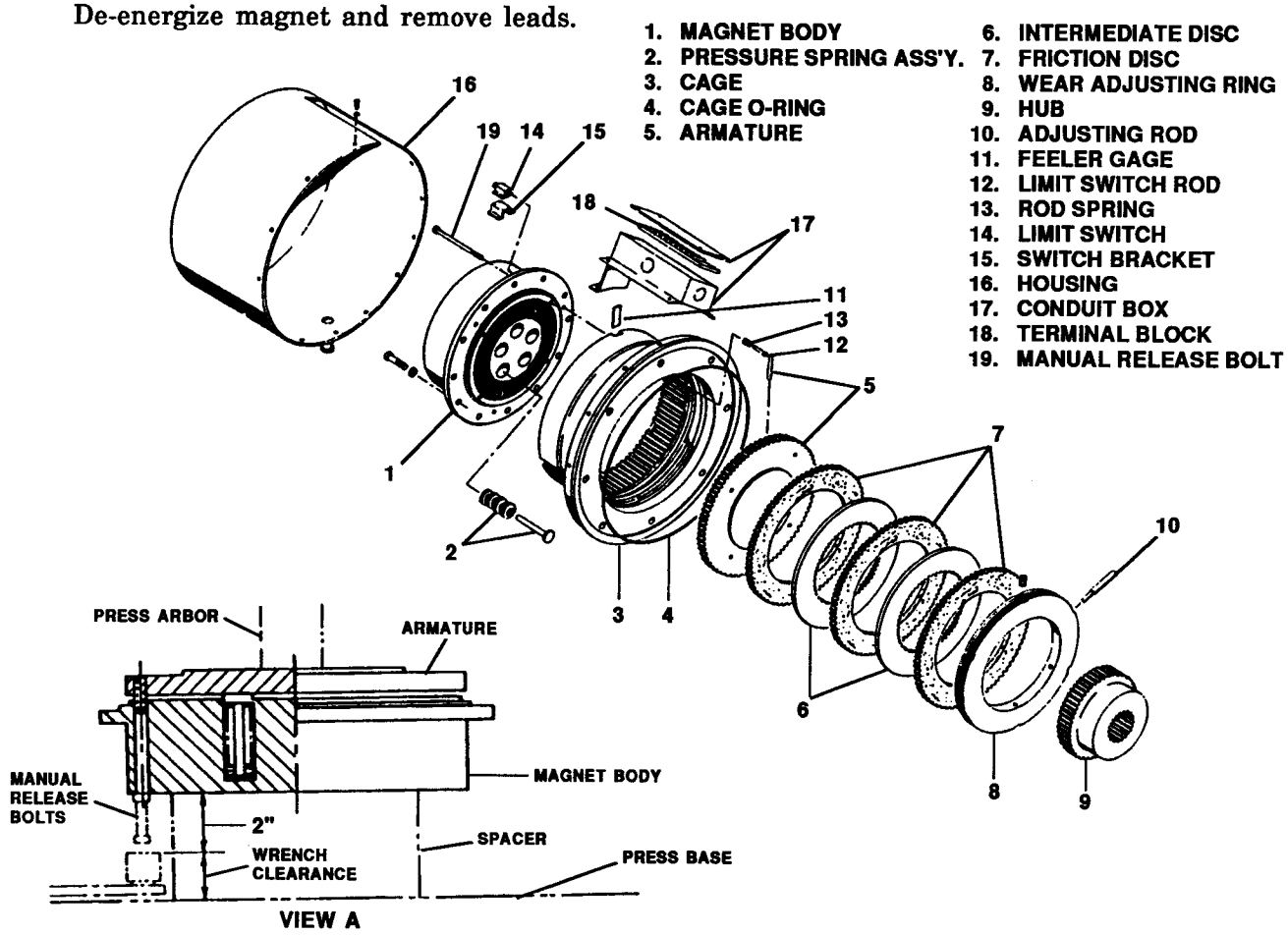
3. Insert brass feeler gages (.050 supplied with brake) into air gap at the three slots and release the brake electrically or with the manual release bolts.
4. Remove the locking screws from the wear adjusting ring in the slots of the cage.
5. Insert the adjusting rod into one of the holes in the wear adjusting ring and rotate CCW to the end of slot. Repeat until resistance is felt. The brake must be released before you can rotate the adjusting ring.
6. Remove gages and turn the adjusting ring to the nearest end of the slot. Remove rod and re-install locking screws.
7. Make sure the brake release switches are clean and actuate freely.
8. Set the brake and re-install the housing. Apply a bead of silicon sealant to all exterior joints.

REPLACEMENT OF FRICTION DISCS

1. Energize magnet and clamp armature to magnet body with four manual release bolts. De-energize magnet and remove leads.
2. Remove cage mounting bolts and magnet body and armature assembly. Back off wear adjusting ring slightly to allow space for new friction disc.
3. Friction discs may now be slid from hub and replaced.
4. Replace magnet body and armature assembly. (Arrows metal stamped on each part must be in line).
5. Reconnect lead wires, energize brake and remove four manual release bolts.
6. Set gap to .050" per BRAKE WEAR ADJUSTMENT.

DISASSEMBLY OF MAGNET BODY AND ARMATURE

1. Place assembly in press with spacer (figure 1-4-18, view A).
2. Press armature against magnet body and remove manual release bolts from armature. (6500 lbs press force required).



HOIST BRAKE
FIGURE 1-4-18

The pumps are equipped with two main relief/ pressure override assemblies referred to as a combination valve; one for the forward propel side, and the other for the reverse propel side.

The pressure override portion of the assembly is set at 5365 PSI. The main relief portion is set 500 PSI above the pressure override as a fixed non-adjustable level.

The pressure override valve prevents continuous dumping of excessive flow, at load pressure, through the main relief valves. This eliminates unnecessary heating of the oil and protects the pump and motor from damage.

6. After first flow regulator is tested, substitute the remaining untested regulators into the 3rd position until all eight flow regulators have been checked. All flow regulators MUST end up in their proper position when test is complete.

NOTE: During calibration of flow controls, as well as anytime jacks are being operated in MANUAL or AUTO-LEVEL mode, the flow controls should not exhibit any chattering or screaming noise.

7. With step 6 complete, re-assemble hoses to proper ports.
8. Now complete JACK CYLINDER CHECK IN MANUAL MODE starting with step 3.

JACK CYLINDER DRIFT TEST

NOTE: Read items 1 through 5 of this test before continuing.

1. Lower all jacks to ground such that the jack pads are firmly on the ground but are not lifting the machine.

NOTE: If in steps 2 and 3 the crawlers are not mounted and the machine is resting on blocks, only lift the machine a few inches.

2. Manually extend left and right front jacks simultaneously to lift the front of the machine.
3. Manually extend left and right rear jacks simultaneously to lift the rear of the machine.
4. Continue to lift the machine by alternating front to rear until the crawler tracks have cleared the ground by 3 or more inches. If crawlers are not mounted, lift the machine approx. 6 inches off the blocks.
5. With machine approximately level, position all manual jack controls to NEUTRAL and check for jack cylinder drift. Drift should not exceed 1/8" in 30 minutes.

BRAKE RELEASE PRESSURE CHECK

NOTE: Crawlers must be mounted to mainframe for this test.

1. With 0-1,500 PSI gauges at test ports 5 and 6 and with pump running, the pressure should be at or near zero with hands removed from the propel joysticks and drill/propel select switch in PROPEL NORMAL mode.
2. With pump still running, first lift one propel joystick and then release it and then lift and release the other propel joystick. Anytime either or both joysticks are lifted full up out of the DETENT position, the propel active valve (PAV) will energize and the pressure at test ports 5 and 6 should go to 600 PSI.
3. With drill/propel select rotated to DRILL mode, pressure at test ports 5 and 6 should be zero regardless of whether the joysticks are in or out of the DETENT position.

PROPEL BRAKE EMERGENCY RELEASE CHECK

NOTE: This test must be performed with the pumps OFF.

1. With 0-1,500 PSI gauges at test ports 5 and 6, the bypass valve handle (located on the left side surface of left front jack housing) rotated fully CW, and with hand pump bypass valve CLOSED, manually operate pump handle to raise pressure on the gauge until the CRT displays: PROPEL BRAKE TOW RELEASE. Record the pressure that causes the CRT display to appear. (Pressure should be 500 PSI.)
2. With step 1 complete, continue to operate the pump until the gauge shows 1,000 PSI. Record the amount of pressure drop in 5 minutes (should not be more than 500 PSI).

NOTE: Pressures in step 1 and step 2 should also appear at test ports 5 and 6 on 0-1,500 PSI gauges.

PROPEL PUMP MAIN RELIEF PRESSURE CHECK

NOTE: Crawlers must be mounted and there should be no crawler movement during this test.

Main relief valves are on the top of the pump, as mounted on machine. See figure 2-2-1.

1. With machine still raised on jacks and with a 7,500 PSI gauge at test ports 1 and 2 and a 0-1,500 PSI gauge at test port 59, disconnect the propel brake release line at the brakes and plug the hoses with a -6 O-ring seal plug. Leave the port on the brakes open; do not cap or plug the fittings.

NOTE: Use a 5 mm allen wrench and a 3/4" open end wrench to adjust main relief valves.

CHAPTER 3
AIR SYSTEMS
SECTION 3 — ROTARY SCREW COMPRESSOR
(A-C Compressor Corp. KS-31-LU or KS-27-LU)

DESCRIPTION

The air end of the screw compressor is an oil flooded, single-stage, twin screw, rotary type. The following illustration (figure 3-3-1), viewed from the bottom inlet end of the compressor, shows how it works. The suction (inlet) port is located on the top, drive shaft (inboard) end of the compressor. The discharge port is located on the bottom (outboard) end.

As the male rotor is turned counterclockwise (by the clockwise rotation of the gear shaft and gears - not shown), it drives the female rotor clockwise. This action causes air to be drawn through the suction port completely filling the uncovered channels or grooves between the spiral (helical) lobes in the male and female rotors. As the rotors continue to turn, the lobes begin to intermesh at the bottom. This inter-meshing causes the spiral grooves to become shorter, thus resulting in the compression of the air entrapped in the grooves. Compression continues until the grooves are uncovered by the discharge port.

During the compression process, cool oil is injected into the entrapped air by a gear-type oil pump, direct driven by the outboard end of the male rotor. The oil is injected for the following reasons:

1. COOLING – The oil removes the heat of compression to maintain discharge air temperatures below 200°F.
2. SEALING – The oil seals the internal clearances between the rotor, cylinder, and discharge end casing to prevent loss of air volume back to the inlet.
3. LUBRICATION– The oil lubricates the rotors, bearings, gears, and mechanical shaft seal.

COUPLING ALIGNMENT

Final alignment of direct-driven units is made by moving or shimming the unit so that misalignment of the unit and drive shafts is within .002 inch. Misalignment can be either parallel,

HOW IT WORKS

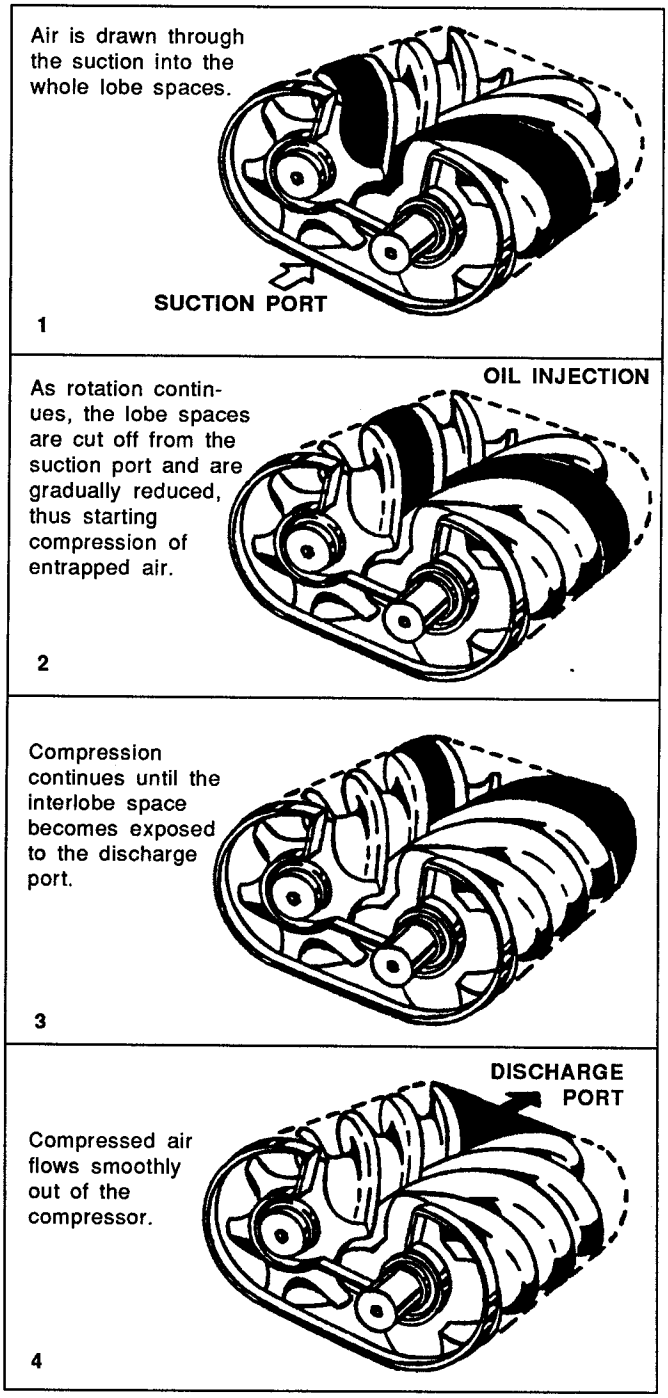


FIGURE 3-3-1

3. Close the butterfly valve to unload the compressor and observe at what pressure the tank stabilizes.

4. To increase the tank pressure level, loosen the air pressure control locknut and rotate the T-handle clockwise when viewed from the top. Continue turning until the desired tank pressure is achieved without exceeding the pressure rating on the compressor name plate. Re-tighten the locknut.

5. To reduce the tank pressure, open the butterfly valve to load the compressor. Loosen the locknut on the air pressure control valve and rotate the T-handle counter-clockwise. Close the butterfly valve to unload the compressor. Check the adjusted pressure level in the receiver tank. If the tank pressure still needs to be lowered, repeat this step 5 procedure. If the tank pressure needs to be raised, follow the procedure in step 4. Re-tighten the locknut.

After the tank has been adjusted to the desired pressure level, reconnect the wiring at the pressure switch contacts and the solenoid valves. This will re-connect the reduced unloaded horsepower feature.

With the reduced unloaded horsepower oil piping arrangement, the oil pump flow rate can be controlled by adjusting the pressure setting of the relief valve built into the pump (figure 3-3-15, item 19). The oil pump is adjusted to the proper flow rate if the temperature rise across the compressor is approximately 54° to 58°F. This is measured by noting the discharge air/oil temperature and subtracting the oil injection temperature, using the two thermometer gauges on the compressor instrument panel. The minimum allowable oil pressure on the discharge side of the ten micron oil filter (21), which supplies oil to the bearings, seal, and gears, is 13 PSIG. This can be measured by installing a pressure gauge on top of the oil filter (figure 3-3-11). The relief valve setting controls the pressure rise across the pump. The pressure must not exceed 113 PSIG (pump discharge minus pump inlet pressure). The maximum allowable discharge pressure on the pump is 150 PSIG. In cold weather, the oil is thicker at start-up and the pump discharge pressure provides the driving force to initiate oil flow through the oil cooler.

To adjust the oil pump relief valve and reduce the temperature rise across the compressor, or to provide additional pressure to assist in initiating oil flow through the cooler during cold weather starting, use the following procedure:

1. Install a 0-100 PSIG pressure gauge at the pump inlet and a 0-200 PSIG pressure gauge at the discharge of the pump.

2. Loosen the threaded cap on top of the pump.

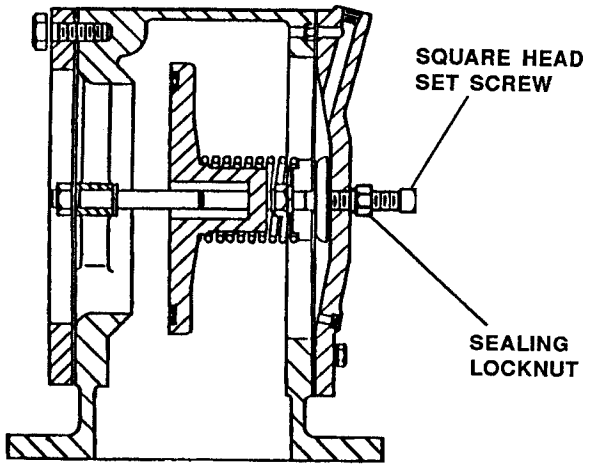
3. Loosen the locknut

4. Rotate the adjusting screw clockwise (when viewed from the top) to increase the pump discharge pressure, or counter-clockwise to reduce the discharge pressure. Do not exceed the pressure limitations stated above.

5. Re-tighten the locknut and carefully re-tighten the cap. Do not over-tighten this cap to avoid cracking the casting.

VARIABLE VOLUME FEATURE (Optional)

The purpose of the variable volume feature is to decrease the bailing velocity to reduce/eliminate sandblasting of the drill pipe and bit, resulting in increased life of these components. To reduce the bailing velocities, reduce the air flow rate or "CFM" of the compressor. Turning in the square head setscrew (figure 3-3-10), so that it protrudes through the inside face of the cover on the inlet valve, will push on the inlet valve and partially close it. This limits how far the inlet valve can open while drilling, resulting in the desired throttling of the air flow through the compressor.



INLET REGULATING VALVE
FIGURE 3-3-10

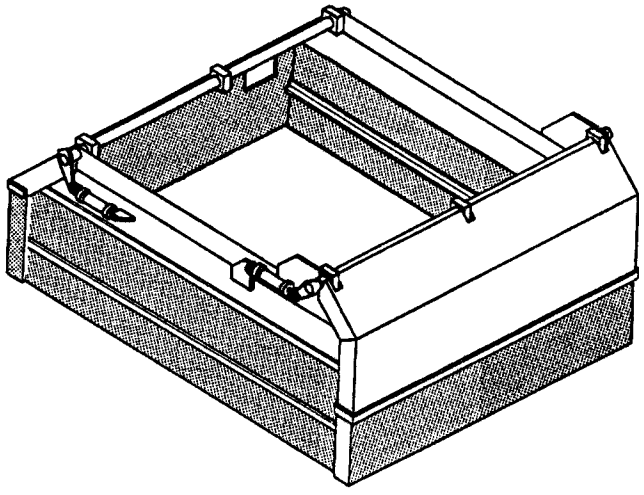
CHAPTER 4
DUST CONTROL

GENERAL MAINTENANCE

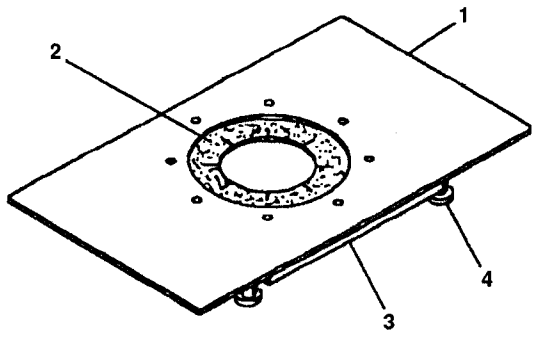
The dust control system on the 49-RII drill consists of the drilling platform and dust curtains which trap the cuttings and dust in an area under the machine. Two methods of controlling the trapped dust are available: water injection which dampens the dust before it leaves the drilling hole, and a dry-type system which draws the dust ladened air through filter elements which separates the dust from the air.

DRILLING PLATFORMS AND DUST CURTAINS

Daily inspect the dust curtains (Figure 4-1-1) for tears and other damage. Replace worn or damaged curtains. Check the curtain raising ropes for broken or frayed ropes. Replace broken or damaged ropes. Check the dust deflector seal (Figure 4-1-2) which fits around the drill pipe for damage. Replace if damaged. Check the curtain raising lever mechanism for proper operation. Lubricate all pins once a week.



DUST CURTAINS
FIGURE 4-1



1. SEAL CARRIER
2. SEAL
3. SEAL RETAINER
4. ROD END KNOB

DUST REFLECTOR
FIGURE 4-2

WATER INJECTION

The maintenance of the water injection system consists mainly of keeping the water tank full of clean water, checking weekly that the pump and valves are operating correctly, and that all hoses and fittings are not leaking.

Correction

In this case, several paths to a solution of the problem are open:

1. The lubricant should be checked. The use of the centralized system eliminates the need (in most cases) for the heavy soap additive which only lengthens the effective line of the individual lubricant application.
2. The lubricant can be made more resistant to physical change by the use of low temperature additives.
3. The output of lubricant per cycle can be increased and the lubrication interval lengthened.
4. Be sure lubricant used meets requirements of system.

Quite often, when hand operated systems are being tested after installation, repeated operations of the system are made and sometimes the interval between cycles is short, resulting in the subject difficulty. It should be remembered that under normal conditions, the cycling of a hand operated system will usually be infrequent (once an hour at the most), allowing plenty of time for proper venting.

LUBE PUMP

For maintenance and troubleshooting of the GRACO lube pump, refer to separate vendor manual. For schematic of lube pump system, see figure 5-2-1.

LUBRICATION (Figure 5-2-2)

Stage 1

The injector piston is in its normal, or rest, position. The discharge chamber is filled with lubricant, the slide valve is about to open the passage leading to the measuring chamber above the piston.

Stage 2

When the slide valve uncovers the passage, lubricant is admitted to the measuring chamber above the piston. This piston forces lubricant from the discharge chamber through the outlet port.

Stage 3

As the piston completes its stroke, it pushes the slide valve past the passage, cutting off further admission of lubricant to the passage and measuring chamber. The piston and slide valve remain in this position until lubricant pressure in the supply line is vented.

Stage 4

After venting the injector spring expands, causing the slide valve to move, so that the passage and discharge chamber are connected by a valve port. Further expansion of the spring causes the piston to move upward, forcing the lubricant in the measuring chamber through the passage and valve port to refill the discharge chamber.

PROBLEM	CAUSE	CORRECTIVE ACTION
	6. Motor problem (in the case of propel or cable reel system.)	6. Check hydraulic propel motor or cable reel motor.
	7. Cylinder problem (in the case of cylinder actuated components.)	7. Check cylinder
	8. Wrong oil for operating conditions (oil too thin.)	8. Use heavier viscosity oil.
Sluggish operation but sufficient pressure.	1. Oil viscosity too heavy for operating conditions. Extreme cold stiffens oil in outside portions of hydraulic system.	1. Use lighter viscosity oil.
Dirt or abrasives in oil.	1. Carelessness in filling.	1. Add oil thru return line filters only
	2. Oil is beyond change interval.	2. Test samples of oil periodically and change at correct interval, or sooner if necessary.
	3. Defective or saturated filter element.	3. Replace element.
	4. Pressure vacuum relief not in place on reservoir.	4. Replace pressure vacuum relief.
	5. Defective filter element in pressure-vacuum relief valve (reservoir vents.)	5. Replace element.
	6. Sediment buildup in bottom of reservoir.	6. Drain and flush reservoir.
HYDRAULIC OIL COOLER		
Not cooling oil.	1. Control thermostat not working.	1. Replace thermostat.
	2. Dirty cooling fins.	1. Clean with compressed air or steam.
	3. Bypass valve stuck open (dirty or defective.)	3. Clean valve. Replace if necessary.
	4. Fan loose on shaft.	3. Tighten setscrews.
	5. Motor not running or wrong direction.	4. Check breaker and motor. Replace if necessary.
	6. Internal surfaces coated with sludge.	6. Disconnect from system and degrease.

APPENDIX A4 - LUBE BENCHMARKS

MPG - MULTI-PURPOSE TYPE GREASE

SCOPE

Lubricants performance requirements for Multi-Purpose Type Grease.

APPLICATION

For heavy duty ball, roller and plain bearings.

GENERAL REQUIREMENTS

1. HEAT RESISTANCE - Shall be thermal stable.
2. RETENTION IN BEARINGS - Shall not exhibit high leakage.
3. MECHANICAL STABILITY - Shall work continuously with a minimum change in consistency.
4. WATER RESISTANCE - Shall withstand water wash-out or leaching.
5. REVERSIBILITY - Shall be stable with repeated heating and cooling.
6. PRESSURE OIL SEPARATION - Shall resist oil-soap separation.
7. DISPENSABILITY - Shall have the ability to be pumped through automatic lubrication systems without the aid of heat tracing on the lube lines at the designated ambient temperatures.
8. EXTREME PRESSURE - Shall withstand heavy shock loading.
9. COMPATIBILITY - Low temperature greases shall be compatible with mineral oil base greases and their oil seal material.

COMPOUNDING

Suitable for producing the extreme pressure characteristics (without inert fillers) required for heavy duty ball, roller and plain bearing lubrication.

Specific Requirements

AMBIENT TEMPERATURE	NOTE #1	110° TO 30°F	40° TO 0°F	+10 TO -50°F
NLGI	ASTM. DD-217	2	1	NOTE #2
TYPICAL PENETRATION	ASTM. D-217	265-295	310-340	NOTE #2
DROPPING POINT °F. MIN.	ASTM. D-2265	325	325	NOTE #2
TIMKEN O.K. LOAD, LBS., MIN.	ASTM. DD-2509	40	40	40
SHELL FOUR BALL EP	ASTM. D-2596			
LOAD WEAR INDEX, KG., MIN.	ASTM. D-2596	40	40	35
LOAD WELD, KG., MIN.	ASTM. D-2596	200	200	200
SHELL FOUR BALL WEAR	ASTM. D-2266			
WEAR SCAR DIAM., MM., MAX.	ASTM. D-2266	0.60	0.60	0.60
COPPER STRIP CORROSION	ASTM. D-130	PASS	PASS	PASS
RUST TEST	ASTM. D-1743	PASS	PASS	PASS

NOTATIONS

1. AMBIENT TEMPERATURE - The ambient temperature shall be the temperature at the point of lubricant application.
2. LOW TEMPERATURE GREASE - For extended use in low temperature (+10° to -50°F) areas, this product should be capable of slumping in containers and should be pumpable through lube lines without the aid of heat tracing.

   In order to minimize compatibility problems, it is desirable that the thickener and additive system be the same as NLGI #1 and #2 greases.

RWRL - RUNNING WIRE ROPE LUBRICANT

SCOPE: 1

Lubrication performance requirements for hoist rope lubricant.

APPLICATION

Primarily for hoist ropes or any other running ropes where fatigue and not wear is of prime concern.

GENERAL REQUIREMENTS

1. Penetrate between adjacent wires in order to lubricate and protect them against wear and to keep the rope core from drying out and deteriorating.
2. Provide a lubricant between sheaves and wire rope.
3. Resist being washed off.
4. Protect against rusting or corrosion.
5. Form a non-sticky film so that dust and dirt will not build up on the wires.
6. Remain pliable and resist stripping at the lowest temperatures to which the rope will be exposed.
7. Preferably is should form a light colored transparent film so that wear, corrosion or broken wires can be readily detected by inspection.
8. Be capable of easy application, both manually and by devices without being heated.

COMPOUNDING

Suitable for penetrating between the adjacent wires of a rope in order to lubricate them and also to replenish the lubricant in the core.

SPECIAL REQUIREMENTS

1. Must pass United States Steel Retention Test Using a Timken Tester
2. Shell Four Ball E.P. - (ASTM D-2596)

   Load wear index, kg., min. 40
   Load weld kg., min. 250
3. Shell Four Ball Wear - (ASTM D-2266)

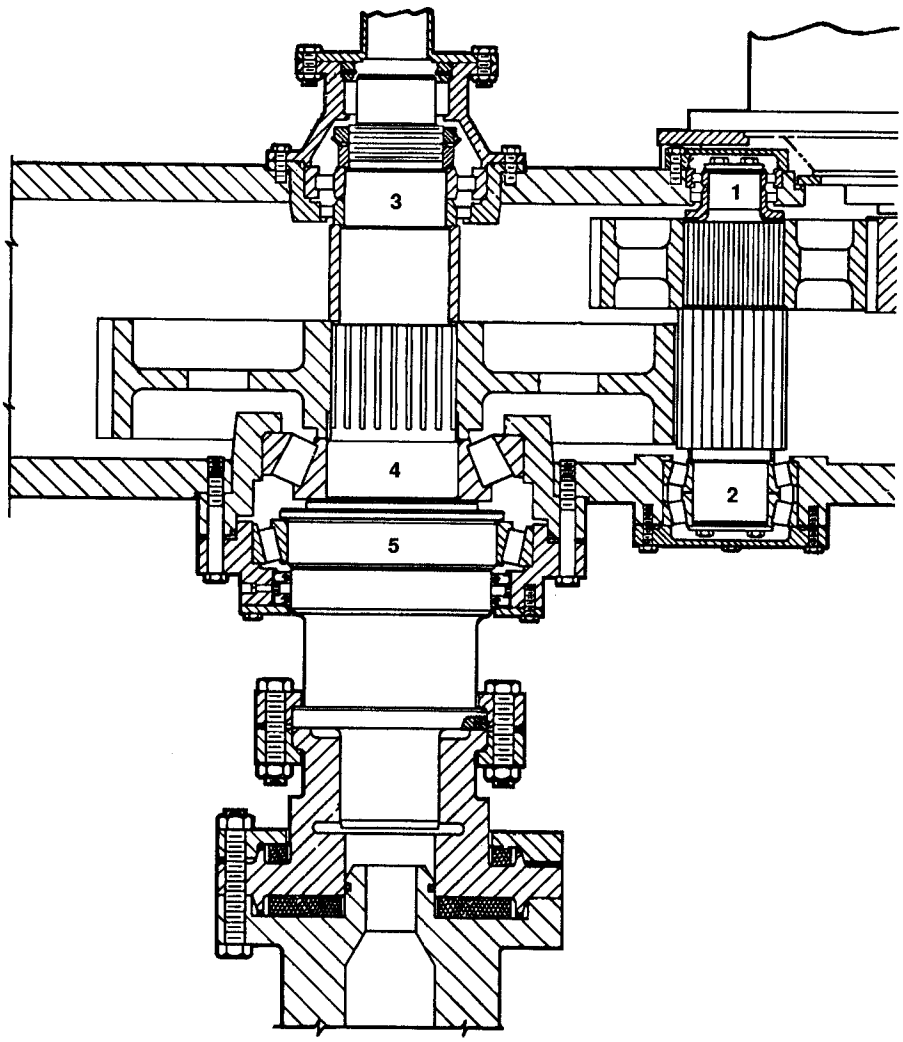
   Wear scar diameter, mm., max. 0.60
4. Timken O.K. Load lbs., min. - (ASTM D-2782).....45
5. Copper Strip Corrosion - (ASTM D-130), pass
6. Suggested Application Temperature Ranges

   There should be a lubricant for each of the following temperature ranges:
   110° to 30°F 40° to 9°F 10° to -50°F

NOTE: These performance requirements are bench marks and not a specification. Therefore, meeting these limits as described above does not relieve the supplier of the responsibility associated with brand name products.

ITEMS TO BE CHECKED	✓ SHIFT 1	2	3	LIST PROBLEMS / NOTE ACTION
AC voltage in operator's cab				
Operation of machine while in production and with the operator, note the following:				
Water injection				
Deck view hatch				
Boarding stairs				
Dust curtains				
Once a day inspect the rotary head for loose nuts and bolts				
Maintenance Foreman's Initial				

ITEMS THAT NEED TO BE CORRECTED ON THE NEXT 250 HOUR SERVICE:



ROTARY GEARCASE SHAFTS

ITEM	BEARING DESCRIPTION	TO SHAFT	TO HOUSING
1	CYLINDER ROLLER BEARING UPPER INT. SHAFT	.0006T- .0017T	.0000- .0020L
2	TAPERED ROLLER BEARING ASSEMBLY LOWER INT. SHAFT	.0005T- .0025T	.0010L- .0030L
3	CYLINDER ROLLER BEARING UPPER DRIVE SHAFT	.0001T- .0021T	.0000- .0056L
4	TAPERED ROLLER BEARING LOWER DRIVE SHAFT (HEAVY DUTY)	.0028T- .0048T	.0004L- .0050T
5	TAPERED ROLLER BEARING LOWER DRIVE SHAFT	.0005T- .0025T	.0010T- .0050T

L = LOOSE
T = TIGHT

BEARING FITS
ROTARY SHAFTS
FIGURE A7-2