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Technical Manual

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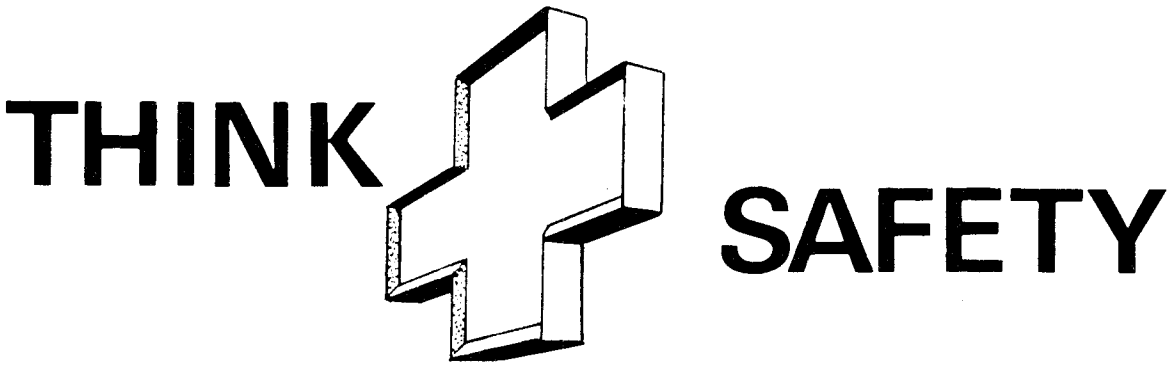
ALL hold down bolts on rotating frame. Especially swing gear case, motor mounting, machinery pedestal and base bolts. Check also motor generator and air compressor mount and base bolts. Tighten rod bolts on bearing housing.

Examine and readjust the hoist brake, if needed. Look at the condition of brake lining. Remove inpsection plate from swing gear case. Look at condition of gears. Use pry bar to detect any side motion of shaft indicating worn bearings. Examine condition of rotating brakes and their adjustment. Adjust, if needed. Inspect air compressor "V" belt tension, replace if needed. Fill the anti-freezer. Check auto-lube system for loose or broken fittings or injectors.

Check center journal thrust washer and bearing. Secure ALL guards and safety features in place. DISCONNECT POWER SOURCE with machine shut down so electrical crew may adequately clean and inspect motor generators and electrical cabinets. NOTE any discolored electrical parts, it's a sign of overheating. In humid areas, look for fungus and mildew. Dry compressed air at LOW pressure works well for dust removal. Clean corrosion from parts joints and connections. Retighten, where needed, any loose connections and terminals. Use of proper tool here eliminates broken terminals and terminal blocks. Replace missing or damaged tags and labels. Bundle loose wiring. Fasten ALL components and wiring in cabinets. Check the cable armor tight in the fixture. Look closely where wires and cables pass thru openings and grommets. Insulation damage generally occurs here. Replace grommets if needed. Arcing of motors and generators causes discolored commutators. Look at brushes and brush holder condition. Correct brush spring tension where needed. Collector rings need cleaning and checking also. Use a hand grease gun at each injector. Fill ALL grease lines and purge EACH bearing with MPG. Remember to replace ALL plugs, covers and inspection plates.

Passing equipment condition reports along the line is important too. Wear patterns show up at varying degrees in time. Recording and checking these reports at a future date allows comparison and planned shutdowns. Planned repairs, part orders and crews for a scheduled shutdown eliminates idle downtime.



Start the FILTER FAN MOTORS by fully depressing and releasing the filter fan start push button switches one at a time. Check to see that the indicator lights up. You will hear the sound of the fans as they come up to speed. Shut them down immediately if unusual noises are heard.

Start the AIR COMPRESSOR by flipping the air compressor selector switch to the "AUTO" position. Be sure the air compressor is operating properly or that the reservoir is sufficiently pressurized.

Check the following: hoist, swing and crowd brakes in set position and all control levers in neutral. The machine is now ready for start up.

Observe the air pressure on the air pressure gauge. Minimum operating air pressure is ninety pounds per square inch. Normally the reading should be approximately one hundred fifteen pounds per square inch.

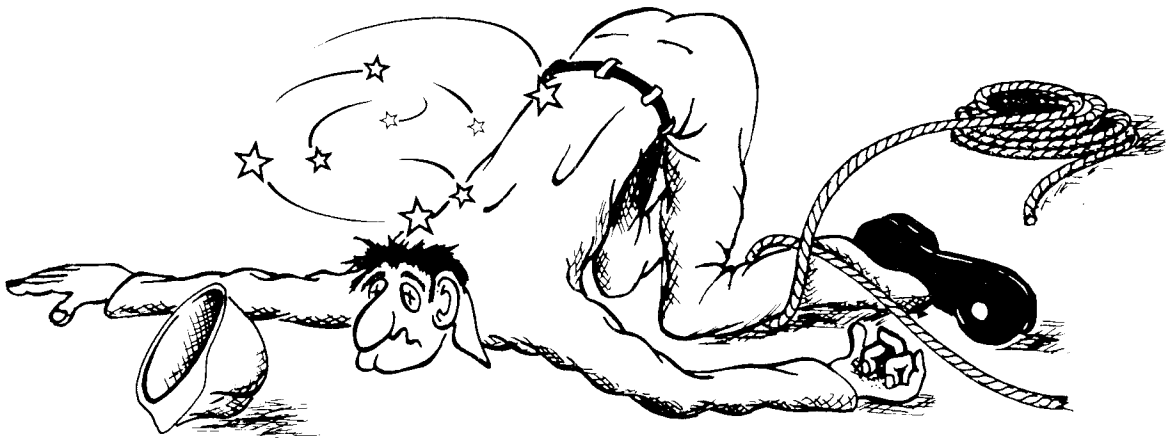
Check the pitch ram pressure and pitch reservoir gauges to be sure hydraulic gauge readings are within the respective operating range. DO NOT operate the machine if the hydraulic gauge readings are not in the normal range.

With brakes set and controllers in neutral, fully depress and release the excitation start push button switch. The indicator light will come on. The motion controllers are now energized.

Check the control transfer switch for proper operating mode.

Release the hoist, swing and crowd brakes by flipping "down" the toggle switches. The machine is now ready to dig.

KEEP WORK AREAS CLEAN



DESCRIPTION OF OIL AND GREASE CLASSIFICATION

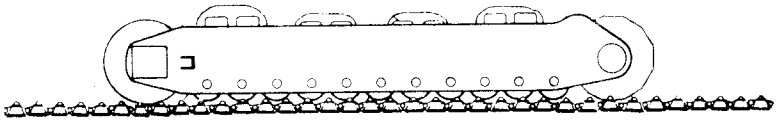
CODE	NAME	DESCRIPTION
MPG	Multipurpose Grease	A well manufactured E.P. grease having good resistance to both heat and water, possessing good mechanical stability and oxidation resistance. It must be suitable for use in Farval, Lincoln and Trabon automatic dispensing systems. It shall be free of corrosive and deleterious foreign matter of any kind. Special products not meeting the requirements of the Engineering Standard may be required for operation at sub-zero ambinent temperatures. MPSD should be consulted regarding products intended for service at low ambient temperatures. USES—Anti-friction bearings both packed and gun lubricated, chassis and plain bearings and central lubricating systems.
RGL	Regular Gear Lubricant	Semi-fluid greases having just enough body to retain them in a semi-enclosed case. It must have good adhesive, load carrying and non-channeling properties USES -Semi-enclosed gear cases.
OGL	Open Gear Lubricants	Either of two types of product may be specified. They are intended for use on open gearing where retention is a problem. Both must be adhesive in nature and resist dripping from or flinging off the exposed gearing either idle or in motion. They must be water and corrosion resistant and have E.P. properties. 1. Type B must be suitable for application without heat or diluent and should be suitable for use in automatic dispensing systems if required.

LUBE POINT DESIGNATIONS (Pages 14 and 15):

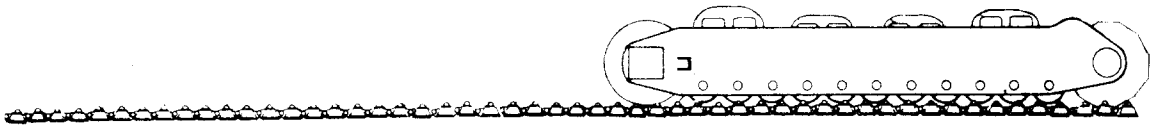
1. Front Idler Rollers
2. Crawler Load Rollers
3. Fifth Propel
4. Sprocket Shafts
5. Roller Circle
6. Swing Pinions
7. Steering Clutches
8. Hoist Gear
9. Intermediate Hoist
10. Center Journal
11. Pitch Sheaves
12. Hoist Sheaves
13. Upper Hoist Sheaves
14. Stiffleg Pins
15. Stiffleg Foot Pins
16. Bail Pins
17. Bellcranks
18. Bellcrank Pitch Pendant
19. Handle Sockets
20. Handle Pins
21. Ball Socket Hoist Link Balls
22. Hoist Link Ball Pin
23. Hoist Link
24. Handle Pins
25. Pitch Pendants
26. Dipper Door
27. Mast Foot Pins
28. Front Crowd Link Pins
29. Rear Crowd Link Pins
30. Crowd Sheave Bushing
31. Crowd Equalizer Bail
32. Crowd Motor Bearing
33. Crowd Drum Bushing
34. Crowd Gears

seated against the sprocket upper driving lugs. The shoes are now being fed into the belt instead of pulled out and ALL belt slack must be initially taken up between the sprocket and load roller next to the sprocket. As machine continues to move, this storage capacity is rapidly accumulated with excessive belt slack. As a result, shoes buckle between the rear load roller and sprocket. This forces the machine to climb over these buckled shoes. When belt slack continues to increase, the belt separates from the sprocket which causes an out-of-pitch condition. The result here is severe wedging and binding that causes a pounding motion and again more belt stretch and higher bearing loads.

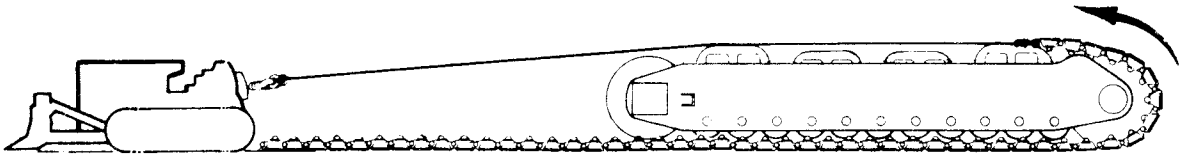
TO REPLACE BELT, retract front roller to loosen. Separate belt at the first joint above ground under the front roller. Remove lock bolts and drive out the connecting pins. Pro-



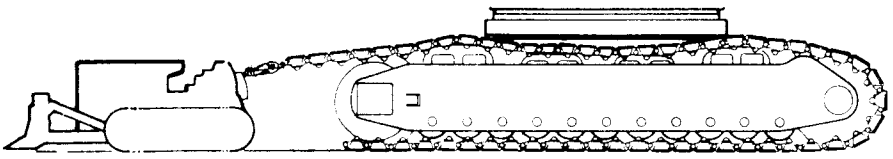
pelling to the rear of the crawler belt will allow the belt to lay out. Align new belt with the



last shoe of the old. Continue to propel machine to the rear of new belt. Disconnect old belt from new and remove from work area. Attach a wire rope to the rear end of the belt,



then to a truck or dozer. Pull up on belt to engage the shoe lugs with the drive sprocket.



Propel machine forward and winch belt over top of crawler side frame and slide bars. Pull belt ends together and connect with pins. Re-adjust belt tension.

TO REMOVE IDLER ROLLER, release belt tension and separate belt at first joint above ground. Propel machine FORWARD to position the un-pinned shoe, which is laying on the ground, to the rear of the idler roller. Propel machine in reverse or pull tread rearward to

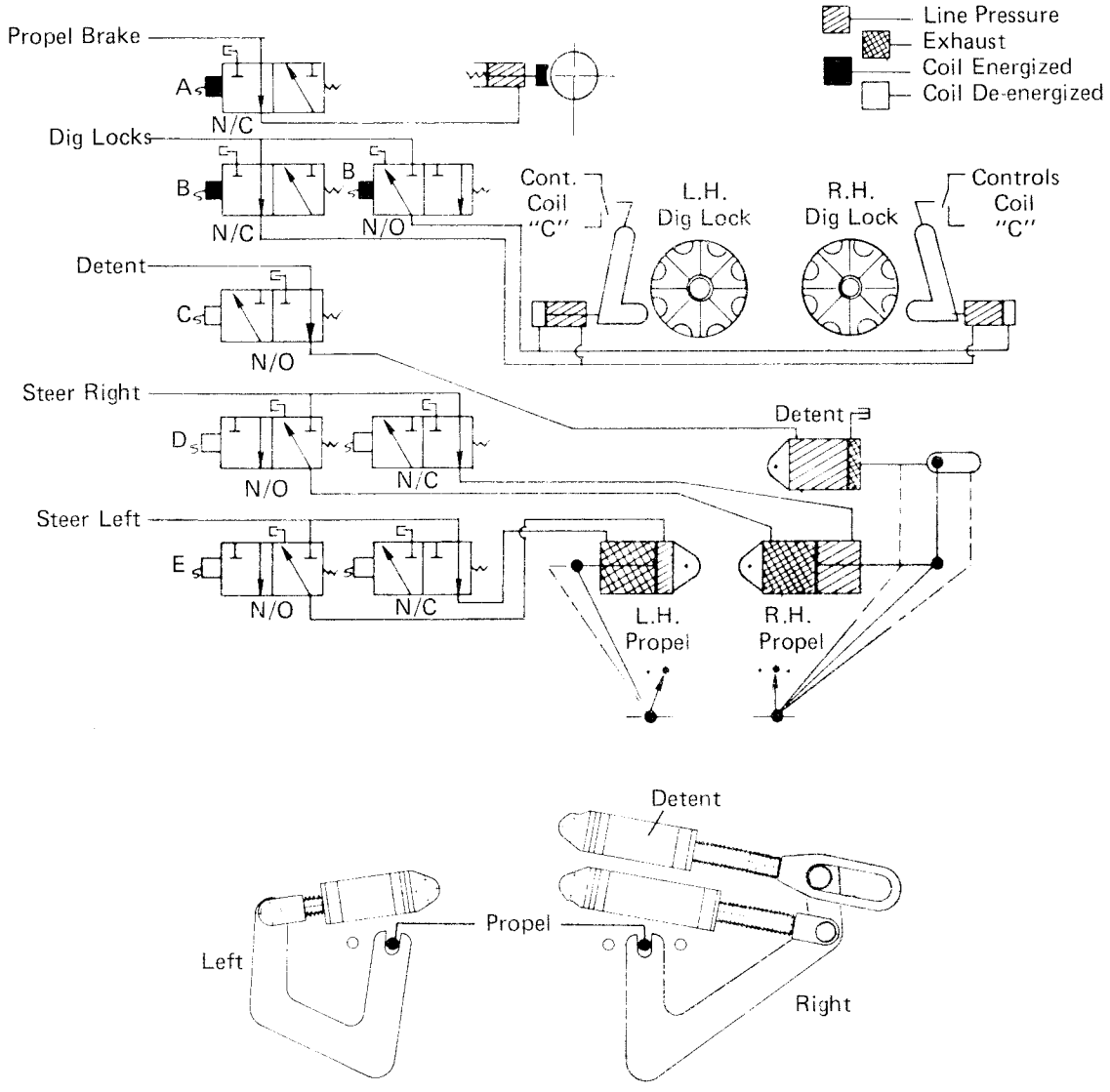
PROPEL MODE:

– Propel brake released

– Dig locks retract

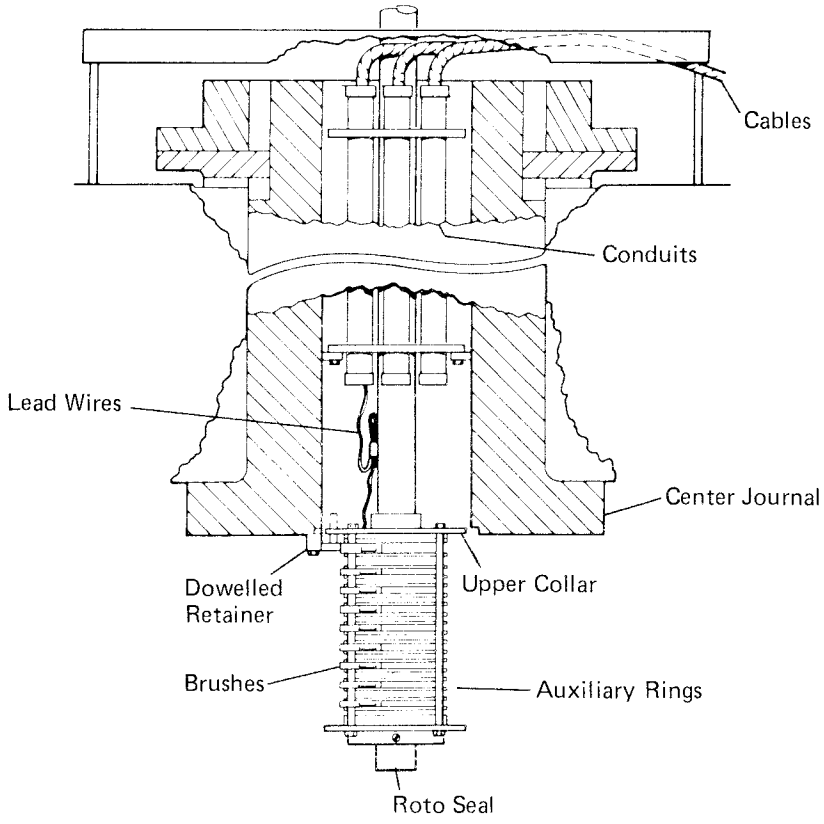
– Detent cylinder extends

– Steering cylinders retract to propel position



PROPEL

The **AUXILIARY COLLECTOR RINGS** are attached to the roto seal assembly, below the center journal, with set screws. The upper collar, which is part of the brush holder, is stabilized with a dowelled retainer. The dowelled retainer is secured to the bottom of the center journal.



CENTER JOURNAL REMOVAL is thru the lower frame. Propel machine over a pit, deep enough to allow the shaft to clear the lower frame underneath.

CAUTION: All POWER must be OFF during this operation to eliminate shock hazards.

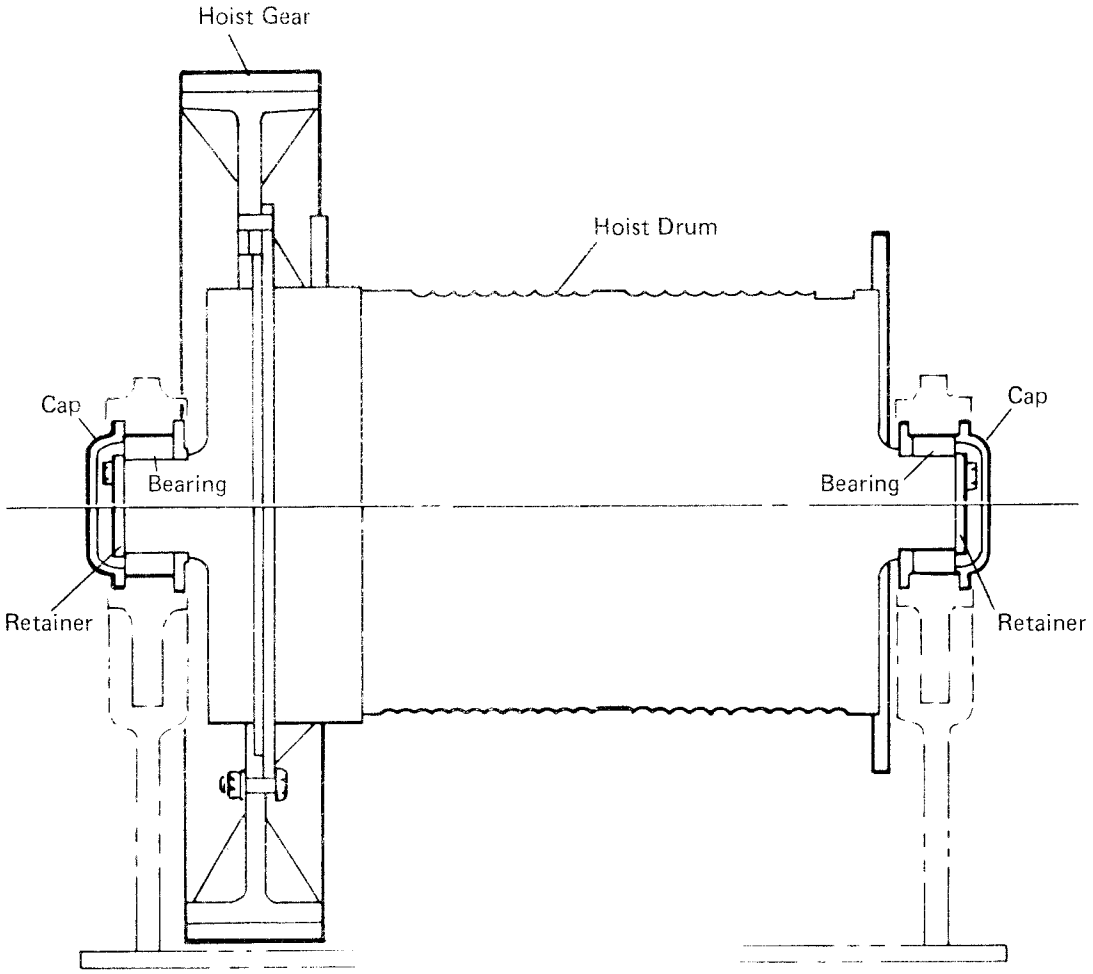
Remove cover plate from bottom of lower frame for access to the auxiliary rings and center journal.

Remove capscrew which secures the dowelled retainer that stabilizes the auxiliary collector ring.

The **HOIST DRUM SHAFT** is composed of a cast drum with integral shafts. Rope grooves are machined into the drum casting. The main hoist drive gear bolts onto the left hand drum flange. Two spherical roller self aligning bearings support the drum.

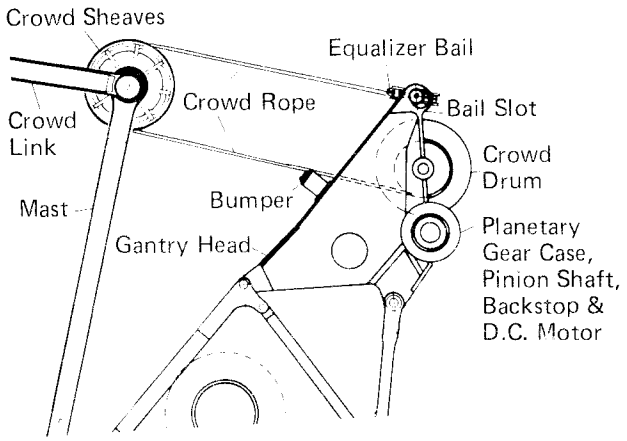
Assemble the double spherical roller bearings on stub shaft and in housing in the following manner:

Install inside retainer and shaft spacer. Clean stub shaft and inside housing. Heat bearing in oven to 200 degrees F. Assemble bearing on shaft, tight against spacer. Bolt retainer in place and wire lock the capscrews. Raise bearing housing in place. Use an eyebolt, threaded into top of housing. This eyebolt is for handling housing ONLY. DO NOT attempt lifting drum assembly with this eyebolt.



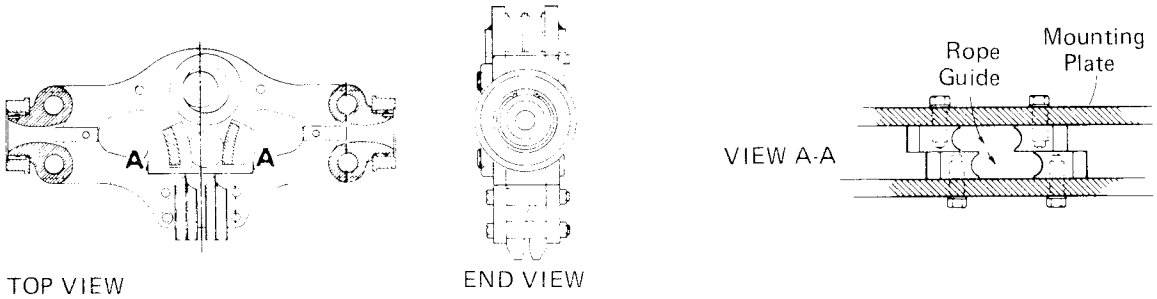
HOIST DRUM SHAFT

The **CROWD MACHINERY** is composed of a D.C. motor, dual pinion shaft, double reduction planetary gear case and a dual geared drum shaft. Dual brakes (spring set-air released) mount on the pinion shaft. Brakes can be set either by the operator or a "slack rope" condition. Dual ropes, each 2 inch x 176 foot long, are attached at midpoint to the equalizer bail, reeved around the crowd sheaves and anchored on the crowd drum. A bumper provides a positive stop for the sheaves. All the above mentioned assemblies, except the mast mounted crowd sheaves, are assembled to the gantry head and above the roof line.



CROWD MACHINERY

To counteract the **SLACK CROWD ROPE,** a backstop or one-way clutch is provided on the crowd machinery and attached to the planetary gear case. The backstop will not slip when crowd is retracted; however, the backstop transmits only a small amount of torque when crowding out before the backstop will slip and allow gear case to rotate.



EQUALIZER BAIL

Slack rope conditions occur when the operator is crowding out. As the ropes go slack, the equalizer bail moves down in its mounting slot. A limit switch is then activated and sets off an audible alarm in the operator's cab; thru mechanical linkage, the crowd brake is set. When the crowd brake has set, the backstop will slip or rotate, thus preventing the operator

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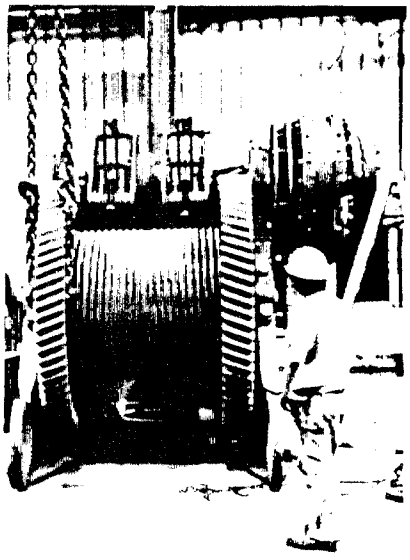
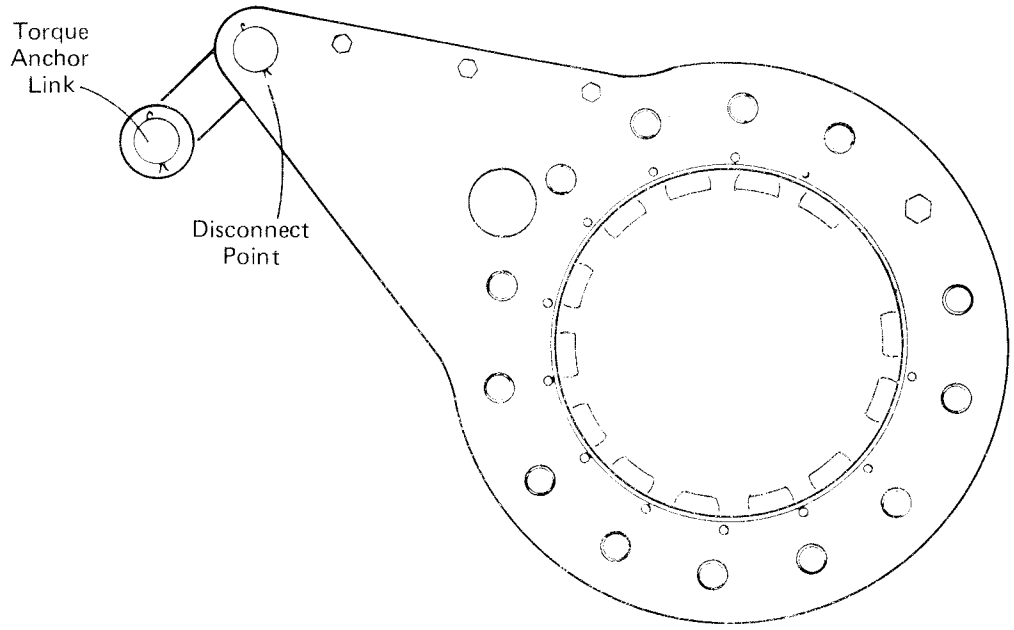
CROWD DRUM



Edge view of crowd drum & helical gears

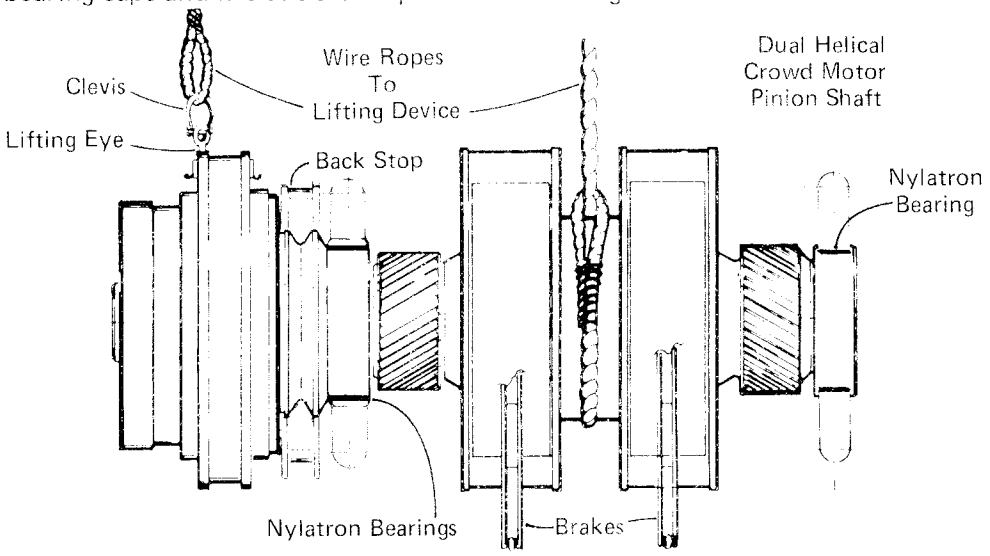
Remove cotter pin and disconnect torque anchor link from the backstop assembly.



BACKSTOP ASSEMBLY

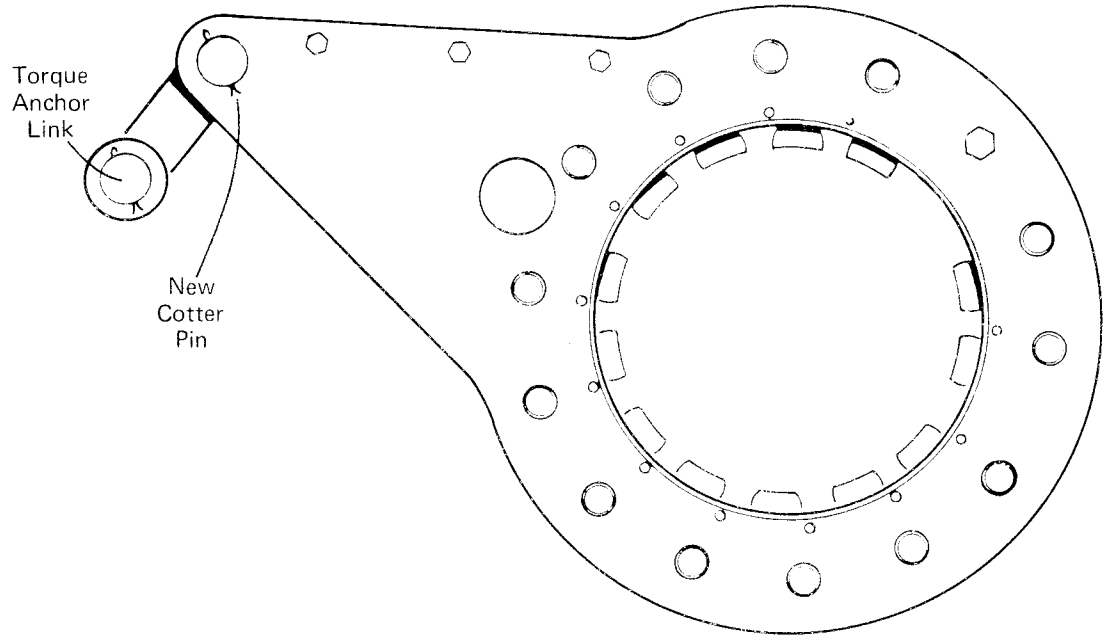
Remove crowd motor as described on page 53 and attach a wire rope sling around crowd pinion shaft between brakes. Attach a second wire rope with clevis, to the gear case lifting eye. Secure to a suitable lifting device and take-up slack.

Remove bearing caps and lift out crowd pinion shaft and gear case.



CROWD PINION SHAFT AND PLANETARY GEAR CASE REMOVAL

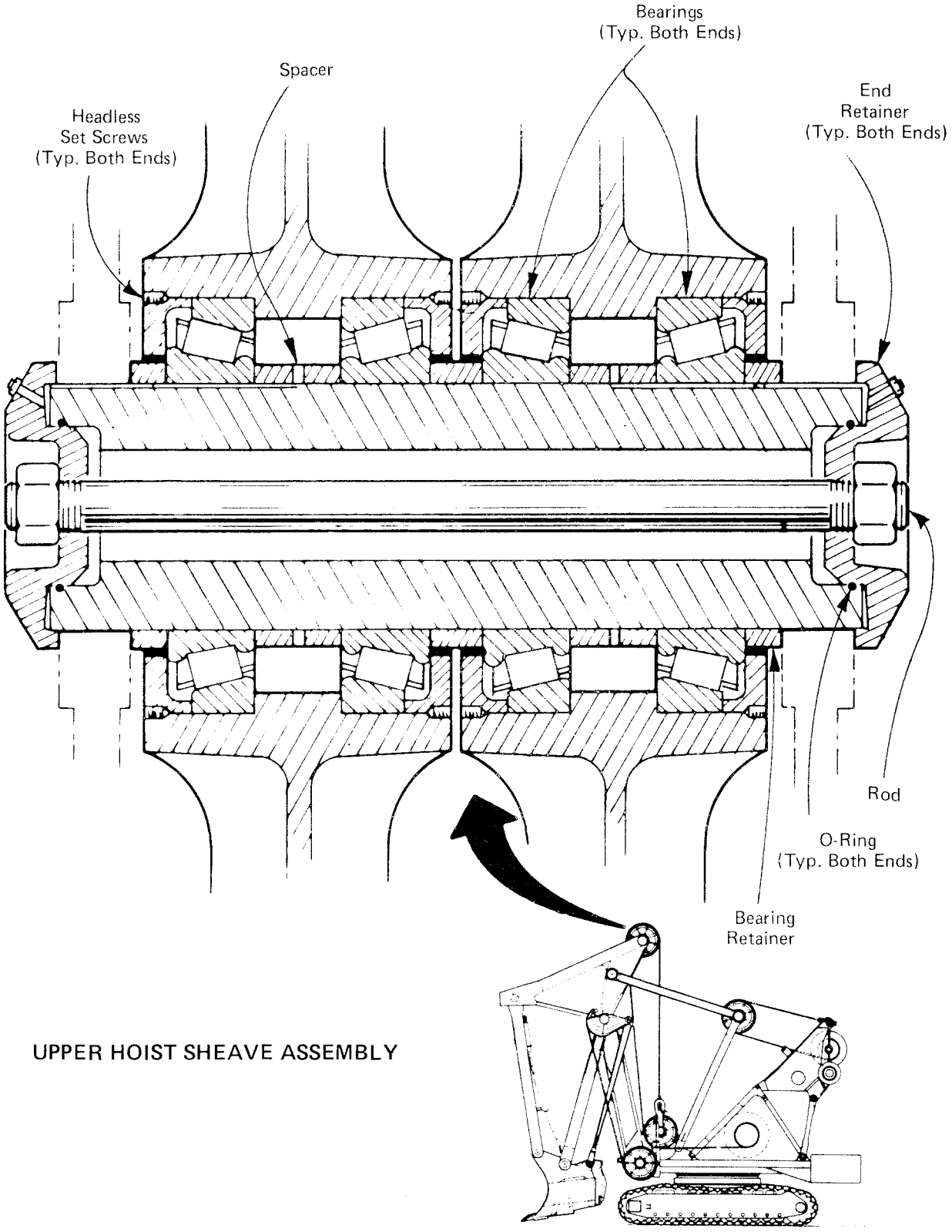
Align splines on shaft end with splines in bushing and, at the same time, the pinion (sun) with planet gears. After establishing alignment at both ends, push input pinion shaft into place. Remove special tool from shaft and tubed fixture from planetary gear case housing. Install retainer cap and secure. Reconnect roto seal. Disconnect wire rope sling.



INSTALLATION OF BACKSTOP ASSEMBLY

Reassemble backstop to torque anchor link and secure with new cotter pin. Be sure drain/filler plugs are secured except one, which will be used as a filler for gear lubricant. Rotate planetary gear case to position an oil check plug at the bottom and remove plug. Fill gear case with 25 gallons of gear lubricant (GL 140) then secure oil check plug and drain/filler plug. Gear lube level should be checked daily by removing oil check plug in its downward most position. The 25 gallons (full capacity) should bring the level up to the plug. Check with finger for capacity. If lube is below the required capacity, fill until gear lube runs out of the oil check hole than secure plug.

NOTES:



UPPER HOIST SHEAVE ASSEMBLY

PITCH SYSTEM MAINTENANCE –

FILTER: Check filter (item 28) before filling on a weekly basis. When dirt indicator nears red zone replace filter. Indicator should be checked while raising dipper at maximum speed with pitch released. Close gate valves (items 21) to prevent loss of fluid before changing filter element. Valves should be completely open during normal operation.

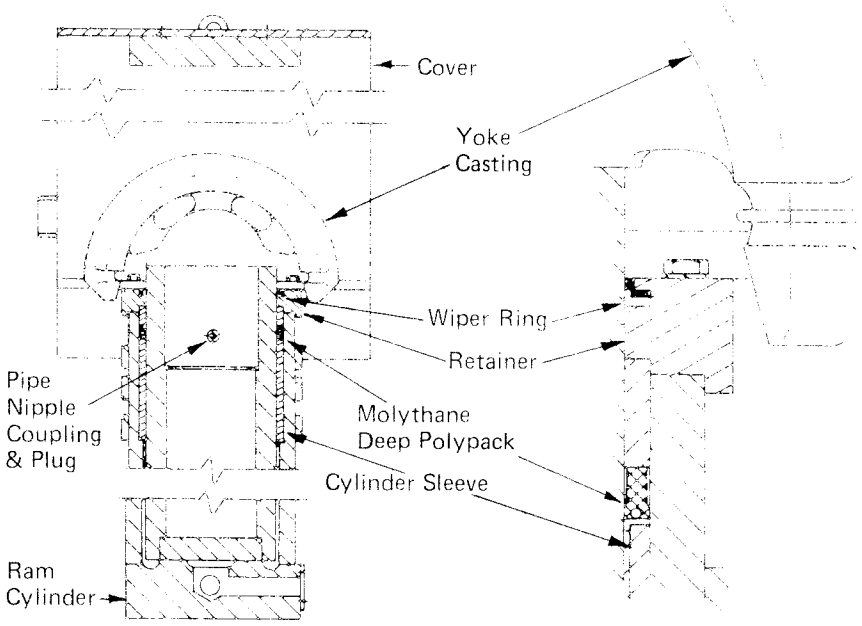
Hydraulic drive fluid (HDF) should be near bottom of the reservoir sight glass with dipper FLAT on the ground and system charged.

The dry nitrogen gas pressure should be 90-130 psi with fluid at proper level and dipper flat on the ground.

Minimum fluid level on reservoir sight glass can be measured 33 inches from tank bottom, while maximum fluid level measures 56-1/4 inches from tank bottom.

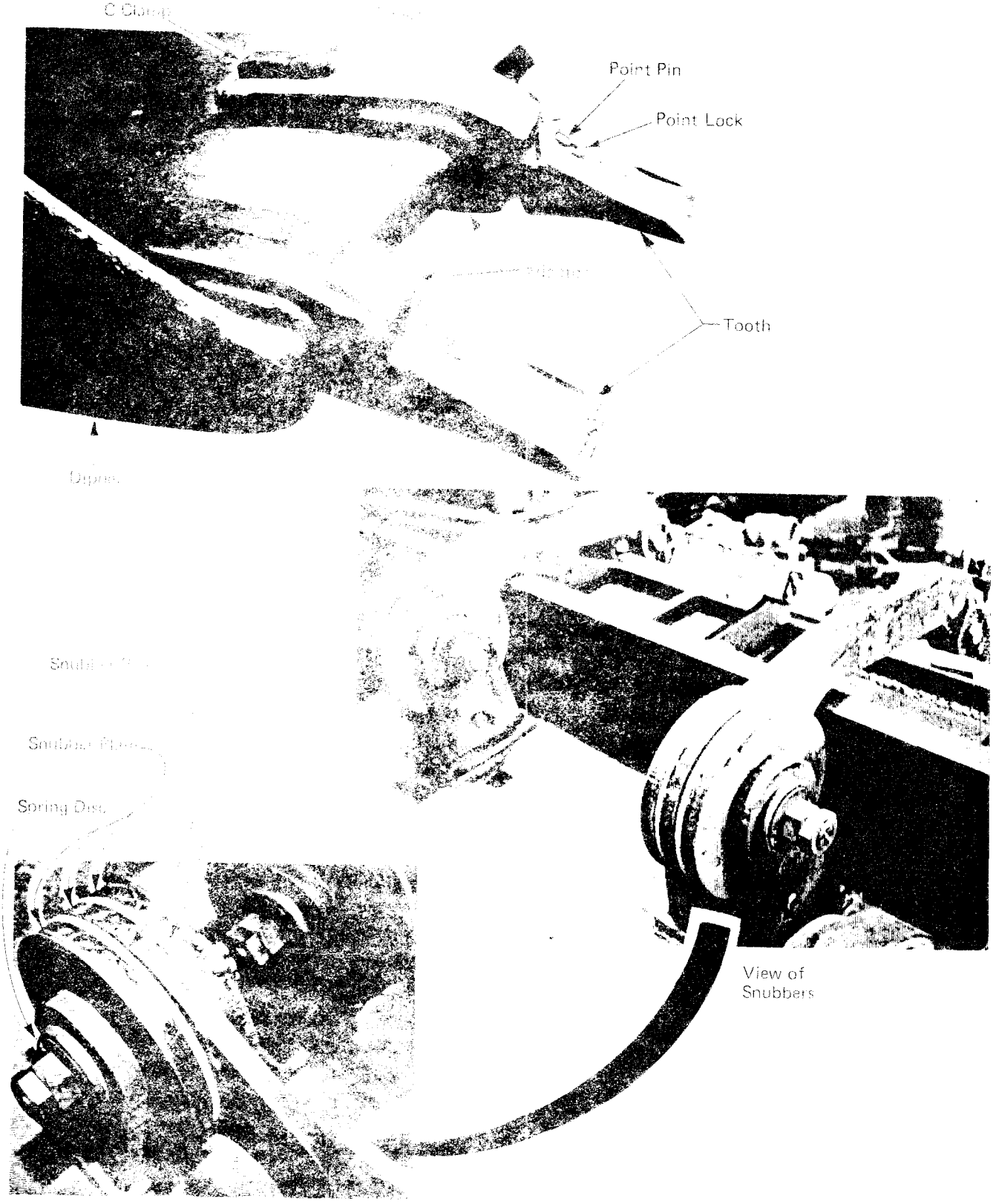
Either or both LOW nitrogen pressure and LOW fluid level create a slack pitch rope condition. Check pressure gauge and sight glass to insure proper level and pressure.

PITCH CYLINDER CONSTRUCTION is shown by a cross section of a pitch cylinder. Note that ALL wearing parts are contained in the removable gland assembly. Also the ram does



PITCH UNIT ASSEMBLY

NOTE: Wiper ring lip must point upward, Polypack O-ring and lips downward.


Point Pin
Point Lock
Tooth
View of
Snubbers

COMMAND LEVERS for Hoist, Pitch, Crowd and Swing provide Operator control with a "joystick" type device. Each lever can control: two machine functions simultaneously. The Horn and Dipper Trip thumb buttons are located at ends of levers.

The Lever Head Section protrudes above the Control Stand and attaches through a pair of trunnion type universal or "Hooke" joints that provide 360 degrees lever movement. A Rubber Boot protects the Head Section from dust contamination.

Command Lever movement in any given direction lengthens (or shortens) one OR both Control units located within the stand. Control unit centering springs are arranged to return the Command Lever to NEUTRAL (center) position when released, regardless of deflection.

NOTE: Hoist Command Lever may be held by a magnetic detent while lowering hoist. This provides operator with an opportunity to remove hand from lever briefly.

The frames and operating mechanism of ALL four Control units are identical. Hoist, Crowd and Swing Control units are fitted with three contact switches (A, B and C) and a potentiometer (1). The Pitch Control unit differs in that only one switch is installed with a dummy potentiometer providing a guide for rack (2).

Lengthening or shortening the Control unit causes the rack (2) to drive the potentiometer pinion (3). Total Potentiometer Shaft rotation is governed by a mechanical Stop. Any Rack (2) movement from Center UP OR DOWN compresses the Centering Spring (4).

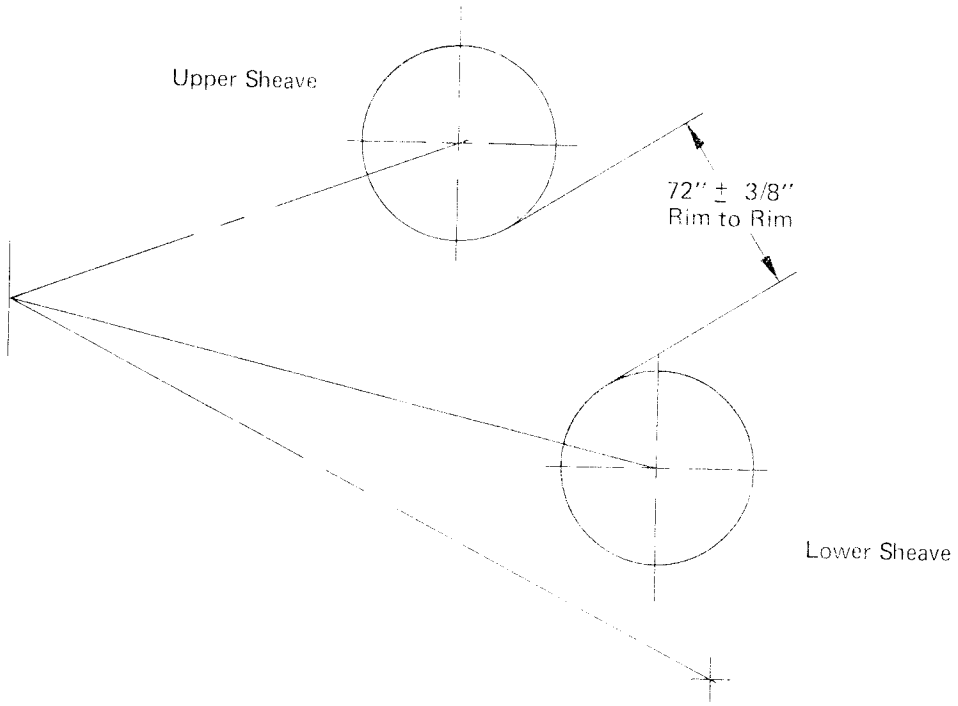
A plunger (5) attaches to the Rack (2) and moves the switch contact plates when the Control unit moves from Neutral position. Lower Contact Plate (6) follows Plunger movement as Control unit lengthens and Upper Contact Plate (7) follows Plunger movement as the unit shortens. Switch bracket (8) attaches to Upper Contact Plate (7) so ANY movement from Neutral opens switch (C) contacts.

SWITCH ACTUATION

Switch	Collapsed Control Unit	Neutral	Extended Control Unit
A	–	+	+
B	+	+	–
C	–	+	–

NOTE: + = Switch Actuated
– = Switch Released

To adjust the hoist motion limit mechanism, raise the dipper until the distance between the hoist sheave rims is 72 inches as shown in View 3.



HOIST SHEAVE POSITION FOR ADJUSTMENT
View 3

Position the hoist/lower cams and cam drive pin at the midpoint of their adjustment using the adjusting screws (H). Loosen clamp (X) shown in View 1 and rotate the sheave/drum on the limit mechanism until the cam (D) alignment mark is in-line with the step in follower (E), tighten the clamp (X).

NOTE: To make the rope slide easily in the large sheave, relieve the rope tension by forcing the mechanism forward.

Back off the cam follower stop (G) so that the follower will touch the low part of the cam as it rotates. Rotate the potentiometer (F) shaft to its mid position* and install. DO NOT TIGHTEN THE HOLD DOWN CLAMPS UNTIL THE DRIVE GEARS ARE PROPERLY ENGAGED.

Hoist the dipper until the hoist frame mechanical stops contact the stiffleg mechanical stops and install the hoist position potentiometer (A) with the mark on the potentiometer shaft at mid travel*. Clamp the shaft with screw (Z) and rotate the potentiometer 120° counter-clockwise (when viewed from L.H. side of machine) and tighten the 3 hold down clamps.

*Locate the potentiometer shaft mark 180° from midpoint, between the CCW and CW terminals on the potentiometer.

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HYDRAULIC PITCH SCHEMATIC

Item	No. Used	Part Name
1	1	Gauge, 0-200 psi
5	1	Gauge, 0-5000 psi
9	1	Globe Valve, 2''
12	1	Check Valve, 3'' Silent
17	1	Check Valve, 1-1/2'' Screwed End, Union Body
21	1	Gate Valve, 1-1/2'' Bronze
24	2	Gate Valve, 4''
28	1	Filter
31	2	Check Valve, Manifold Mounted
42	1	Quick Disconnect
46	2	Valve, Relief
55	1	Valve, Tank
72	1	Valve, Check
88	1	Valve, Safety Relief
94	1	Valve, Solenoid
106	1	Valve, Needle

Accurate, properly maintained test equipment, suitable for the quantities for measurement is needed also.

a D.C. voltmeter for 125-600 volts,

a D.C. millivoltmeter for 60 millivolts,

zero center meters preferred,

a volt-ohm-milliamp meter or

a multi-meter (example, Simpson 260),

an A C. voltmeter, unless multi-meter is accurate,

a quality tachometer is often handy, and

a 500 volt D.C. megger test insulation quickly.

Knowing the capabilities and limitations of each instrument helps keep repair and replacement costs reduced, since most test equipment suffers from the wrong connection rather than damage from dropping.

Now – get set to find the trouble.

INVESTIGATION: When trouble occurs, the operator is the "Expert Witness", so contact him first for answers to the following important questions.

How many motions are effected?

Is motion dead or just retarded?

Is it intermittent or continuous?

Did trouble develop slowly or suddenly?

What happened just before the failure?

A complaint concerning POWER means different things to different people, so try to get specific answers to the following:

Will machine lift as heavy a load as before?

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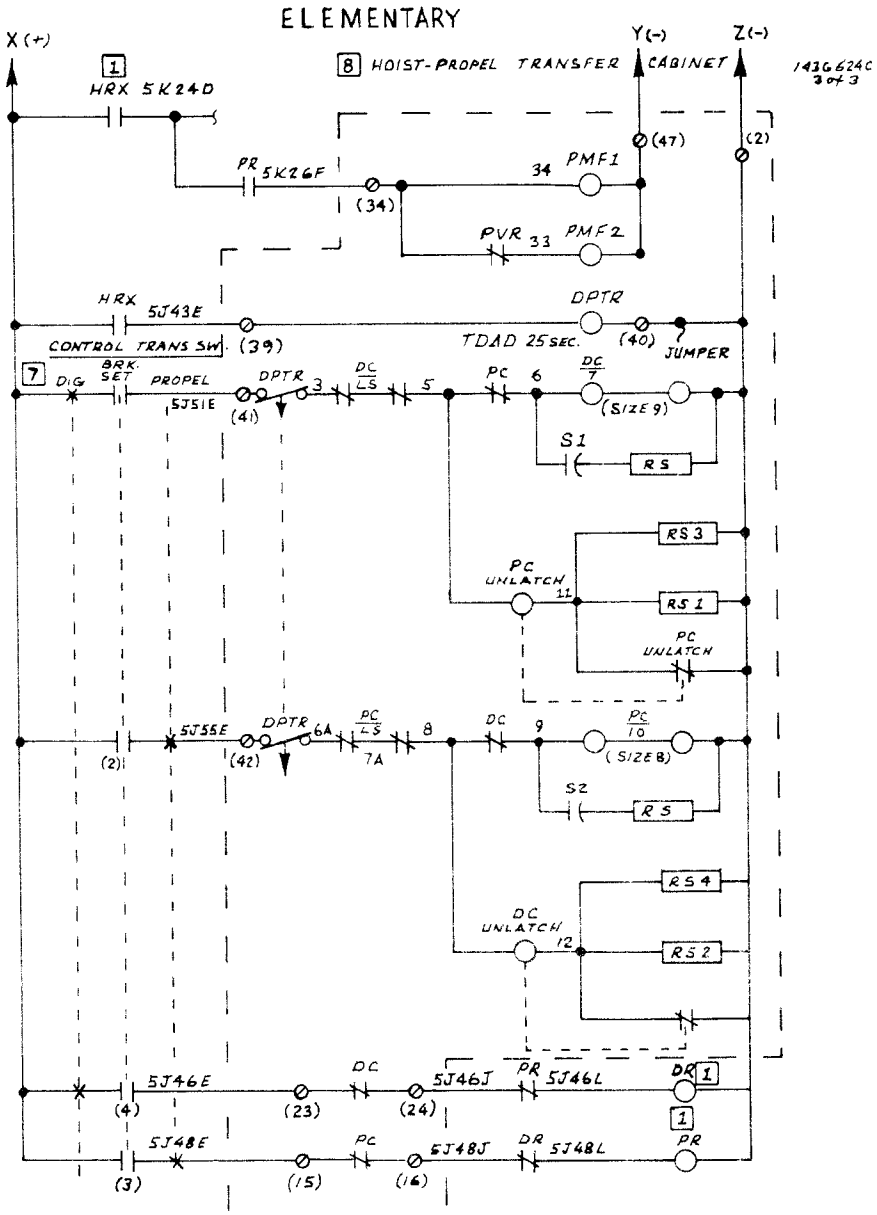
ELEMENTARY
X(+)
Y(-)
Z(-)
8 HOIST-PROPEL TRANSFER CABINET
1416G624C 3 of 3
1 HRX 5K24D
PR 5K26F
34 PMF1
(34)
PVR 33 PMF2
(47)
(2)
HRX 5J43E
CONTROL TRANS SW. (39)
DPTR
TDAD 25 SEC.
(40)
JUMPER
7 DIG BRK. SET PROPEL
5J51E
DPTR 3
DC LS 5
PC 6
DC 7 (SIZE 9)
S1 RS
RS 3
PC UNLATCH 11
RS 1
PC UNLATCH
5J55E
DPTR 6A
PC LS 8
DC 9
PC 10 (SIZE 8)
S2 RS
RS 4
DC UNLATCH 12
RS 2
5J46E
DC
5J46J
PR 5J46L
DR 1
5J48E
PC
5J48J
DR 5J48L
PR
HOIST/PROPEL
CONTACTOR WIRING
L1(+)
PMF2
PM2
L2(-)
JUMPER
PMF1
PM3
6
PROPEL MOTOR SHUNT FIELD
(PM 1)
PVR
36
7A34H
PR
7A29G
RESP21 4K
RESP20 15K
RESP19 15K
RESP22 300~
RESP23 300~
RESP24 300~
PVR
37
(35)
PVR: PICK-UP @ 287 V (VG=575)
DROPOUT @ 237 V (VG)=475)
7A34C
(38)

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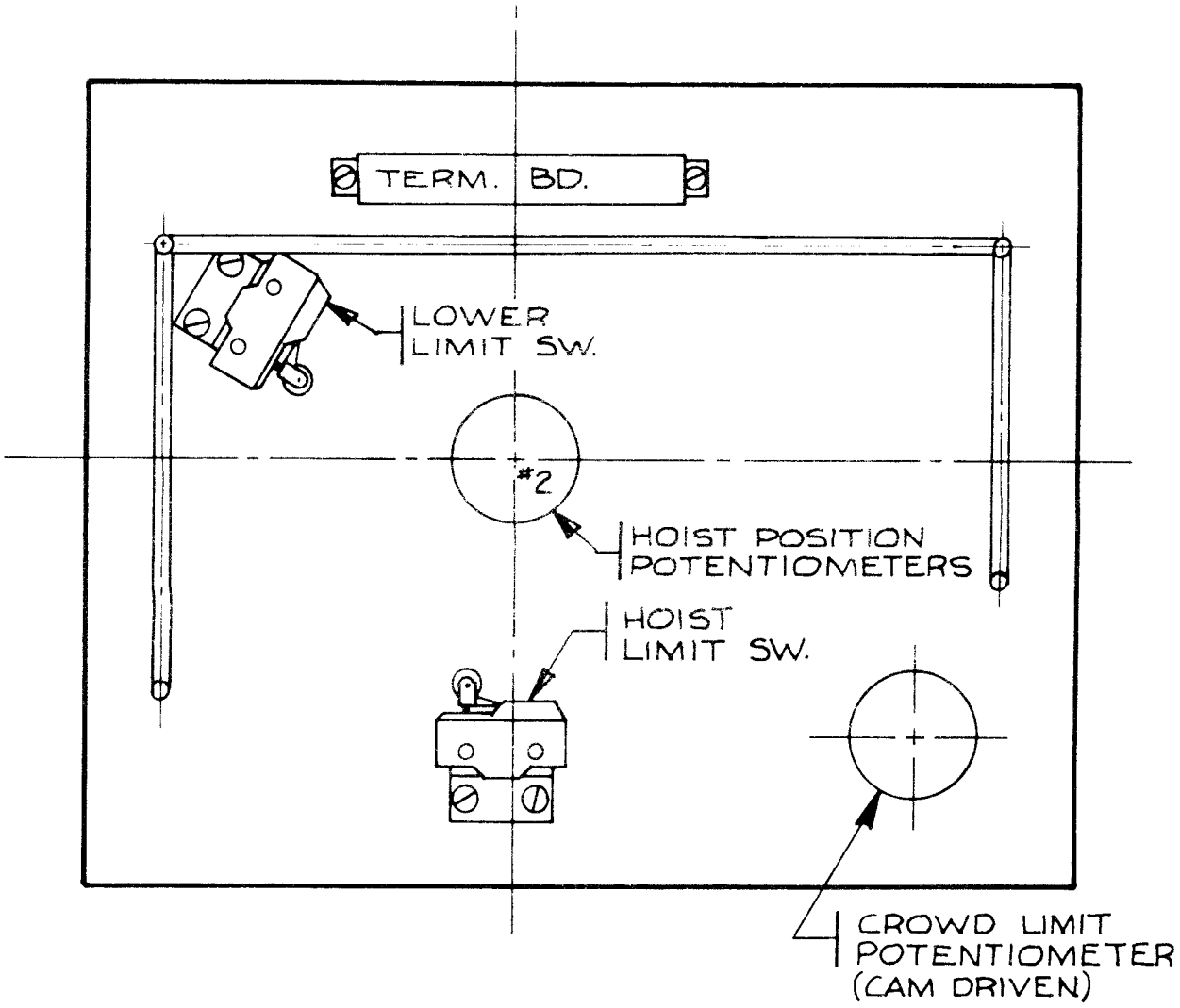


HOIST

The proper **INSTALLATION OF OIL AND GREASE SEALS** insures the continued operation of this machine.

Wherever assembly design permits; solid molded, soft type seals are used. Each molded seal fits with a slight interference on the outside diameter creating an oil tight fit between seal and bore. This fit holds the seal and prevents it from turning in the bore. The split seals supplied for replacement avoid the major machine disassembly required to install solid seals.

WARNING: DO NOT CUT A SOLID SEAL TO MAKE A SPLIT SEAL.

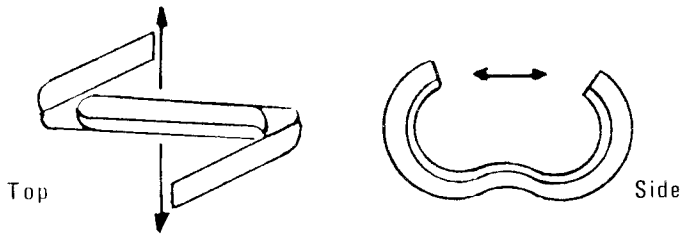
Split seals, especially made with interference fit at butt, install with compression at the joint. Consider split seals as temporary, until replaced with a solid seal at next major overhaul.

Store seals in a dark, cool, dry area. DO NOT OPEN shipping container before use. KEEP seal as clean as possible.

SPLIT SEALS install in a similar manner to solid seals.

1. Remove the garter spring and separate at the hook and eye.

2. Open the seal for shaft installation as shown in sketch.



Right Way Wrong Way

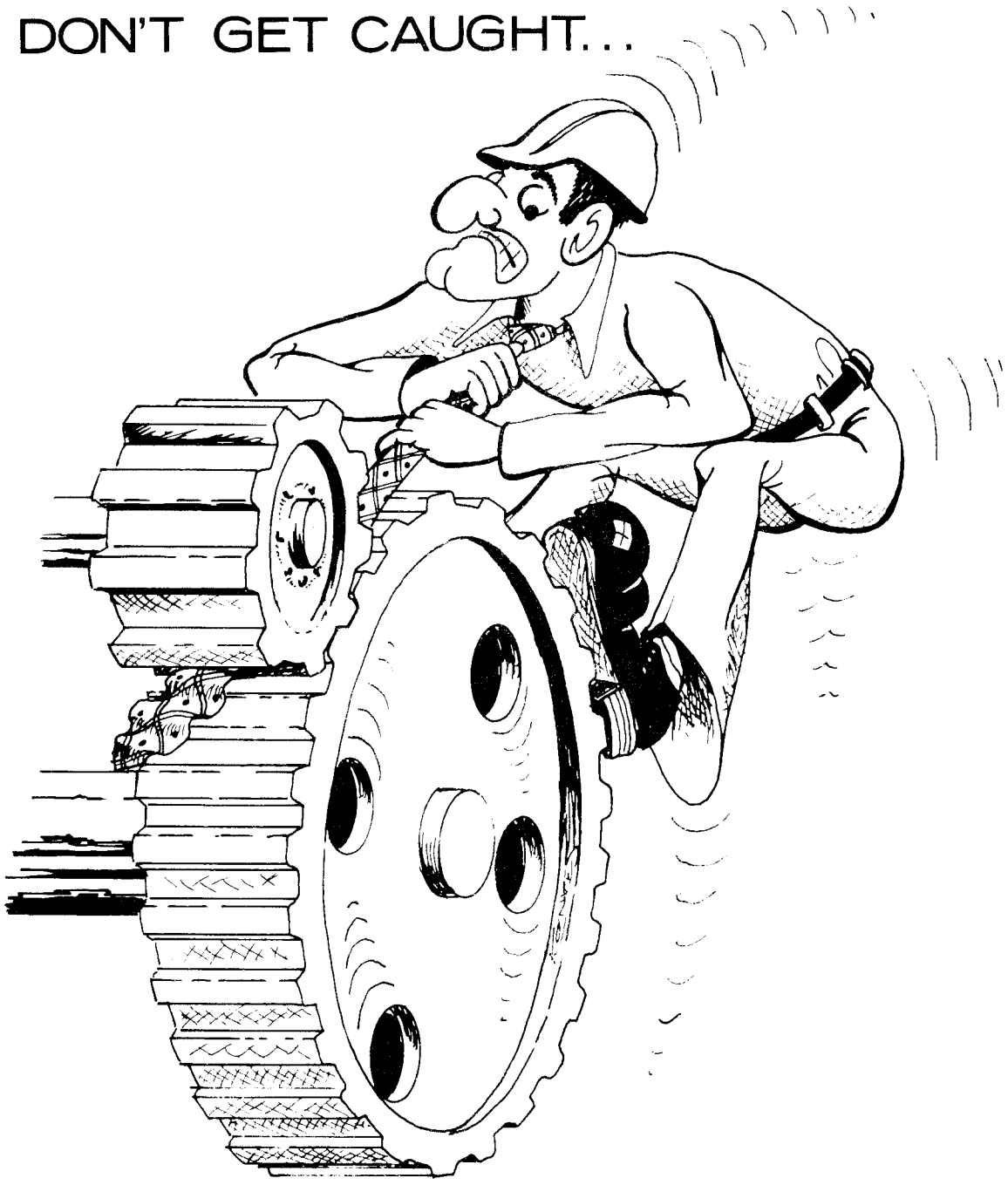
3. Move the butt ends along the axis of the seal.

DO NOT PULL ENDS APART. THIS BENDS OR BREAKS THE BACK OF THE SEAL.

WARNING: AT FIRST A SPLIT SEAL MAY APPEAR TOO LONG. DO NOT TRIM OR CUT THE ENDS OF THE SEAL.

4. Lube ALL seal surfaces, particularly the O.D. and the lip. Apply lube to shaft and bore also.

DON'T GET CAUGHT...



...WITH LOOSE CLOTHING

Broken wires.

Corroded wires.

Marks indicating mechanical abuse, distortion or crushing.

Inspect rope sheaves often. Check sheaves and drums for proper alignment. Use no reeving that requires reverse bends unless provided with sufficient space between the bends for adequate rope recovery.

Do not allow wear at rope sheave groove. An old rope wears a groove to a reduced radius. This groove crushes or deforms a newly installed rope.

Avoid sheave groove or drum lagging from assuming rope lay shape. Alternate right and left hand lays, if needed. Keep sheaves and drum free of rough spots, nicks and burrs. Never use cracked or chipped sheave.

Maximum rope life and the best service evolves from extreme care in handling and installation. This is important. Working a new rope at reduced loads gives the rope lay time to acquire a permanent set. Slow acceleration and deceleration of load and eliminating sudden actions are good habits to develop. Never overstress a rope by jerking or catching a heavy, falling load.

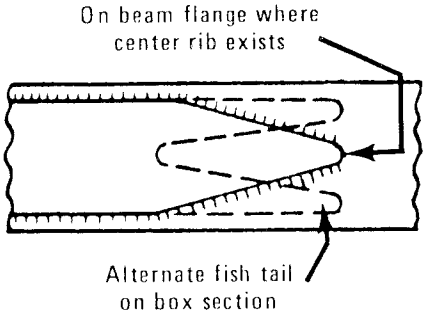
Lubrication remains the most important item in rope care. All rope is lubed when manufactured. Generally thin and filmy, this lube eases the manufacture rather than preserve the rope. This film drys rapidly or dissipates thru surrounding conditions.

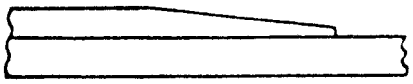
Lubricate every rope at installation and keep coated thru continued service. Lubricant serves to reduce internal friction wear and the outer wire wear against sheave or drum. Lube protects rope from weather and corrosive air, too.

Marion recommends a light, penetrating type lubricant (WRL) containing anti-rust and corrosion agents and anti-wear additives. This lube saturates rope interior thus reducing internal friction while providing a protective outer coating.

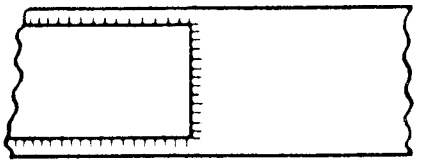
The rope lubricant selected may be an asphaltic type containing volatile solvent or diluent which allows strand and core penetration. This lube type works well for operations in highly abrasive material or water submersion.

One method of rope lubrication utilizes an automatic system that provides a drip fixture above sheaves on boom point, gantry, and fairlead. This system is generally timer controlled with manual override for severe conditions.





Reinforcing Plate Taper End
recommended



Reinforcing Plate Square End,
not recommended

REINFORCING REQUIRES EXTREME CAUTION in weld repairs. Faulty reinforcing has caused many repeat failures. The weld alone, if PROPERLY made, is sufficient to make the part as strong as it was originally. However, in cases where reinforcing seems needed, apply the following. Patch plates of NOT greater than three fourths the thickness of the part being reinforced to EXTEND beyond the critical areas. TAPER and ROUND the ends of these plates. EXTEND the weld completely around the ends and SMOOTH OUT gradually to the original structure. TAKE every care to eliminate stress concentration, such as: square ends; sharp break offs; exposed and rough, flame-cut edges; etc. (See sketches).

POSTHEAT TREATMENT: When employing this or in cold weather, SLOWLY COOL the welding area at a rate of 50 degrees F. or 27 degrees C. per hour to the normal temperature of 150 degrees F. (65.5 degrees C.) This is important. This usually means additional general heating AFTER completing the weld. Smooth up ALL rough edges and welds. Clean and repaint the repair areas.

ADDITIONAL INFORMATION or material on welding for a particular repair job may be obtained by sending ALL details to the Service Department of Marion Power Shovel Division, at Marion, Ohio 43302.

MATERIAL IDENTIFICATION

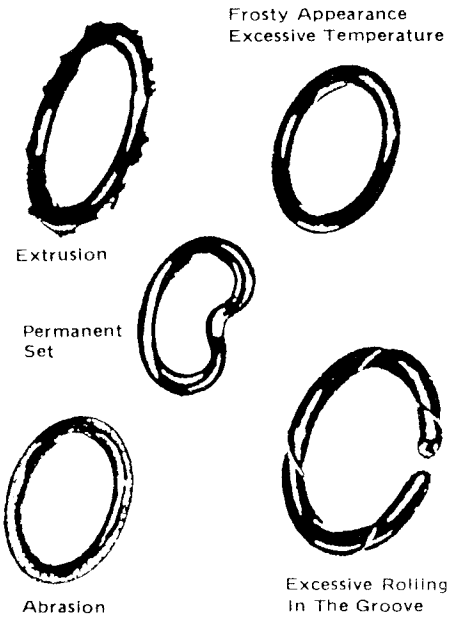
MARION MATERIAL SYMBOLS and

MAJOR COMPONENT PARTS

The following information contains the various materials used in major parts. Refer to the identification plate or material symbol on casting for specifics. Pre 1959 machines have no material identification on identification plate.

NOTE 1: Use E-6010 or E-6012 for nonstructural parts ONLY. For example; sheet metal, guard rails, catwalks, house coverings and stiffeners.

O-rings in service undergo slight swelling and softening which may be non-visible, when worn. Increased damage can occur on re-installation, so use ONLY NEW RINGS. Inspection of old, damaged rings can identify failure from extrusion, wear, torsion set, excessive permanent set or rolling in the groove.



Excessive extrusion may indicate the use of the wrong ring or backup rings were not installed. Irregular wear may indicate a rough spot or eccentricity in the cylinder. The ring may also fail from defect that careful pre-installation inspection may have seen. Some O-rings, lacking proper resilience, might have been subjected to overtemperatures. Since rings are not designed for high temperatures, they should be replaced, regardless of appearance, once known rings have been subjected to unusual heat. Overheated rings are hardened, crack with flexing, take a set and lack resilience. Once old ring has been inspected, cut it in two pieces and THROW AWAY.

Before installing, check surfaces and rings. Metal surfaces must be free of dust, dirt and gunk. Stoddard solvent (kerosene base with rust inhibitor) cleans parts and leaves a good surface for lube to adhere to. However, these cleaning fluids can cause some rings to swell. So check that cleaning fluid does not harm the O-ring if left on surface.

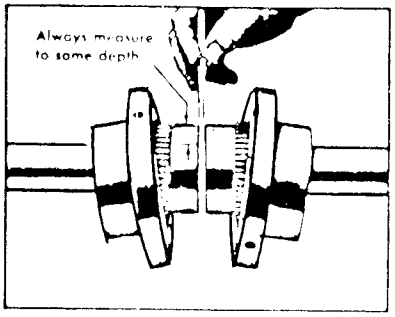
Once the proper O-ring is selected and part number is rechecked; examine the ring closely for defects, dirt or lint.

Throw out faulty rings after cutting so they do not get mixed with good ones. Discard new rings that are too tight once installed, do not return these to storage.

Once installed; an O-ring seats snugly, but freely in its groove.

PREPARATION requires checking the surface for scratches from fingernails, tools or fitting threads. DO NOT pinch ring between boss and fitting. Watch for sharp edges on groove shoulder or fitting. Thread burrs may be removed by running a nut onto the thread.

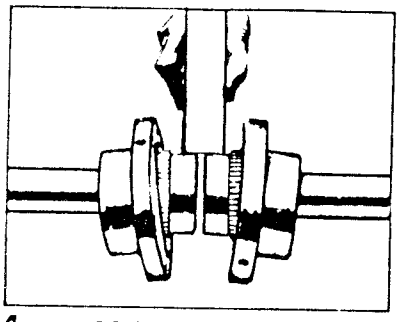
Before installing, lube ring and surface sparingly with a light coat of grease. Lubing helps eliminate a distorting stretch (causing a leak) and aids ring in seating naturally in groove without wrinkles or twists. Remember, the lube must be compatible with O-ring material and system fluid.



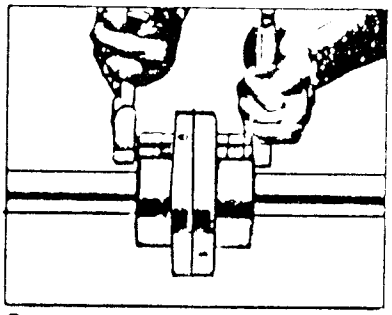
3 GAP AND ANGULAR ALIGNMENT

3. GAP AND ANGULAR ALIGNMENT—Use a spacer bar equal in thickness to gap specified in Table. Insert bar, as shown, to same depth at 90 degree intervals and measure clearance between bar and hub face with feelers. The difference in minimum and maximum measurements should NOT exceed the ANGULAR limit specified in Table.

4. OFFSET ALIGNMENT—Align so that a straight edge rest squarely on both hubs as shown and also at 90 degree intervals. Check with feelers. Clearance should NOT exceed OFFSET limit specified in Table. Tighten ALL foundation bolts and repeat steps 3 and 4. Realign coupling if necessary. Grease hub teeth.



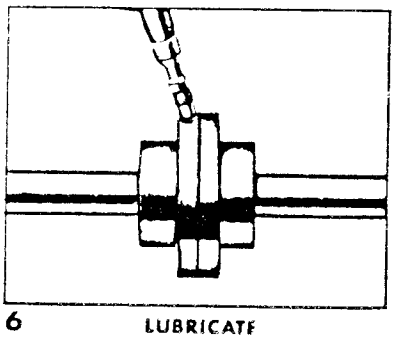
4 OFFSET ALIGNMENT



5 INSERT GASKET AND JOIN FLANGED SLEEVES

5. INSERT GASKET AND JOIN FLANGED SLEEVES—Insert gasket, DO NOT DAMAGE GASKET, between flanges. Position flanged covers with lube holes at 90 degrees and draw flanged cover into position. Use bolts, nuts and lockwashers furnished with coupling. IMPORTANT: Tighten flange bolts and nuts to torque specified in Table.

6. LUBRICATION—Fill with grease until excess appears at an open hole; then insert plub. Continue procedure until all plugs have been inserted. IN ADDITION, vent TOP flanged sleeve by inserting a 0.010 inch thick SMOOTH feeler gauge between seal and hub. Fill until excess appears at feeler. Repeat at 90 degree intervals. CAUTION: INSERT ALL plugs after lubricating.



6 LUBRICATE

204-M

DAILY ELECTRICAL INSPECTION

1. Check following bearings:
   a. M.G. set bearings?
   b. Hoist motor bearings?
   c. Swing motor bearings?
   d. Exciter set bearings?
   e. Fan blower bearings?

2. Are all contactors operating properly?
3. Are all lights operating properly?
4. Are all motors commutating properly?
5. Are all generators commutating properly?
6. Is the air conditioner operating properly?
7. Is the air filtering system operating O.K.?
8. Are all warning systems operating properly?
9. Visually examine operator controls:
   a. Are the main controllers working O.K.?
   b. Are the auxiliary controls working O.K.?
10. Is all electrical equipment clean and dry?

204-M

WEEKLY MECHANICAL INSPECTION

ROTATING FRAME

1. Any stress marks evident on vertical plates:
   a. Paint cracks or ripples?
   b. Actual distortion on plates?

2. Any stress marks evident on horizontal plates:
   a. Paint cracks or ripples?
   b. Actual distortion on plates?

3. Are there any cracked welds?
   a. Main joints vertical welds?
   b. Main joints horizontal welds?
   c. Reinforcing plate welds?

4. Main rotating lower bosses:
   a. Are welds solid?
   b. Is lubrication adequate?
   c. Is bearing temperature normal?
   d. Are seals for bearings O.K.?

5. Visually examine center journal:
   a. Is there evidence of overheating?
   b. Is lubrication adequate?
   c. Is there any vibration?
   d. Is there excess clearance under nut?
   e. Is there excess side movement?

6. Visually examine lubrication lines:
   a. Any evidence of damaged lines?
   b. Any leakage evident?
   c. Any loose clamps?

7. Visually examine air piping lines:
   a. Any damaged lines?
   b. Any evidence or leaks?
   c. Any loose clamps?

204-M

MONTHLY ELECTRICAL INSPECTION

1. Are all ground connections O.K.?

2. Is the insulation proper on all motors?

3. Is the insulation proper on all generators?

4. Are all A.C. contactors in good condition?

5. Are auxiliary generator batteries charged properly?

6. Visually examine all slip rings:

   a. Are they all operating properly?

   b. Are they all securely fixed in place?

   c. Do any of them show excess wear?

   d. Are all brushes serviceable?

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