Technical Manual

8050

SECTION 1

ENGINEERING DATA

INDEX

8050

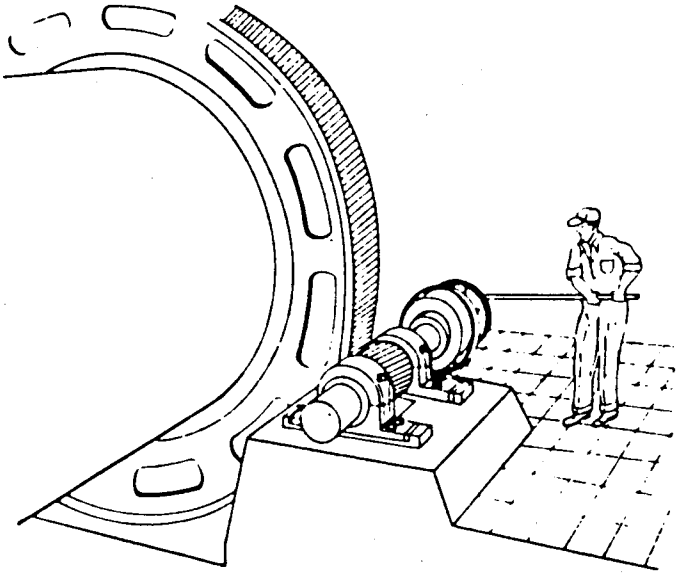
Shaft Nom. Diam.	Shaft O.D.	Running Clearance	Shaft Nom. Diam.	Shaft O.D.	Running Clearance
25-3/4	25.750 24.745	.037 .055	29-3/4	29.750 29.745	.041 .059
26	26.000 25.995	.037 .055	30	30.000 29.995	.041 .059
26-1/4	26.250 26.245	.037 .055	30-1/4	30.250 30.245	.041 .059
26-1/2	26.500 26.495	.037 .055	30-1/2	30.500 30.495	.042 .060
26-3/4	26.750 26.745	.038 .056	30-3/4	30.750 30.745	.042 .060
27	27.000 26.995	.038 .056	31	31.000 30.995	.042 .060
27-1/4	27.250 27.245	.038 .056	31-1/4	31.250 31.245	.042 .060
27-1/2	27.500 27.495	.038 .056	31-1/2	31.500 31.495	.045 .064
27-3/4	27.750 27.745	.039 .057	31-3/4	31.750 31.745	.045 .065
28	28.000 27.995	.039 .057	32	32.000 31.994	.043 .065
28-1/4	29.250 28.245	.039 .057	32-1/4	32.250 32.244	.043 .065
28-1/2	28.500 28.495	.039 .057	32-1/2	32.500 32.494	.044 .066
28-3/4	28.750 28.745	.039 .057	32-3/4	32.750 32.744	.044 .066
33	33.000 32.994	.044 .066	37	37.000 36.994	.049 .071
33-1/4	33.250 33.244	.044 .066	37-1/4	37.250 37.244	.049 .071
33-1/2	33.500 33.494	.046 .068	37-1/2	37.500 37.494	.049 .071
33-3/4	33.750 33.744	.046 .068	37-3/4	37.750 37.744	.051 .073
34	34.000 33.944	.046 .068	38	38.000 37.994	.051 .073
34-1/4	34.250 34.244	.046 .068	38-1/4	38.250 38.244	.051 .073

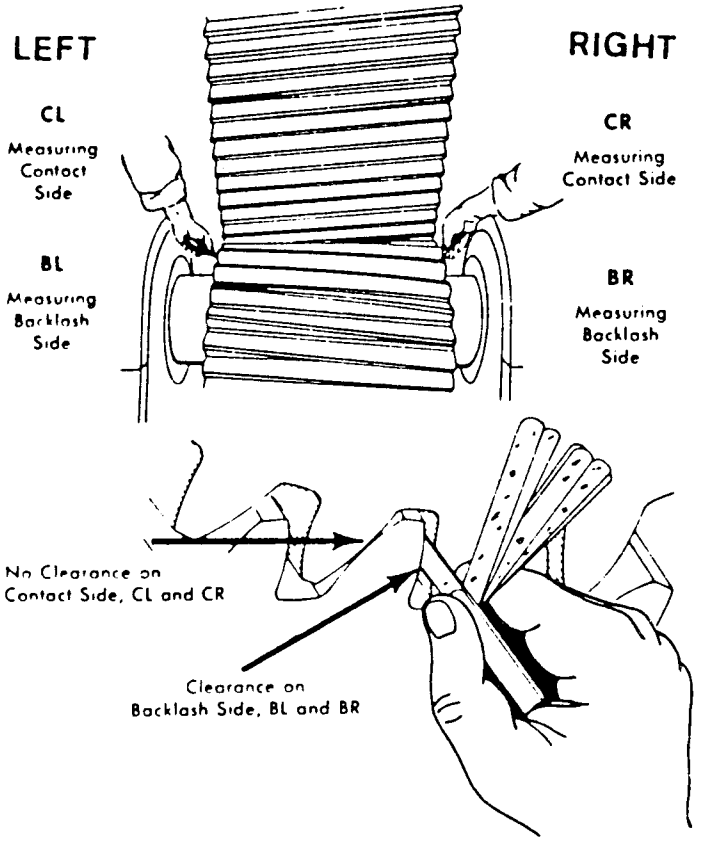
8050

This table applies EQUALLY to BOTH Fine and Course threads.

Fastener Diameter		MPSD Fastener Classifications Torque (Foot Pounds)			
Inch	(mm)	Bolt Screw A	Screw B	Screw C	Socket Head Cap Screw
1/4	(6.35)	6	10	12	14
5/16	(7.938)	12	18	28	30
3/8	(9.525)	20	30	46	50
7/16	(11.113)	30	50	75	80
1/2	(12.7)	46	75	115	120
9/16	(14.288)	65	110	170	180
5/8	(15.875)	95	150	230	240
3/4	(19.05)	150	250	370	400
7/8	(22.225)	200	380	590	630
1	(25.4)	300	580	890	960
1-1/8	(28.575)	480	780	1410	1520
1-1/4	(31.75)	660	1100	1960	2120
1-3/8	(34.925)	890	1460	2630	2840
1-1/2	(38.1)	1060	1750	3150	3400
1-3/4	(44.45)	1890	3110	5610	6050
2	(50.8)	2720	4500	8100	8750
2-1/4	(57.15)	3420	6500	11700	12600
2-1/2	(63.5)	4380	7150	16200	17400
2-3/4	(69.85)	7320	12100	22450	23500
3	(76.2)	9450	15750	28450	30600

PLACE PINION ASSEMBLY IN POSITION: Bring pinion shaft into approximate parallel with the gear axis by leveling and preliminary shimming of bearing pedestals. NEXT, place pinion into mesh with the gear for setting of contact and backlash. If gearing is single helical, REMOVE bearing caps. MAKE SURE the thrust ring is in correct pedestal. CHECK the free bearing in center of its axial float. When using locknuts to secure bearing, CHECK for tightness and MAKE SURE the washer lock tab is secure.





TORQUE PINION TO GEAR: Fix gear to prevent rotation and torque pinion to gear in actual direction it operates. (See sketch) If a herringbone gear, MAKE SURE pinion apex centers on gear apex. DO THIS by leveling pinion back and forth endwise, checking it FREE to float within the bearings. Antifriction bearings float free and center in their pedestals when pinion centers against apex of gear. Establish ALL backlash values with LOAD on gearing. Apply cable load to the drum by raising an empty bucket.

CHECKING TOOTH CONTACT AND BACKLASH: Set the contact and backlash at the SAME time. Select recommended backlash requirements from table 3 and proceed as follows.

With pinion torqued firmly to gear CHECK the contact and backlash side of teeth at the mesh point. DRAW a feeler gauge between teeth as shown in bottom sketch. ADJUST pedestal until obtaining a near zero feeler gauge reading at CL and CR, and a near equal backlash (within recommended range) at BL and BR. TAKE measurements at four points on the gear, 90 degrees apart.

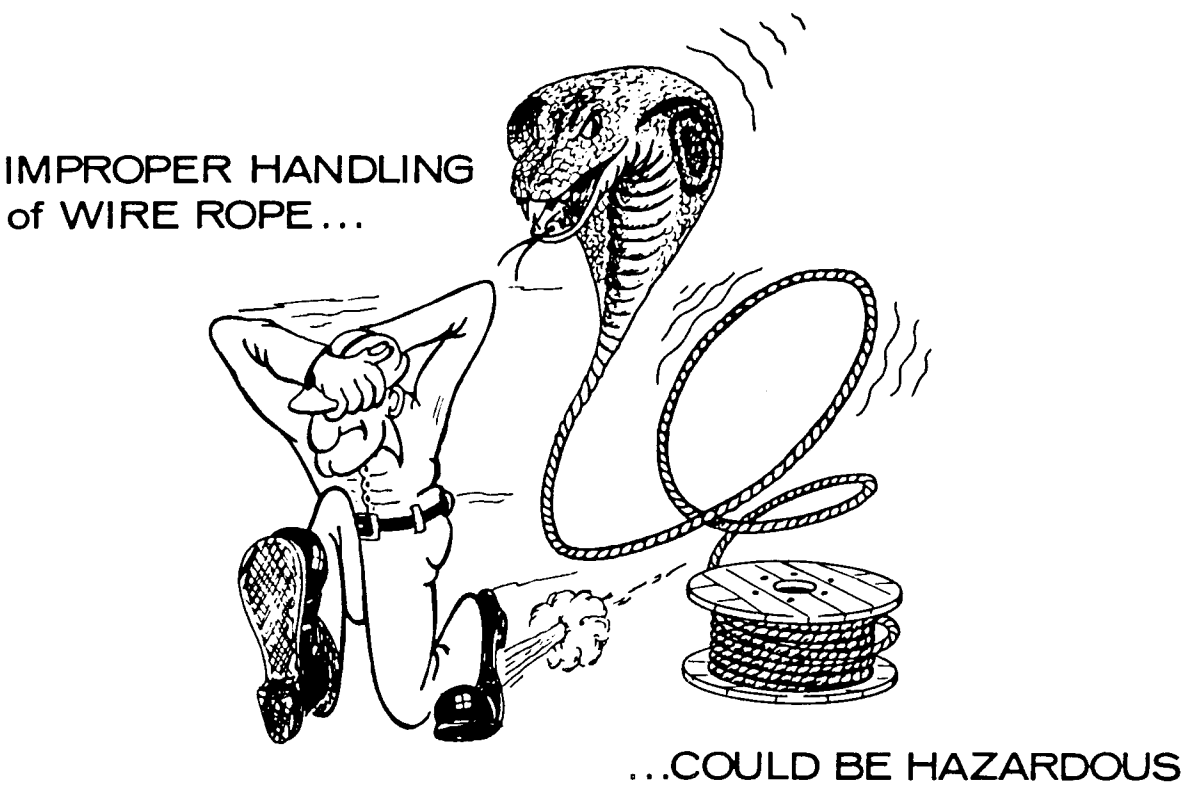
Examine this worn rope to reveal any irregular or internal rope fractures. This exam determines subsequent cuts.

The correct spacing and number of clips is shown in the table:

Rope Diameter (in inches)	Rope Diameter (in mm)	Clips	Space (in inches)	Space (in mm)
5/8	15.	3	4	101
3/4	19.	4	4-1/2	114
1	25.	4	6	152
1-1/4	31.	5	7-1/2	190
1-1/2	38.	6	9	228
2	50.	8	12	304
2-1/2	63.	8	15	381
3	76.	9	18	457

Inspect these ropes often. Replace any that show signs of deterioration. Due to the elasticity factor involved, use only those ropes recommended by Marion Parts Department. Never use larger or smaller diameter rope. When proper rope is unavailable, contact Marion Engineering Department.

Information for these instructions and cautions obtained from MPSD CI-897.



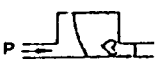
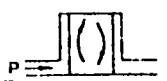
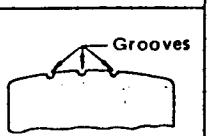
8050

TABLE 1

COMPONENT PART	MATERIAL – MPSD SYMBOL
Bail	CB, CC2A, CH, CK, F, FK, FT1, FHL
Bucket	See Table 2
Boom	F, FK, FK1, FHL, FK2
Boom Foot	CB, CK, CL5, CN, F, AISI-4140
Gantry	F, FK, FHL
Gantry Frame	CB, CN
Gear, Forged and Cast	CC2A, CC2A-Q, CFE, CK Series, AISI-4130, 4140, 4340
Gear, Fabricated	F & FX (Web), SE, AISI-4130, 4140, 4340, CC2A-Q, CK, CN (Rim & Hub)
House (Note 1)	F
Ladder (Note 1)	F
Lower Frame	CB, CC2A, F, FK, FK2
Machinery Frame	CB, CC2A, F, FK
Machinery Guard (Note 1)	F
Walking Crank	CK, Mod. CN, C-74 Alloy
Main Rotating Gear	CK, FT1, AISI-1045
Rail	CC2A-Q, CK-Q, CK-QS, AISI-1070, 4330, 4340
Sheet Metal (Note 1)	F
Tub	F, FK, FK2
Upper Frame	CB, F, FK, FT1
Walking Shoe	F, FK

8050

MODES OF FAILURE

FAILURE	GENERAL CONDITION	EXAMPLE
Progressive cutting by corner of piston groove.	Pulsating pressure on O-Rings.	
Progressive cutting as in static packing plus abrasive wear.	Pulsating pressure on O-Ring.	
Knibbling extrusion. Rupture of material, large pieces torn off.	Fatigue from shock loads, high temperature, local seizure, pulsating pressure, etc.	
Rotation of part or all of circumference of packing in groove (sometimes called "spiral failure")	Complete explanation not found. Occurrence not predictable. Possibly sudden increase in friction on working face.	 Found to occur chiefly when packing was moving in same direction as pressure
Axial grooves worn in working surface.	Imperfections in cylinder surface. Particles of dirt, metal, or rubber.	 Segment of Plan View
Axial grooves as above.	Rapid passage of oil across working face.	See above sketch
Packing totally extrudes through clearance space.	Large radial clearance. Soft packing.	

DECIMAL EQUIVALENTS

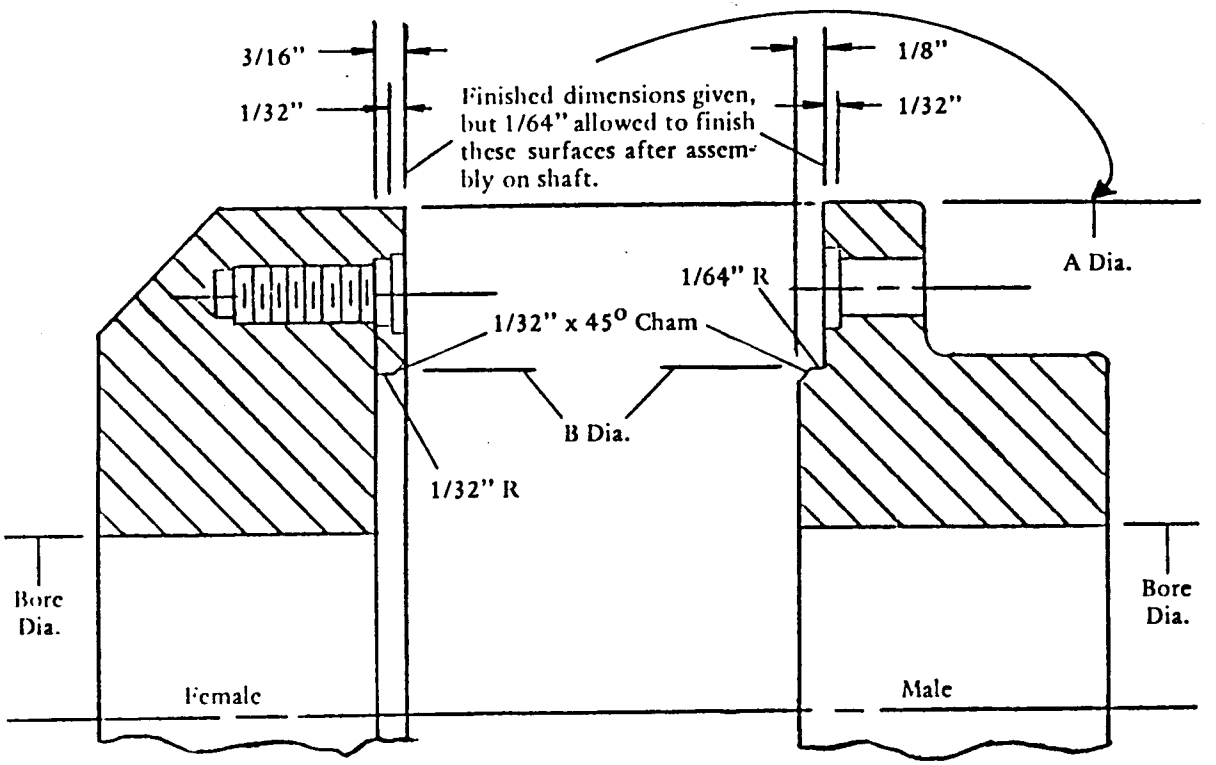
	.0156 — 1/64
1/32 —	.0312
	.0468 — 3/64
1/16 —	.0625
	.0781 — 5/64
3/32 —	.0937
	.1094 — 7/64
1/8 —	.1250
	.1406 — 9/64
5/32 —	.1562
	.1719 — 11/64
3/16 —	.1875
	.2031 — 13/64
7/32 —	.2187
	.2344 — 15/64
1/4 —	.2500
	.2656 — 17/64
9/32 —	.2812
	.2969 — 19/64
5/16 —	.3125
	.3281 — 21/64
11/32 —	.3437
	.3594 — 23/64
3/8 —	.3750
	.3906 — 25/64
13/32 —	.4062
	.4219 — 27/64
7/16 —	.4375
	.4531 — 29/64
15/32 —	.4687
	.4844 — 31/64
1/2 —	.5000
	.5156 — 33/64
17/32 —	.5312
	.5469 — 35/64
9/16 —	.5625
	.5781 — 37/64
19/32 —	.5937
	.6094 — 39/64
5/8 —	.6250
	.6406 — 41/64
21/32 —	.6562
	.6719 — 43/64
11/16 —	.6875
	.7031 — 45/64
23/32 —	.7187
	.7344 — 47/64
3/4 —	.7500
	.7656 — 49/64
25/32 —	.7812
	.7969 — 51/64
13/16 —	.8125
	.8281 — 53/64
27/32 —	.8437
	.8594 — 55/64
7/8 —	.875
	.8906 — 57/64
29/32 —	.9062
	.9219 — 59/64
15/16 —	.9375
	.9531 — 61/64
31/32 —	.9687
	.9843 — 63/64
1 —	1.0

FINISHING AND RECOMMENDED FITS – Unless otherwise called for, replacement coupling's have a finished bore and 1/64 inch of material on face, rabbet diameter and O.D. to be removed after assembly on shaft.

Keyed couplings usually have an interference fit between .5 to 1. mil per inch of diameter.

Keyless couplings need an interference fit of 1. mil per inch of diameter.

Measure the rabbet diameter and finish machined surfaces to match mating half coupling using fit from line to line to .001 inch interference. (See sketch.)



CHECKING COUPLING ALIGNMENT requires secure bolting of M-G set base to deck in operating position. Follow the step by step procedure and accurately record ALL readings. This is important. When checking more than one M-G coupling, always start at coupling nearest the two-bearing unit, (usually the motor.)

THE SOLIDLY COUPLED SETS PROCEDURE IS:

1. Loosen ALL coupling bolts to point they do not hold valves together.

2. Start at coupling at two-bearing unit (usually the motor) or near middle of a long set. Two diametrically opposed bolts need careful adjustment to be loose and YET NOT

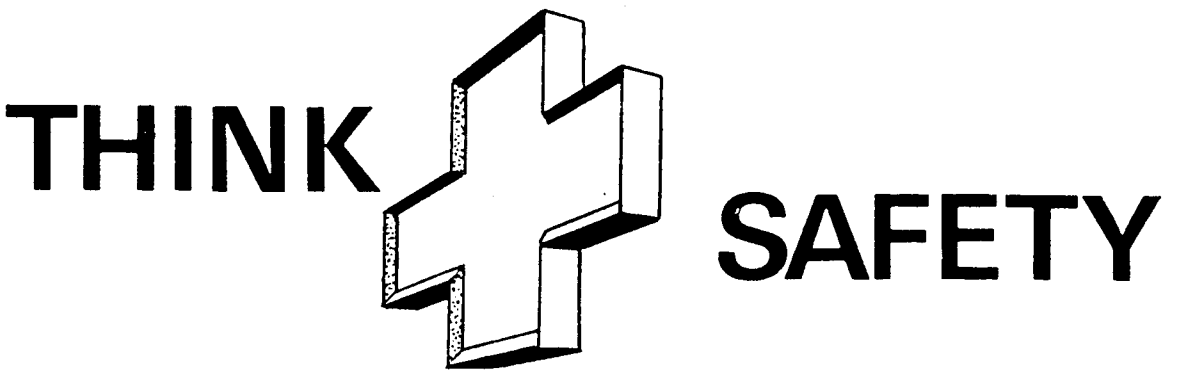
8050

USE ONLY CLEAN AND PROPER LUBRICANT – KEEP IT CLEAN

Selection of proper lubricant remains of the utmost importance. Improperly lubricated bearings, gears, couplings, and other precision parts quickly fail. For this reason, lubricants selected in accord with the ASTM Standards are recommended. These standards were compiled in cooperation with major petroleum suppliers to insure the consumer of exact supply to specific requirements regardless of source.

We recommend you avail your petroleum supplier of the following information to assist him in selecting the proper product for each application on this machine.

Final acceptance of all lubricants supplied to this standard will be based upon satisfactory performance in its intended application and does not relieve the supplier of performance responsibility of brand name products.



NAME OF PART	TYPE	NO. OF POINTS	LOCATION	LUB. SYM.	METHOD AND FREQUENCY
LUBRICATION OF HOIST MACHINERY					
Hoist Drum Support Bearing	Anti-Friction	2	In Bearing Retainer	MPG	Hand, 500 Hrs.
Intermediate Hoist Shaft (In Case)	Anti-Friction	—	From Gear Case	GL	100 gal., Each Gear Case
Intermediate Hoist Shaft (In-Board)	Anti-Friction	2	In Bearing Retainer	MPG	Hand, 500 Hrs.
Hoist Motor Extension Shaft	—	—	From Gear Case	GL	—
Hoist Motor Coupler	—	4	Plug in Coupler Flange	MPG	Hand, 500 Hrs. (4-1/2 lbs.)
Hoist Gear	—	4	Drip On	OGL	Automatic
Hoist Motor	Anti-Friction	8	In Motor End Bell	EMG	Hand, 500 Hrs.
Hoist Rope	—	—	Spray on at Tri-structure	WRL	Semi-Automatic 8 Hrs.
LUBRICATION OF DRAG MACHINERY					
Drag Drum Support Bearing	Anti-Friction	2	In Bearing Retainer	MPG	Hand, 500 Hrs.
Intermediate Drag Shaft (In Case)	Anti-Friction	—	From Gear Case	GL	100 gal., Each Gear Case
Intermediate Drag Shaft (In-Board)	Anti-Friction	2	In Bearing Retainer	MPG	Hand, 500 Hrs.
Drag Motor Extension Shaft	Anti-Friction	—	From Gear Case	GL	—
Drag Motor Coupler	—	4	Plug in Coupler Flange	MPG	Hand, 500 Hrs.

8050

SECTION 3

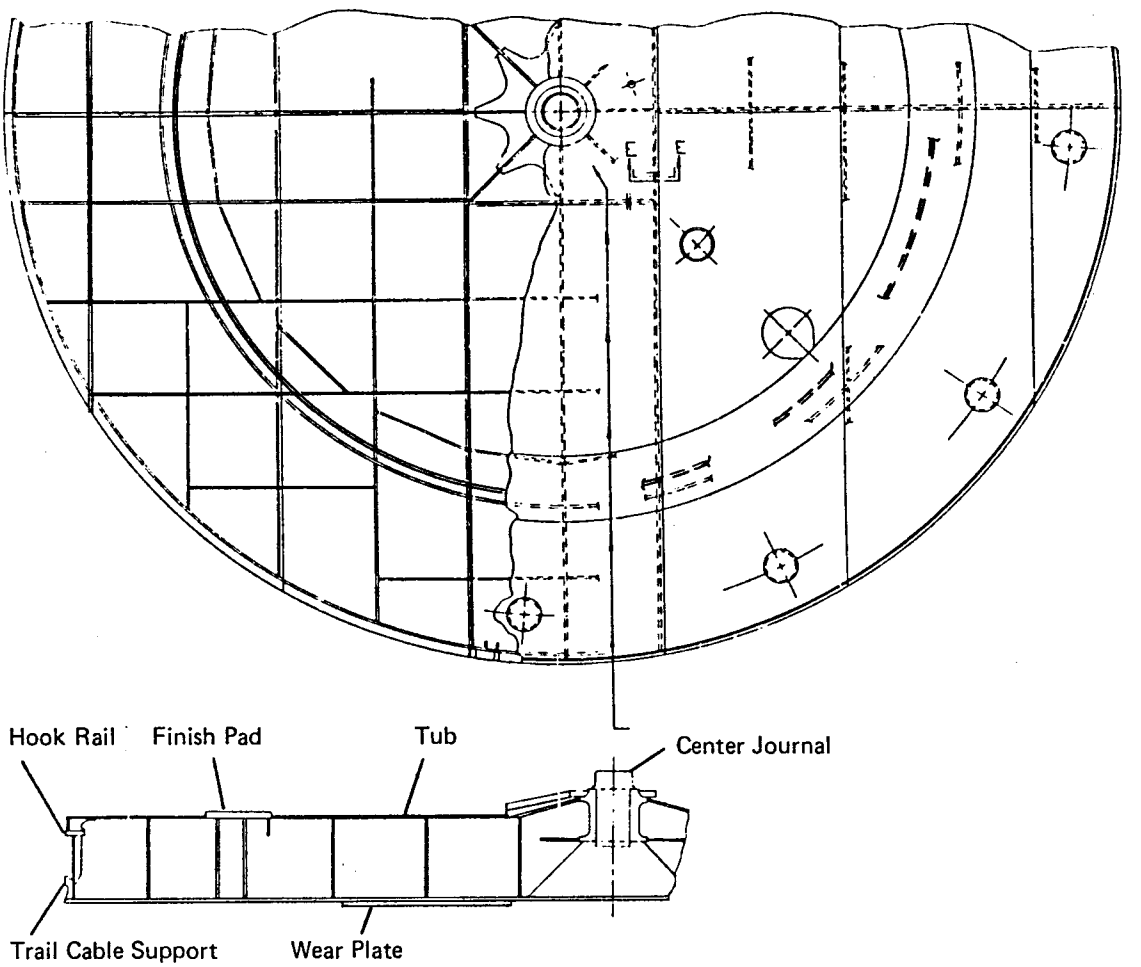
COMPRESSED AIR SYSTEM AND COMPONENTS

INDEX

SECTION 4

MECHANICAL ADJUSTMENTS

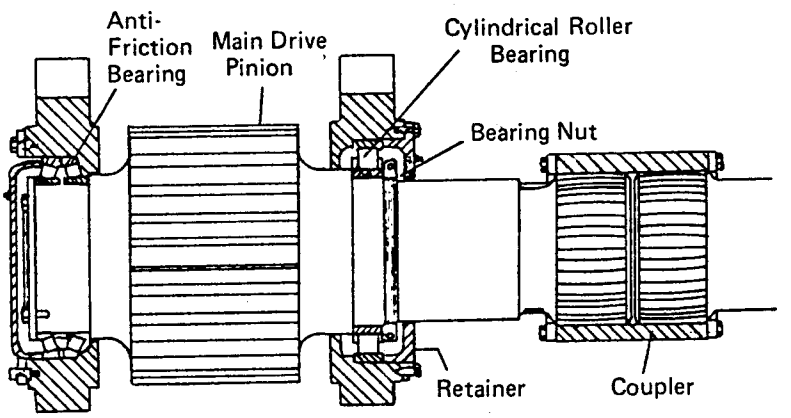
The TUB or base structure requires little maintenance. Manholes in top plate and bulkheads provides access for inspection. Check this structure at regular intervals for cracks, broken welds, deformed bottom plates or bulkheads caused by working over rocks or uneven ground. Note particularly any bent or damaged plates in roller circle area, rotating gear or center journal. Look for the effect on flatness or alignment of components. Repair ALL damage promptly. Keep tub area clean and DRY.



with Molycote M 3402 and pack seal cavities with Belray Silicone Valve Seal Lubricant. Install as shown in Engineering Data Section with lip seal TOWARD case.

Add 310 gallons, or to dipstick full mark, of GL lube in gear case (see Lube Section).

The **MAIN PROPEL DRIVE PINION SHAFT** is connected to the second intermediate shaft by means of a coupler.



The coupler transmits motor torque to walking eccentric, but will not transfer walking stresses or deflections of frame to gear box. The coupler consists of an integral splined sleeve which engages the external involute splines of the main propel pinion shaft and second intermediate shaft. A slight crown is cut on external splines to allow a limited deflection or misalignment. Keep spline coated with OGL Type B lube.

The main pinion is supported by two anti-friction bearings, one double row tapered roller bearing and one single row cylindrical roller bearing.

The tapered roller bearing (outside) cones and spacer is clamped tight on the shaft by a bearing retainer plate. Clamp bearing cones tight and wire lock cap screws.

A bearing nut holds the cylindrical roller bearing inner race in place. Clamp nut in place with pinch bolts.

Tighten bearing retainer cap tight and measure gap between cap and bearing housing. Insert enough laminated shims under cap to fill space. Be sure to coat both sides of shim(s) with Permatex. Rotate shaft to properly align roller while tightening bearing caps.

Assemble cylinder roller bearing with housings pinned in place.

Hand pack bearing at assembly with MPG lube.

HOIST AND/OR DRAG DRUM assemblies consists of two self supporting rope lagging sections bolted together at center with rod bolts. Parts are interchangeable.

The drum end castings and gear hub are rod bolted to the lagging.

The split double helical drive gear halves are joined together and mounted on drum end castings as described in Engineering Data Section.

NOTE: All bolts should be checked after first week of operation, thereafter, every 500 hours. Should any bolts appear loose, repeat tightening procedure.

The drum is supported by two large diameter spherical roller bearings. The bearings are mounted in bearing housings that are bolted to gear case and pedestal. The bearing cones are held in place on the stub shaft by a retainer plate. Be sure spacer ring is placed over stub shaft before bearing cone is assembled on shaft. The bearing cup is held in housing by a retainer plate and bearing cap with rod bolts. The gear end bearing cup is held snug between cap and plate. The opposite bearing cap is allowed to float on the drag drum while the right end of hoist drum is allowed to float. Hand pack bearings at assembly with MPG.

HOIST OR DRAG MACHINERY GEAR CASE motors and gearbox for hoist drum are located at left of drum. The drag drum motors and gearbox are located at right of drum.

The motors drive the drum thru a gear train consisting of motor extension shafts and intermediate shaft assemblies. The shaft assemblies are mounted in an oil tight case.

The motor extension is a shaft with integral pinion that is coupled directly to motor armature shaft by a flexible coupling. The shaft is supported in the gear case by two single row cylindrical roller bearings. The bearings and flexible coupling allow limited end play so that pinion can slef align double helical gear mesh. Refer to eccentric cartridge mounting for gear teeth alignment.

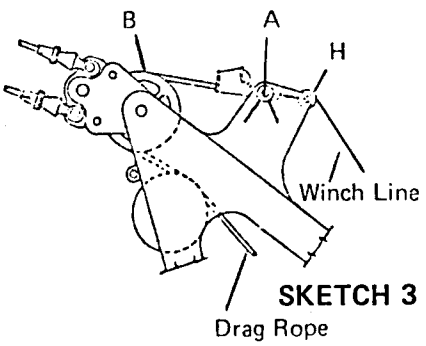
The motor coupling hub is attached to the tapered motor armature shaft by the procedure described in Engineering Data Section under installation of shrink fit pinions.

The intermediate shaft assembly consists of a large double helical gear that meshes with the motor extension shaft pinions. The gear is attached to the shaft and integral pinion by involute splines. The shaft is supported by two single row, cylindrical, roller bearings. One bearing is mounted in a boss of the gear case. The inside end of shaft is supported by a bearing mounted in an outboard bearing housing, bolted to gear case structure.

Remove winch line from ropes and sheave C. Reeve line over sheave H, around sheave B, over sheave C, then to deck.

Attach the two DRAG ropes to the HOIST drum. Attach winch line a few feet from end of drag rope.

Operate winch to pull drag rope until rope clears sheave B. Attach rope socket, then pin at point A. See sketch 3.



SKETCH 3

ROPE LENGTH EQUALIZATION IS VERY IMPORTANT! Allow ropes to slip in drum clamps, then retighten clamps.

Check all hoist brakes for proper shoe adjustment and maximum braking force. Also check socket wedge, socket pin connection and U-bolts on drum.

Operate hoist to take slack out of rope and tension off shaft F. Remove retainer from shaft F, SLOWLY and cautiously start to lower boom.

After sheave B clears tri-structure, stop and install sheave D and sleeves E on shaft F as shown in sketch 4.

With sheave and sleeves in place, continue lowering boom onto cribbing. Lower boom support ropes to top of boom. Take care when lowering ropes around boom floating sheaves.

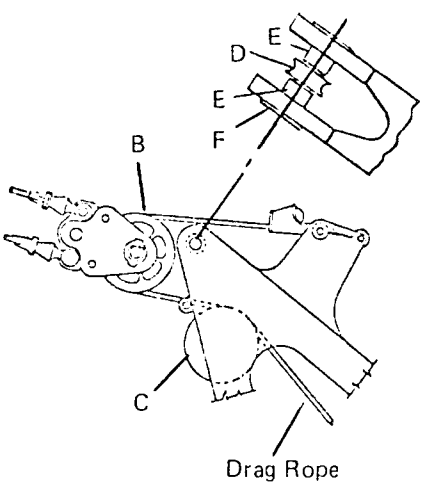
With boom and support ropes in a lowered position, this is a good opportunity to check condition of support rope dampers and gaskets between wood blocks on support rope.

To **RAISE BOOM** (once lowered) slowly tighten drag ropes and raise boom a few feet off cribbing. STOP. Check all fittings and hoist brakes holding power.

Continue to raise boom until sheave B is almost in position then STOP. See sketch 4. Remove shaft F, sheave D and sleeves E.

Continue to raise boom until bore of sheave B is in line with bore of tri-structure. Replace shaft F and retainer on shaft.

Remove pin at A, then socket from drag rope. See sketch 3.



SKETCH 4

8050

PROCEDURE FOR ASSEMBLING FAIRLEAD SWIVEL PINS INTO MOUNTING BRACKET –

1. Assemble lower swivel pin (solid pin) into lower bracket.

   A. Pack pin in dry ice for a minimum of 12 hours, circulate the air inside the box to provide even cooling of the whole pin.

   B. Locate bracket so that pin may be removed from cooling box and installed into bracket in a minimum amount of time. Suggest a dry run before freezing pin to practice handling.

   C. After installing frozen pin, maintain pressure to hold pin against shoulder in bracket while it warms to room temperature.

2. Assemble upper swivel pin (hollow pin) into upper bracket.

   A. Assemble bearing complete, bearing retainer and bearing retainer sleeve on shaft.

   B. Pack pin in dry ice for a minimum of 6 hours, circulate the air inside the box to provide even cooling of whole pin.

   C. Locate bracket so that pin may be removed from cooling box and installed into bracket in a minimum of time. Suggest a dry run before freezing pin to practice handling.

   D. After installing frozen pin, maintain pressure to hold assembly against bracket clamping the bearing and bearing retainer sleeve while it warms to room temperature.

FAIRLEAD SNUBBERS (two used) consist of a two pieced friction band anchored to gantry and wrapped on a friction housing bolted to top of fairlead swivel bracket. A bolt and heavy spring join the band halves. Adjust snubber, by turning connection bolt nuts, tight enough to stop any swinging of fairlead bracket at start or stop of machine rotation.

NOTE: Many small motors use sealed bearings requiring no lube for 2 or 3 years. Add lube with units stopped and drain plug removed. After adding lube, run generator or motor with bottom plug removed for about one full hour to allow ALL excess lube to flow out. PLEASE REPLACE DRAIN PLUG. In most cases, the main hoist, drag and swing motors have no plug to remove. Surplus grease flows out in the pocket beneath bearing housing.

On vertical and a few horizontal motors, remove the plug same as with generators. As mentioned in the 250 hour lube procedure, these bottom plugs are removed before lubing to see that excess lube escapes. Probing with a clean wire assures the old grease has not hardened and blocked the passage. PLEASE REPLACE DRAIN PLUG.

About once a year, or after 7500 operating hours; purge bearings by pumping enough lube thru bearing while running so new grease appears at shaft or bottom plug hole. As lube seeps out along shaft, wipe away. This is important. Finally, after 15 to 20 minutes of operation, thoroughly clean off shaft. New grease usually appears first at bottom hole, but it may be seen first at the shaft. PLEASE DO NOT FORGET THE DRAIN PLUG.

Whenever possible, about once in 2 years, disassemble bearings and remove ALL old lube by thoroughly cleaning with light lube oil or petroleum solvent. Each time the bottom plug is removed, push a clean wire into the hole to check the lube is not hard and plugging the hole.

One measuring tablespoon equals approximately one ounce of grease. Use General Electric Company ball bearing grease D6A2C5 for their equipment. Use Westinghouse Electric Company grease 1449556 for their equipment.

CAUTION: DO NOT MIX GREASE NOT OF THE SAME BASE.

In cold weather, when machine shuts down long enough to cool off, run hoist, drag and swing motors for warm up and allowing lube to flow before starting to dig. In extreme cold weather, motor bearings may be warmed with a radiant heater. As each set of motors warms up, run under light loads to maintain lube flow while the next set warms up.

FEEDER CABLE must contain a provision for a ground connection. Especially where 2300 volts and above are used. The power line end must attach (see paragraph on ground circuits) to a suitable permanent ground. The machine end must securely attach thru a bolted connection to ground machine frame. This provides a constant ground for the machine and electrical equipment. Failure to provide adequate ground endangers workers and equipment.

POWER LINE GROUNDING CIRCUIT ADEQUATE FOR THE MACHINE CANNOT BE OVER EMPHASIZED. Without a good grounding system, high voltage exists between the machine and ground. The portable cable and power lines supplying the machine must have a ground wire ample in capacity running parallel to the main wires over the entire distance from transformer to machine. A suitable grounding system must be used at the transformer. Consult your electric supplier or MPSD for details.

The **COLLECTOR RINGS** transmit incoming power from tub to rotating frame. ALWAYS DISCONNECT this incoming power at the source when servicing. This assembly consists of four rings stacked with ceramic insulators secured to tub center pin. Location is in space over center journal below deck of rotating frame. The brushes attach to the outside case. Clean and inspect every 30 days.