

19 July 1984

**LUBRICATION ORDER**

(Supersedes LO 5-3810-288-12-1, -2, -3, and -4, 28 September 1969, and -5 and -6, 28 February 1970)

**CRANE SHOVEL, TRUCK MTD, 20-TON, 314 CU YD,  
GED, 6 x 6 (HARNISCHFEGER MODEL M320T)  
(NSN 3810-00-861-8088)**

Reference: TM 5-3810-288-12, AND FEDERAL SUPPLY CATALOG C9100-IL.

Hard time intervals and the related manhour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the hard time interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer than usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

Clean parts or fittings with dry cleaning solvent (SD), Type II or equivalent. Dry before lubricating. Dotted arrow shafts indicate lubrication on both sides of equipment. A dotted circle indicates a drain below. Relubricate all items found contaminated after fording or washing.

The lowest level of maintenance authorized to lubricate a point is indicated by one of the following symbols as appropriate: Operator/Crew (C) ; and Organizational Maintenance (O).

**WARNING**

**Dry cleaning fluid is flammable. Do not use near a flame or excessive heat. Use only with adequate ventilation. Avoid prolonged breathing of vapors and minimize skin contact.**

**Reporting errors and recommending improvements.** You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, MI 48090. A reply will be furnished to you.

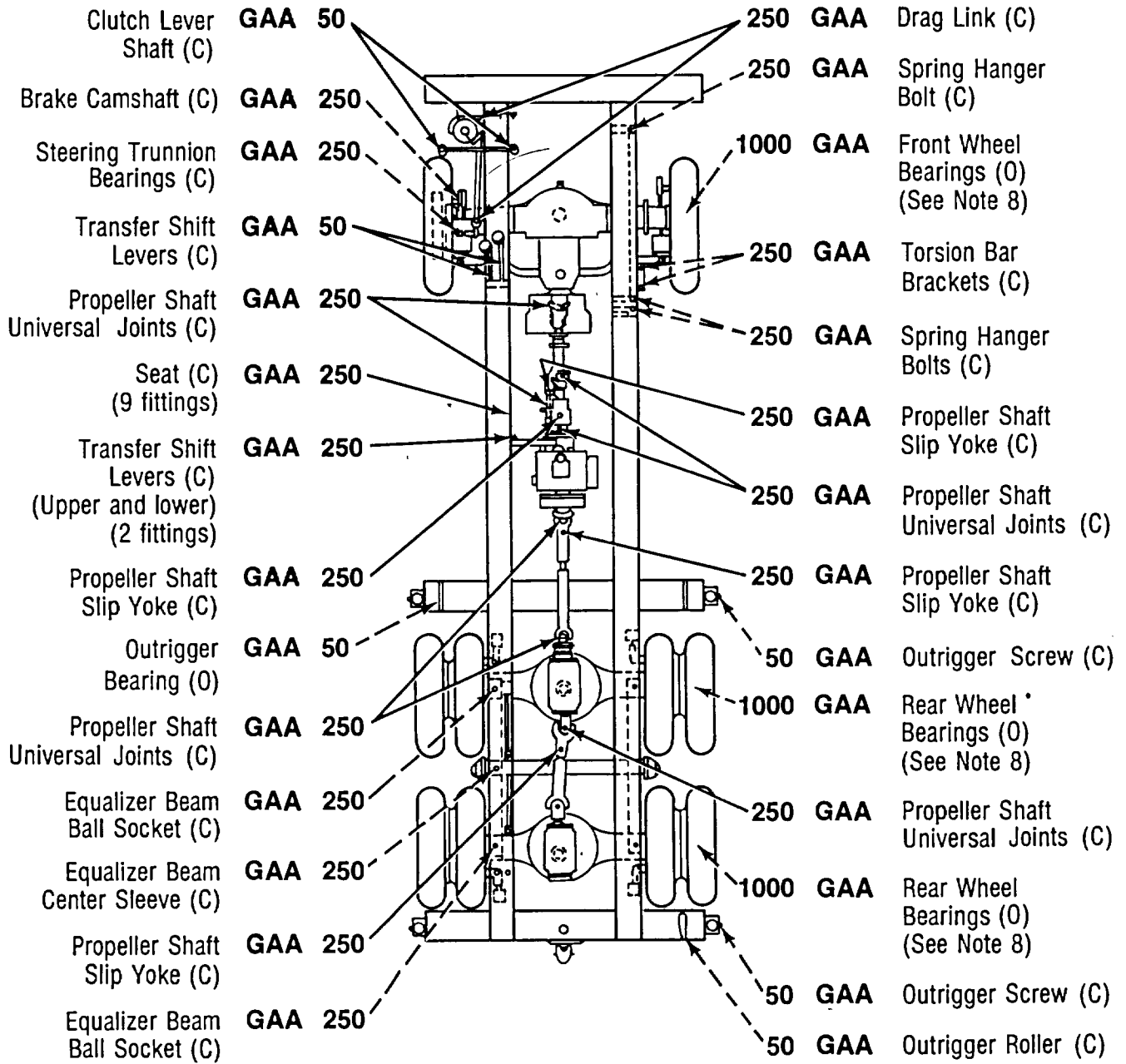
\*The time specified is the time required to perform all services at the particular interval.

*TOTAL MAN-HOURS		*TOTAL MAN-HOURS	
INTERVAL	MAN-HOURS	INTERVAL	MAN-HOURS
5	1.0	100	1.2
10	2.5	250	2.8
50	2.8	500	0.6
		1000	3.0

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**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**

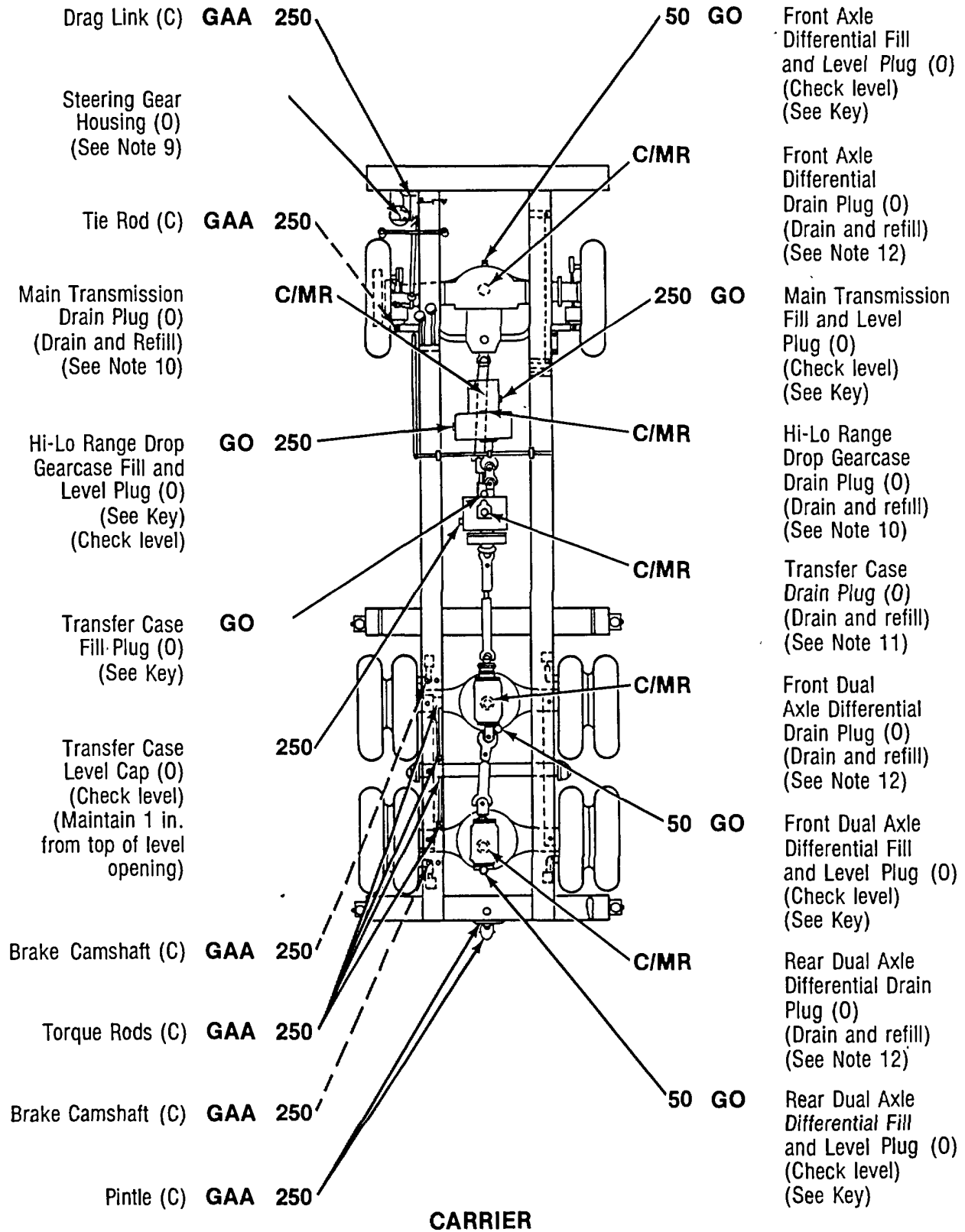


**CARRIER**

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**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**



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**LUBRICANT • INTERVAL**

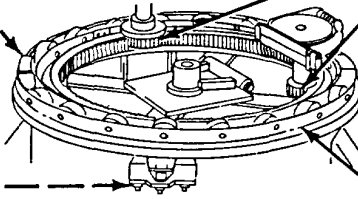
**INTERVAL • LUBRICANT**

Live Rollers (0)  
(28 fittings)

**GAA 10**

Double Hook  
Rollers (0)  
(Beneath deck)  
(6 fittings)

**GAA 10**



**10 CW**

Swing Shaft  
and Gears (0)  
(Clean and coat)

**50 GAA**

Roller Path (0)  
(Clean and coat)

**ROLLER CIRCLE  
TURNTABLE ASSEMBLY**

Boom Foot  
Bushings (C)

**GAA 10**

Swing Brake (C)

**GAA 50**

Center Rotating  
Bushing (0)

**GAA 10**

Vertical Gantry  
Sheave  
Bushings (0)  
(3 fittings)

**GAA 10**

Bridle Anchor  
Bearings (0)

**GAA 10**

Gear and Chain  
Case Drain Plug  
(0)  
(Drain and refill)  
(See Note 13)

**C/MR**

**50 GAA**

Control Levers,  
Brake Pedals,  
and Shafts (C)  
(6 fittings)

**50 GAA**

Brake Control  
Lever (C)

**50 BFS**

Hydraulic Control  
Reservoir Fill  
and Level (0)  
(See Key) (Check  
level)

**50 GAA**

Swing Lock (0)

**GO**

Gear and Chain  
Case Fill Plug (0)  
(See Key)

**50**

Gear and Chain  
Case Level Plug  
(0)  
(Check level)

**10 GAA**

Bridle Sheave  
Bushings (0)

**MACHINE DECK**

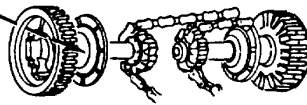
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**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**

Horizontal Swing Shaft (C) **GAA 10**

**10 GAA** Swing Clutch Housing (C)



**HORIZONTAL SWING SHAFT**

Rear Hoist Drum (O)

**GAA 50**

**50 CW** Drive Gears (O) (Clean and coat)

Rear Hoist Drum Shaft (O)

**GAA 50**

**50 GAA** Front Digging Drum Shaft (O)

Drive Chain Idlers (No lubrication required)

**50 GAA** Bearing (O)

Boom Hoist Shaft (O)

**GAA 50**

**50 GAA** Reversing Shaft (O)

Boom Planetary Pawls (O)

**GAA 50**

Boom Hoist Planetary (O)

**GAA 50**

**10 OE/HDO** Drive Chain (O) (Clean and coat)

**HOIST DRIVE SYSTEM**

Wearing Plates and Shipper Shaft Drum (C)

**CW 10**

**5 GAA** Point Sheave Bushings (C) (3 fittings)

Shipper Shaft Bushings (C)

**GAA 10**

**5 GAA** Padlock Sheave Bushing (C)

Crowd Drum (C)

**GAA 10**

**10 GAA** Padlock Hinge Pin (C)

Latch Bar and Keeper (C)

**OE/HDO 10**

**10 GAA** Dump Chain Levers (C)

**10 OE/HDO** Door Hinge Pin (C)

**SHOVEL**

TA221884

**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**

Horizontal Crossover Sheave Bushing (C) (5 fittings)

**GAA 10**

**10 GAA**

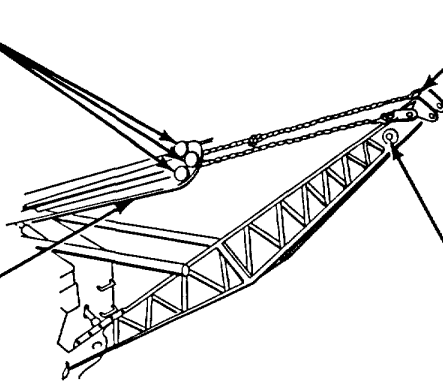
Boom Point Sheaves (C) (3 fittings)

Cables (C) (Clean and coat) (See Note 14)

**OE/ HDO 50**

**10 OE/ HDO**

Guide Roller Bushings (C) (Oil can point)



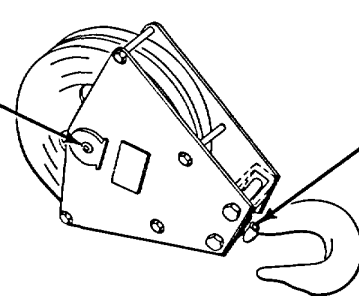
**BOOM AND GANTRY**

Sheave Bushing (C)

**GAA 10**

**10 GAA**

Swivel (C)



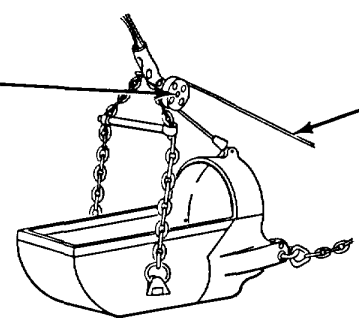
**HOOK BLOCK**

Dumping Sheave Bushing (C)

**GAA 5**

**50 OE/ HDO**

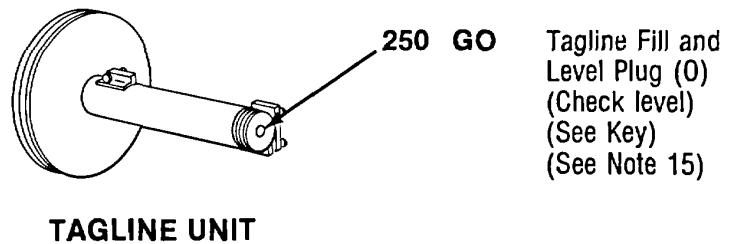
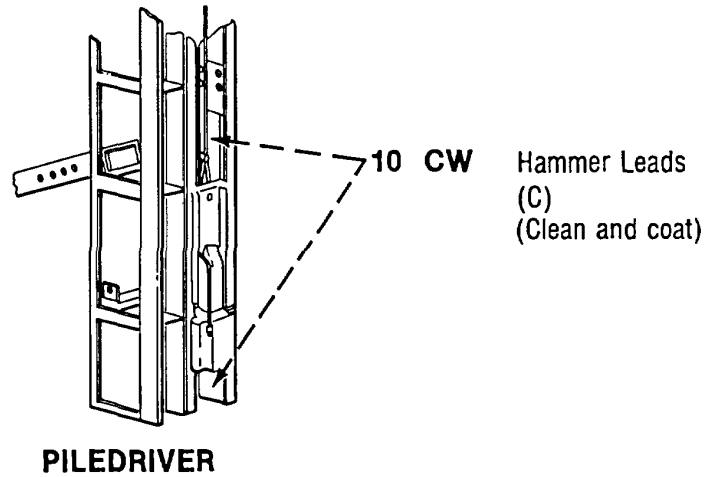
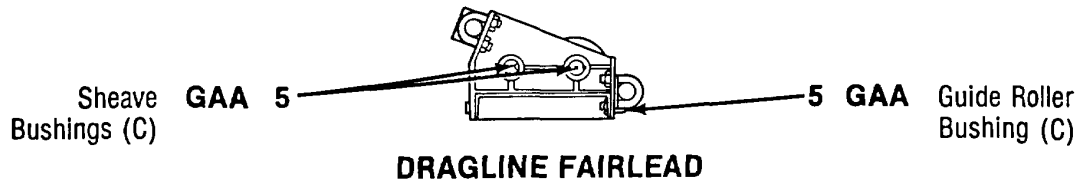
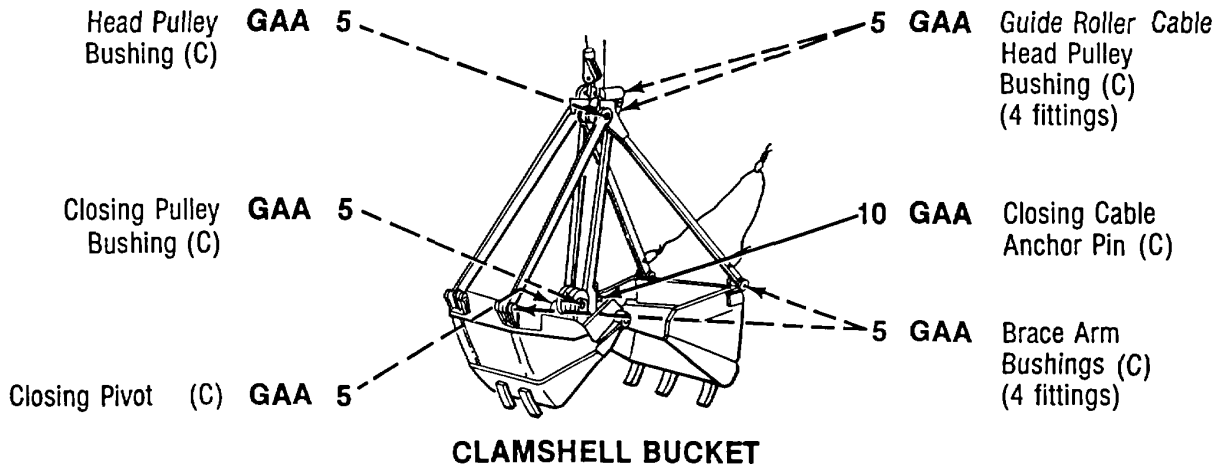
Cables (C) (Clean and coat) (See Note 14)



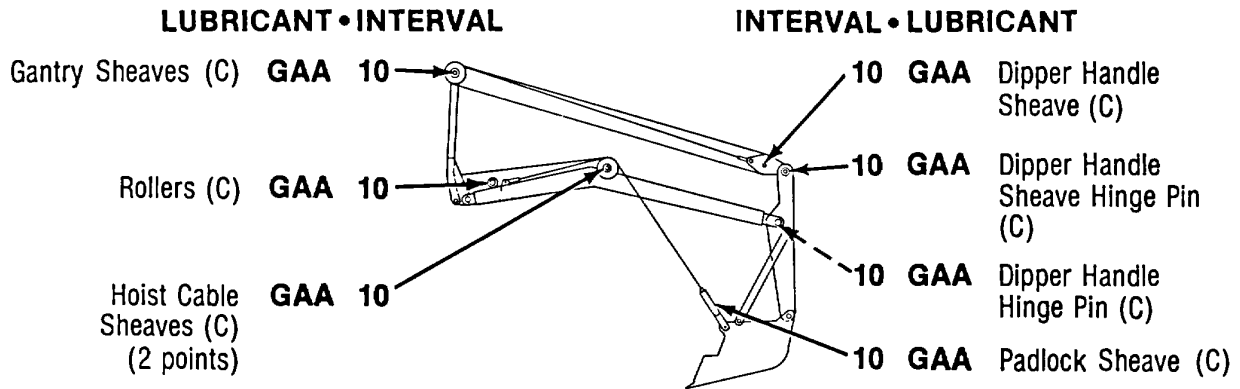
**DRAG LINE BUCKET**

**LUBRICANT • INTERVAL**

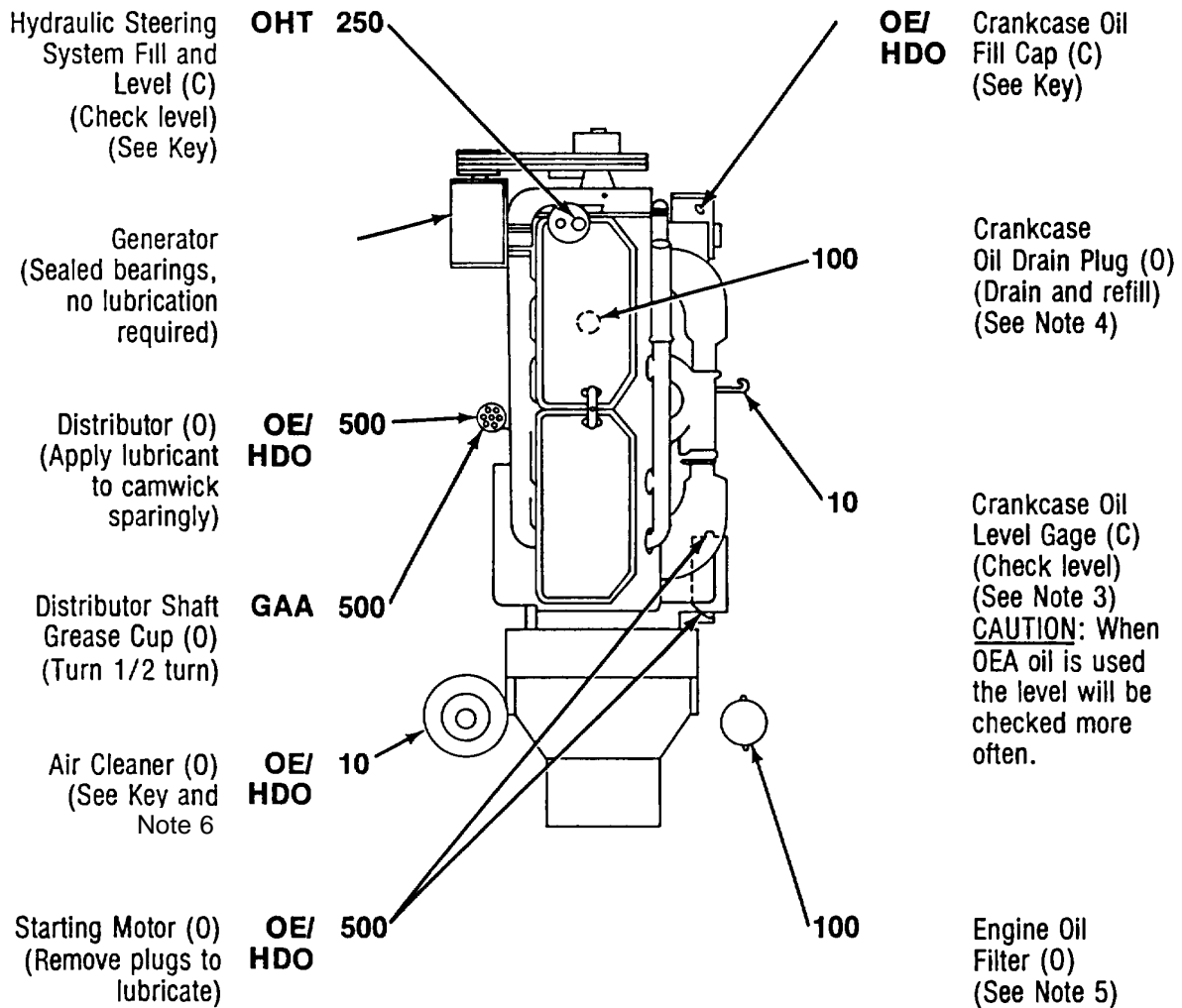
**INTERVAL • LUBRICANT**



TA221886



**BACKHOE BOOM ASSEMBLY**



**CARRIER ENGINE**



**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**

Battery Charging Generator  
(Sealed bearings, no lubrication required)

Crankcase Oil Fill Cap (C)  
(See Key)

Distributor (O)  
(Apply lubricant to camwick sparingly)

Distributor Shaft Grease Cup (O)  
(Turn 1/2 turn)

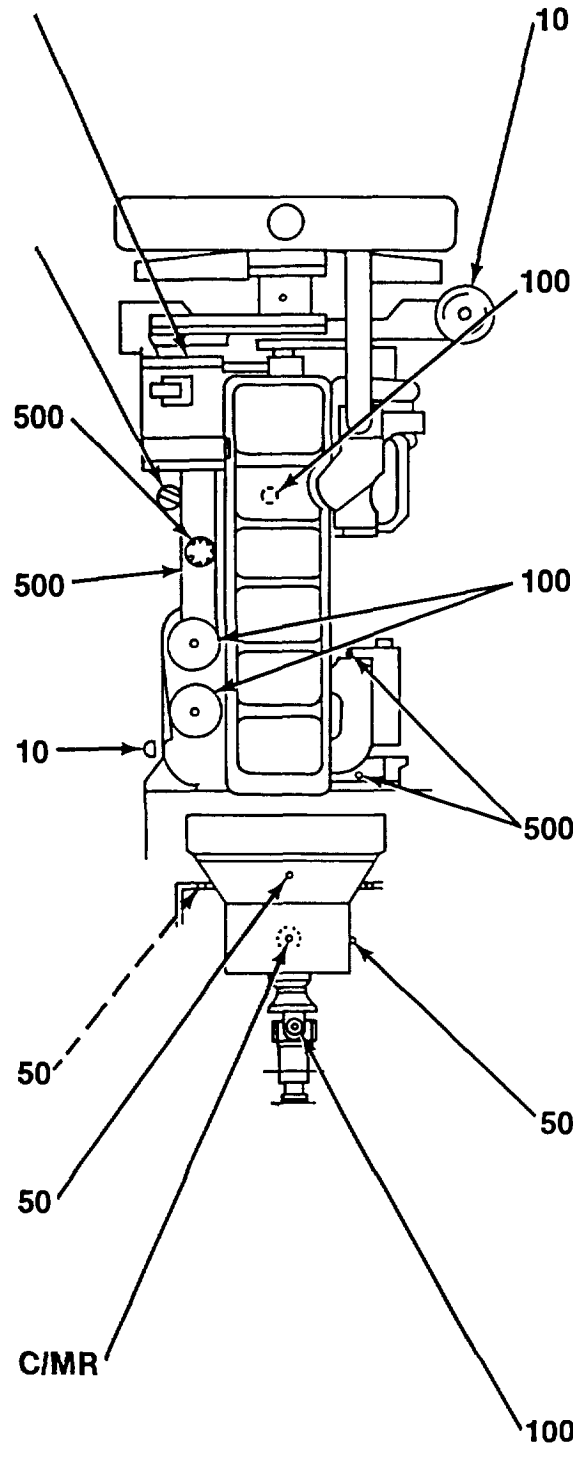
Crankcase Oil Level Gage (C)  
(Check level)  
(See Note 3)

**CAUTION:** When OEA oil is used the level will be checked more often.

Clutch Throwout Shaft (C)

Clutch Throwout Bearing (C)  
(Sparingly)

Transmission Drain Plug (O)  
(Drain and refill)  
(See Note 7)



10 **OE/HDO** Air Cleaner (O)  
(See Key and Note 6)

100 Crankcase Oil Drain Plug (O)  
(Drain and refill)  
(See Note 4)

100 Engine Oil Filter  
(See Note 5)

500 **OE/HDO** Starting Motor (O)  
(Remove plugs to lubricate)

50 **GO** Transmission Fill and Level Plug (O)  
(Check level)  
(See Key)

100 **GAA** Universal Joint (C)  
(2 fittings)

**CRANE ENGINE**

—\* KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +15°F (Above -9°)	+ 40°F to -15° F (+ 4° to -26°)	+40°F to -65°F (+4° to -54°)	
<b>OE/HDO</b> - Lubricating Oil, Internal Combustion Engine, Tactical Service  <b>OEA</b> - Lubricating Oil, Internal Combustion, Arctic  - Carrier Engine Crankcase  - Crane Engine Crankcase  - Oil Can Points (See Note 2)	28 qts. (26.5 L)  16 qts (15.13 L)	<b>OE/HDO 30</b>	<b>OE/HDO 10</b>	<b>OEA</b> (See Note 1)	C/MR - Condition Monitor
- Carrier Engine Air Cleaner  - Crane Engine Air Cleaner	4 qts. (3.78 L)  2 qts. (1.9 L)				
<b>GO</b> - Lubricating Oil, Gear, Multipurpose  - Front Axle Differential  - Dual Axle Differentials  - Main Transmission  - Transfer Case  - Crane Transmission  - Hi-Lo Range Drop Gearcase	11 qts. (10.4 L)  11 qts. ea (10.4 L)  8 qts. (7.56 L)  8-1/2 qts. (8 L)  3-1/2 qts. (3.3 L)  (3.78 L)	<b>GO 80W/90</b>	<b>GO 80W/90</b>	<b>GO 75W</b>	Intervals given are in hours of normal operation.  For Arctic operation refer to FM 9-207

\* See Note 16 for lubricant specification number.

—\* KEY—

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +15°F (Above -9°)	+ 40°F to -15° F (+ 4° to -26°)	+40°F to -65°F (+4° to -54°)	
<b>GO</b> - Gear and Chain Case  - Tagline	72 qts. (68.11 L)	<b>GO 85W/140</b>	<b>GO 80W/90</b>	<b>GO 75W</b>	For Arctic operation refer to FM 9-207  Intervals given are in hours of normal operation.
	4 qts. (3.78 L)				
<b>BFS</b> - Brake Fluid, Silicone, Automotive  - Hydraulic Control Reservoir		ALL TEMPERATURES			
<b>CW</b> - Lubricating Oil, Chain, Wire Rope, Exposed Gear		<b>CW-IIB</b>	<b>CW-IIB</b>	<b>CW-IIB</b>	
<b>OHT</b> - Hydraulic Fluid, Petroleum Base, Preservative  - Hydraulic Steering System	1-1/2 qts. (1.4 L)	ALL TEMPERATURES			
<b>GAA</b> - Grease, Automotive and Artillery		ALL TEMPERATURES			

\*See Note 16 for lubricant specification number.

NOTES:

1. FOR OPERATION OF EQUIPMENT in PROTRACTED COLD TEMPERATURES BELOW-15°F (-26°C). Remove lubricants prescribed in Key for temperatures above -15°F (-26°C). Relubricate with lubricants ) specified in Key for temperatures below 15°F (-26°C). If OEA lubricant is required -to meet the temperature ranges prescribed in the Key, OEA lubricant is to be used in place of OE/HDO-10 lubricant for all temperature ranges where OE/HDO-10 is specified in the Key.

2. OIL CAN POINTS. Each 50 hours lubricate accelerator shaft, governor linkage, air brake treadle roller and hinge pin, clutch pedal linkage, door latches and hinges, yoke pins and clevises, springs, fasteners and all exposed adjusting threads with OE/HDO, except those adjusting threads coming in contact with excavated material.

3. CRANKCASE OIL LEVEL HOT OR COLD CHECK (CARRIER AND CRANE).

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## NOTES CONTINUED:

Cold engine, oil level should be at high mark on dipstick. Hot engine, oil level must be between high and low marks on dipstick (allow to set 5 minutes before checking).

4. CRANKCASE OIL (CARRIER AND CRANE). Oil is to be changed each 100 hours. Drain when lubricant is warm.

5. ENGINE OIL FILTER (CARRIER AND CRANE). Each 100 hours, remove filter element, clean housing and install new filter element. After installing new filter element, fill crankcase, operate engine for 5 minutes, check housing for leaks, check crankcase oil level and bring to "FULL" mark.

6. AIR CLEANER (CARRIER AND CRANE). Each 10 hours, refill reservoir to level mark. Each 50 hours disassemble entire unit, clean, re-oil and assemble.

7. TRANSMISSION (CRANE ENGINE). Each 50 hours check level. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for five minutes, check for leaks and bring oil level to fill and level plug opening.

8. FRONT AND REAR WHEEL BEARINGS. Each 1000 hours, remove wheels, clean and inspect all parts, replace damaged or worn parts, repack bearings and assemble.

9. STEERING GEAR HOUSING.. Serviced by direct support maintenance at time of overhaul. Repack with GAA.

10. MAIN TRANSMISSION/HI-LO RANGE DROP GEARCASE. Each 250 hours check level. Change gear lubricant only 1 when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for F minutes, check for leaks and bring oil level to fill and level plug opening.

11. TRANSFER CASE. Each 250 hours check level. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for 5 minutes, check for leaks and bring oil level 1 inch from top of level opening.

12. FRONT AXLE DIFFERENTIAL/FRONT AND REAR DUAL AXLE DIFFERENTIAL. Each 50 hours check level. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for 5 minutes, check for leaks and bring oil level to fill and level plug opening.

13. GEAR AND CHAIN CASE. Each 50 hours check level. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for five minutes, check for leaks and bring oil level to level plug opening.

14. CABLES. Each 50 hours clean and coat all cables with OE/HDO, except those coming in constant contact with dirt or excavated material.

15. TAGLINE HOUSING. Keep tagline housing 1/2 full of GO. Do not overfill.

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## NOTES - CONTINUED:

16. LUBRICANTS. The following is a list /of lubricants with military symbols and applicable specification numbers.

OE/HDO	MIL-L-2104
GO	MIL-L-2105
GAA	MIL-G-10924
OEA	MIL-L-46167
BFS	MIL-B-46176
CW	VV-L-751
OHT	MIL-H-6083
(SD), Type II	P-D-680

Copy of this Lubrication Order will remain with the equipment at all times, instructions contained herein are mandatory.

By order of the Secretary of the Army:

JOHN A. WICKHAM, JR.  
General, United States Army  
Chief of Staff

OFFICIAL:

ROBERT M. JOYCE  
Major General, United States Army  
The Adjutant General

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