



# **MAINTENANCE & LUBRICATION**

**NCH 35**

## C O N T E N T S

|   |    |
|---|----|
| General . . . . .   | 1  |
| Safety Precautions . . . . .                                | 1  |
| Preventive Maintenance . . . . .                            | 1  |
| Shift Maintenance . . . . .                                 | 2  |
| Scheduled Maintenance . . . . .                             | 3  |
| Scheduled Oil Sampling . . . . .                            | 3  |
| Shift Maintenance Check List . . . . .                      | 5  |
| Lubrication Points . . . . .                                | 6  |
| Lubrication Chart (Fig. 1 NCH 35 Overall Machine) . . . . . | 7  |
| Lubrication Chart (Fig. 2 Grapple Assembly) . . . . .       | 8  |
| Lubrication Chart (Fig. 3 Boom Assembly) . . . . .          | 9  |
| Maintenance Check List . . . . .                            | 10 |
| Maintenance Procedures . . . . .                            | 12 |
| Operator Troubleshooting . . . . .                          | 16 |
| Maintenance Specifications . . . . .                        | 19 |
| Component Capacities & Lubricants . . . . .                 | 20 |
| Lubricant Specifications . . . . .                          | 21 |

---

# Maintenance and Lubrication

## General

A machine that receives regular care from its operators and mechanics generally rewards them with decreased downtime and greater reliability. With the help of the information in this section, you should be able to maintain your Nuclear Cylinder Handler at top operating efficiency. The maintenance and lubrication procedures given here can be performed with a minimum of shop tools.

## Safety Precautions

Before performing any maintenance or lubrication, review the following safety precautions. They're included for your protection.

### 1. Read This Manual

Be sure you understand the procedures outlined in this manual before attempting to carry them out. Pay particular attention to any safety warnings presented. If you have any questions, don't hesitate to ask your Allied Wagner dealer.

### 2. Perform Maintenance on Level Ground

The machine should be on level ground and clear of traffic lanes whenever possible. The parking brake should be set and the wheels blocked.

### 3. Remove Loads

The machine should be unloaded, with the carriage down.



## WARNING

**Never rely on the hydraulics to support any part of the machine during maintenance or**

**lubrication. If necessary, support components with appropriate safety stands. NEVER stand under a component that is supported only by the hydraulics. Make sure it is resting on its mechanical stops or safety stands.**

### 4. Stop the Engine

Before performing any maintenance or lubrication, remove the key from the switch, or tag the key switch "**DO NOT START**", to ensure that the engine is not inadvertently started.

### 5. Use Safe Ladders/Scaffolding

Due to the extreme height of the upper lube points, it is essential to personnel safety that safe ladders, personnel lifts and/or scaffolding be used while servicing. These areas can be dangerously slick under conditions of rain, frost or oil smears.

## Preventive Maintenance

Preventive maintenance is a system that is designed to detect problem areas and prevent equipment failure before trouble can develop to a critical point. The system is based on a series of maintenance checks and servicing points. To be effective, a preventive maintenance program demands strict adherence to a planned schedule of maintenance.

## Benefits of Preventive Maintenance

Time spent making the required periodic checks is a real investment in working equipment and efficient use of man hours. Valuable benefits can be realized, all of which mean savings in time and resources.

## Preventive Maintenance

- Promotes Safety - properly maintained equipment is better able to operate within its design specifications and react positively to the operators control.
- Improves Equipment Availability - by minimizing the chances of breakdown.
- Reduces Unexpected Downtime - crash repairs are expensive and detract from normal scheduled maintenance.
- Reduces Equipment Abuse - provides the ability to predict component life and helps avoid operating equipment to destruction, by replacing parts before they fail.
- Allows Planning of Daily Production - by knowing the condition of available equipment.
- Allows Planning of Maintenance Man Hours - by distribution of duties and necessary lead time for parts ordering.
- Provides Complete History of Equipment - based on performance, frequency and type of repairs and actual man hours expended on maintenance.

## Establishing a Preventive Maintenance Program

The key to an effective preventive maintenance program is diligence in following a maintenance schedule set at regular planned intervals. Such intervals should be made compatible with the nature of operation of the equipment and with the capabilities of the maintenance facility. In any event, the intervals and inspection requirements must be planned, regular, and consistent.

This program proposes the following basic schedule which is based on intervals generally used and accepted in the wood products industry.

Specific maintenance should be completed using the following intervals:

- 10 hours (each shift or daily)
- 50 hours (weekly)
- 250 hours (monthly)
- 500 hours (quarterly)
- 1000 hours (semi-annually)
- 2000 hours (annually)

Each successive schedule (e.g. weekly, monthly, quarterly, etc) builds on the former and is accumulative

in nature. For example, when performing monthly maintenance, the mechanic will first take note of the shift maintenance reports and remedy any discrepancy; then comply with the shift and weekly maintenance, and in addition will perform the checks specified in the monthly schedule.

## Maintenance Record Keeping

The importance of good record keeping cannot be over-emphasized. Each scheduled maintenance form should be checked off as the inspections and service is performed. Quantities of replenished lubricants should be recorded, as well as hydraulic pressure readings. All discrepancies should be recorded whether remedied or pending. Operators and mechanics should sign off forms and return them to the maintenance supervisor for approval and retention in an equipment unit file.

Accurately recorded maintenance forms will give the maintenance personnel an overall view of how particular equipment is holding up under normal operating conditions. Good records, and the ease by which they can be reviewed also enable maintenance personnel to identify and evaluate problem areas and allow adjustment in the maintenance scheduling for their particular operation.

## Shift Maintenance

Shift maintenance is where preventive maintenance begins. The operator normally completes this inspection. It consists of the routine servicing and lubrication of the machine's major systems. On a daily basis, the operator is in a position to identify, remedy and/or record potential problem areas and is able to quickly recognize any change in the performance of his machine. The comments he records on the shift maintenance report become a valuable tool to the maintenance department, and is an important ingredient to the overall success of a preventive maintenance program.

## Shift Maintenance Checklist

A recommended checklist is given here as an aid in developing a practical shift maintenance program if one has not been developed by your company. A shift maintenance report, based on this checklist, should be used to report defects found when making maintenance checks at the beginning of each shift.

Your company may have a different reporting method, however, it is usually a requirement that this form be

# Maintenance and Lubrication

---

filled out at the end of each shift. Accurate shift maintenance reports can help your company anticipate maintenance problems and take action to prevent costly failures.

## Using the Checklist

The reference numbers in the left-hand column of the checklist indicate the physical location of each check point or lubrication point as it appears on the shift maintenance diagram. Circled reference numbers on the diagram indicate lubrication points. Boxed numbers indicate maintenance check points.

Shift maintenance details are provided in the Maintenance Procedures Section. These procedures consist of checks that can be performed by the operator.

## Scheduled Maintenance

Periodic scheduled maintenance is intended to be performed in a complete maintenance facility by trained mechanics. The timely scheduling and completion of these periodic inspections by the maintenance department will determine the length of downtime of a particular machine. Therefore, maintenance scheduling becomes a critical factor in the effective use of man hours and the availability of serviceable equipment.

### Scheduled Maintenance Checklist

Actual operating environment governs the maintenance schedule. Some checks should be performed more often under severe conditions, such as heavy dust, extreme temperatures or extremely heavy loads.

These maintenance checklists are designed to be used as a guide until adequate experience is obtained in establishing a schedule to meet your specific needs.

A detailed list of component checks is provided with a suggested schedule basis given in hours of operation, or calendar time.

The engine manufacturer's operation and maintenance manual should be consulted for additional engine related checks and/or details.

A maintenance schedule should be established using these checklists as a guide. The result will be a maintenance program to fit your specific operation.

## Using the Checklist

Although specific maintenance is identified in these checklists, location and procedure references are not provided in the columns.

Scheduled maintenance is normally carried out by trained mechanics, who are knowledgeable of the equipment systems and component locations. Scheduled maintenance procedures can be found by referring to the appropriate section of the service manual.

## Scheduled Oil Sampling

Use scheduled oil sampling (SOS) to monitor machine condition and maintenance requirements. Oil samples from engine, transmission, axles, and hydraulic system should be taken when the oil is hot and well mixed to ensure an accurate analysis. Contact your Wagner dealer for complete information and assistance in establishing a scheduled oil sampling analysis program for your equipment.



# Maintenance and Lubrication

## Shift Maintenance Checklist

### EVERY 10 HOURS OR DAILY

*Note general vehicle condition. Clear away all collected debris - steam clean if necessary. Check for mechanical damage and loose or leaking components. Report faults to maintenance department.*

#### Before Starting Engine - Check The Following:

| REF   | ITEM  | OK                       | NO                       | ADD   |
|-------|---|--------------------------|--------------------------|-------|
| 19    | ENGINE (Check Oil Level - check for leaks)  | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| 9     | HYDRAULIC TANK (Check oil level - check for leaks)                                  | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| 2     | RADIATOR (Check coolant level - check for leaks)                                    | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| 10    | AIR CLEANER (Check indicator - clean or change element as required, empty dust cup) | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 10    | AIR INTAKE SYSTEM (Check for leaks and damage)                                      | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 18    | ENGINE BELTS (Check for adjustment and wear)  | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 6     | AIR TANKS (Check drain valves for correct operation - one tank on each side)        | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 2     | RADIATOR & OIL COOLER (Are fins clean and unobstructed?)                            | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 17 21 | WHEELS & TIRES (Check condition and pressure)                                       | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| 5     | HYDRAULIC BRAKE FLUID (Check fluid level)   | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| —     | LUBRICATE CHASSIS (Refer to lube chart)   | <input type="checkbox"/> | <input type="checkbox"/> |       |

#### After Starting Engine - Check The Following:

|    |  |                          |                          |       |
|----|--|--------------------------|--------------------------|-------|
| —  | ENGINE (Does it sound normal?)                       | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 13 | INSTRUMENTS (Check for normal readings)              | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 13 | CONTROLS (Check for normal operation)                | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 8  | EXHAUST SYSTEM (Check for leaks and excessive smoke) | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 12 | TRANSMISSION (Check oil level - check for leaks)     | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

#### Note Anything Abnormal Or In Need Of Repair:

LIGHTS \_\_\_\_\_ DEFROSTER \_\_\_\_\_ REVERSE WARNING HORN \_\_\_\_\_  
HORN \_\_\_\_\_ WINDSHIELD WIPERS \_\_\_\_\_  
HEATER \_\_\_\_\_ AIR CONDITIONER \_\_\_\_\_

OPERATOR \_\_\_\_\_ SUPERVISOR \_\_\_\_\_ DATE \_\_\_\_\_  
MODEL \_\_\_\_\_ SERIAL NUMBER \_\_\_\_\_ HOUR METER \_\_\_\_\_

**Lubrication Points****10 HOURS**

| REF            |                        | FITTINGS |
|----------------|------------------------|----------|
| ①              | Steering cylinder pins | 4        |
| ⑪              | Boom to chassis pin    | 2        |
| ④ See Figure 3 | Tilt cylinder pins     | 2        |
| ⑭ & ⑫          | Hoist cylinder pins    | 4        |

**50 HOURS**

|                            |                                    |    |
|----------------------------|------------------------------------|----|
| See Figure 2 for Lube Port | Grapple Tilt pins                  | 2  |
| See Figure 2 for Lube Port | Side Tilt #1 pins                  | 2  |
| See Figure 2 for Lube Port | Side Tilt #2 pins                  | 2  |
| See Figure 2 for Lube Port | Trunnion - Upper                   | 3  |
| See Figure 2 for Lube Port | Trunnion - Lower                   | 3  |
| See Figure 2 for Lube Port | Side Shift pins                    | 2  |
| ⑮ & ⑯ See Figure 2         | Tine cylinder pins                 | 8  |
| ⑳ See Figure 2             | Rollers                            | 16 |
| ㉑                          | Driveline - transmission to axle * | 3  |

**250 HOURS**

|   |                                     |   |
|---|-------------------------------------|---|
| ⑱ | Fan drive bearing (not all engines) | 1 |
|---|-------------------------------------|---|

**500 HOURS**

|   |                   |   |
|---|-------------------|---|
| ⑰ | Tailwheel bearing | 2 |
| ⑮ | Tailpost          | 1 |

\* Use handgun or low pressure adapter;  
lubricate sparingly



# Maintenance and Lubrication

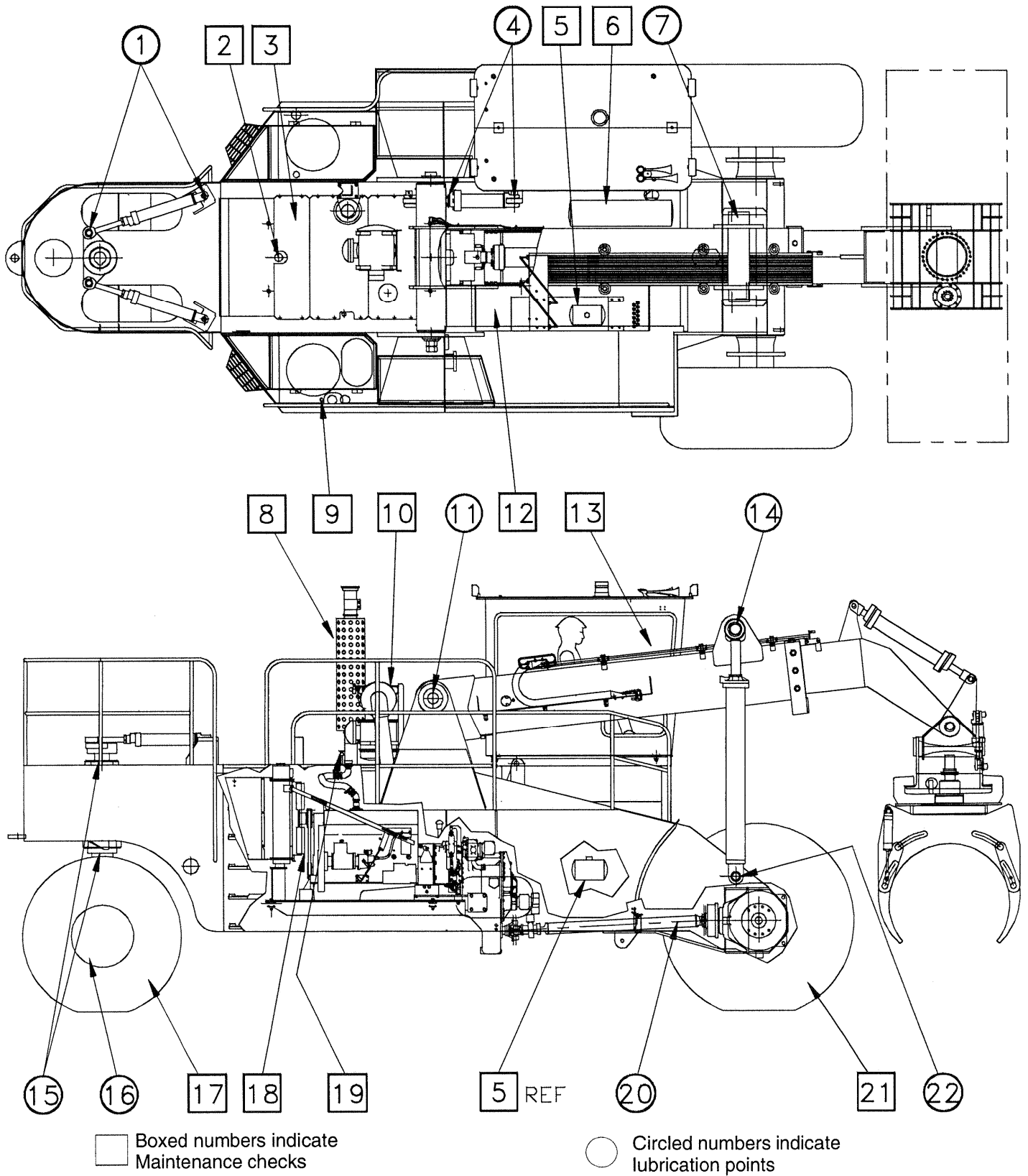
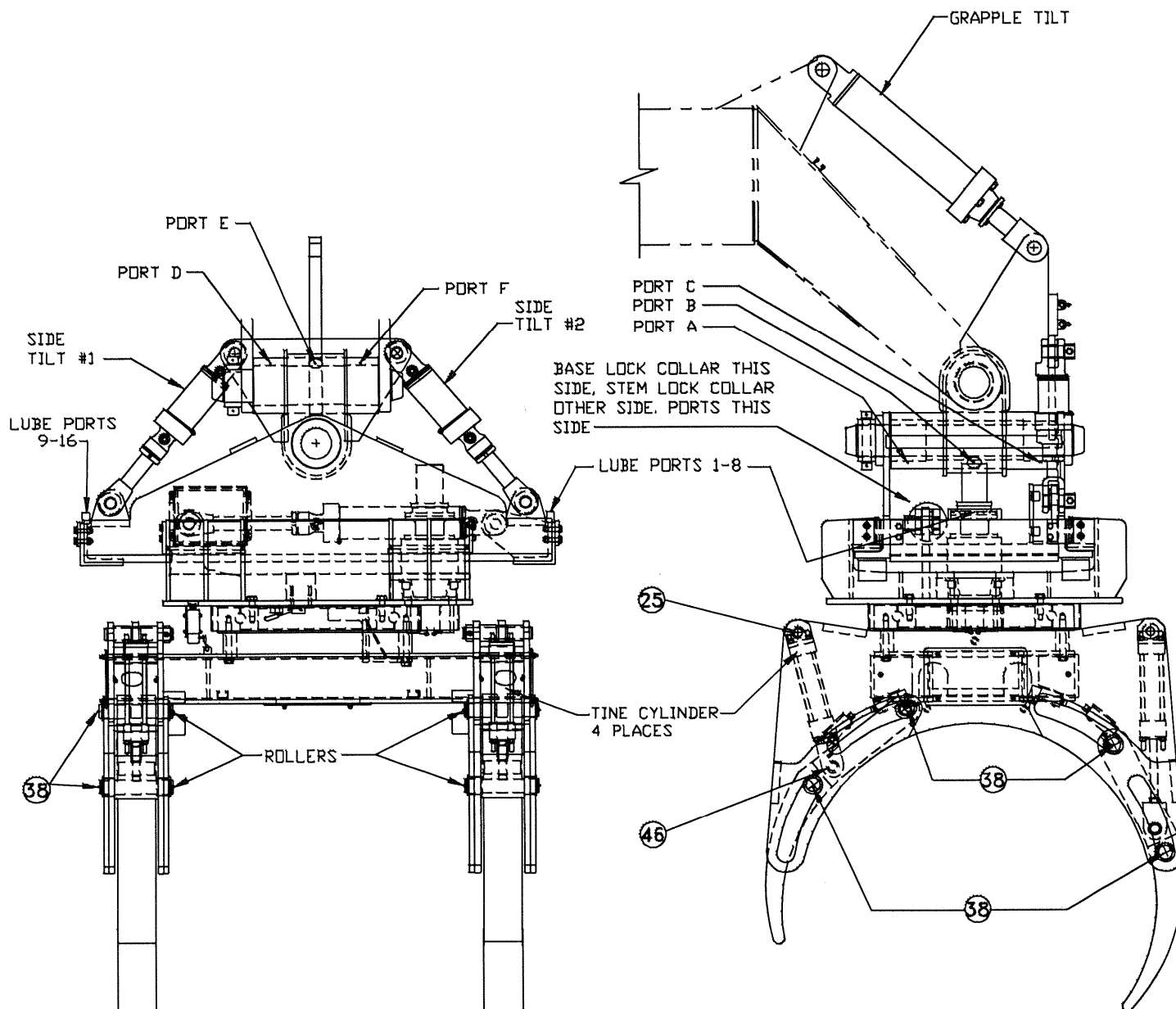


Fig. 1 NCH 35 Maintenance and Lubrication Chart

NOTE: Due to variations in engine types and models, the indicated location of engine filters(fuel, oil, coolant) may not be exact. Consult your specific engine service manual for exact locations.



NOTE: LUBE PORTS ARE IN TWO GANGS, LOCATED AS SHOWN ON DRAWING.

| LUBE PORT | ITEM                    | LUBE PORT | ITEM                    |
|-----------|-------------------------|-----------|-------------------------|
| 1         | STEM - SIDE SHIFT       | 9         | STEM - SIDE TILT #1     |
| 2         | PORT E - TRUNNION UPPER | 10        | BASE - SIDE TILT #1     |
| 3         | PORT F - TRUNNION UPPER | 11        | PORT D - TRUNNION UPPER |
| 4         | PORT A - TRUNNION LOWER | 12        | SWING BEARING           |
| 5         | PORT B - TRUNNION LOWER | 13        | STEM - GRAPPLE TILT     |
| 6         | PORT C - TRUNNION LOWER | 14        | BASE - GRAPPLE TILT     |
| 7         | BASE - SIDE TILT #2     | 15        | BASE - SIDE SHIFT       |
| 8         | STEM - SIDE TILT #2     | 16        | PLUG                    |

Fig. 2 NCH 35 Grapple Assembly Maintenance and Lubrication Chart

# Maintenance and Lubrication

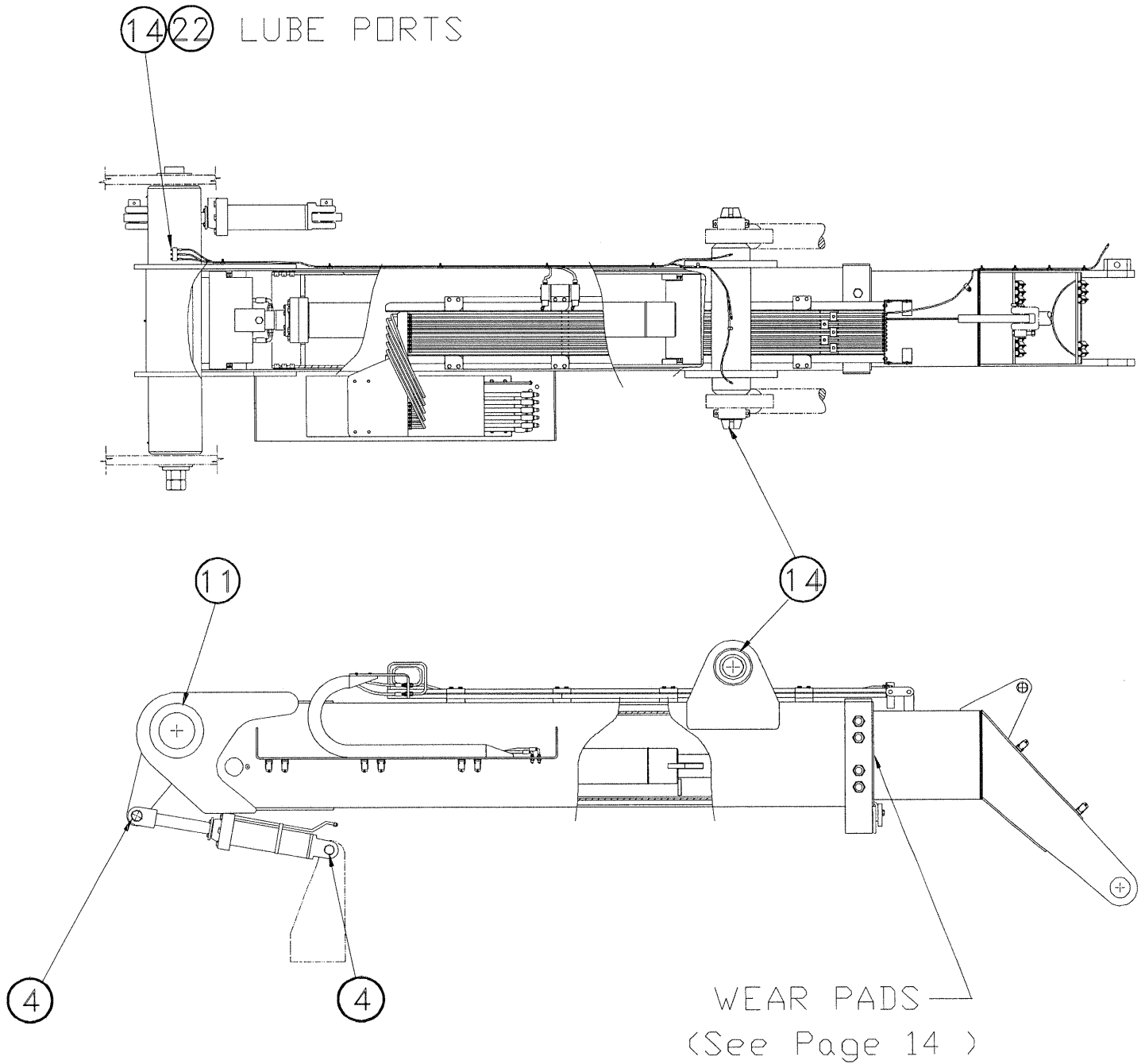


Fig. 3 NCH 35 Boom Assembly Maintenance and Lubrication Chart

**Maintenance Checklist****EVERY 50 HOURS OR WEEKLY**

- |  |                        |
|--|------------------------|
| 1. Repeat the 10 hour check  | OK_____ NO _____       |
| 2. Check for fluid leaks - oil, fuel, water  | OK_____ REPAIR _____   |
| 3. Check brakes for adjustment and wear  | OK_____ REPAIR _____   |
| 4. Check wheel lug nuts and studs mechanically   | OK_____ REPAIR _____   |
| 5. Check battery electrolyte level   | OK_____ ADD _____      |
| 6. Lubricate chassis - refer to Lubrication charts (pages 7, 8, and 9)                                 | OK_____ NO _____       |
| 7. Record engine rpm   | HIGH _____ STALL _____ |
| 8. Check for structural damage - inspect chassis & attachments<br>for bending, cracking & broken welds | OK_____ REPAIR _____   |

**EVERY 250 HOURS OR MONTHLY**

- |   |                       |
|---|-----------------------|
| 1. Repeat the 50 hour check                 | OK_____ NO _____      |
| 2. Change engine oil & filters *            | OK_____ ADDED _____   |
| 3. Take engine oil sample for analysis *    | OK_____ NO _____      |
| 4. Check axle differential oil level        | OK_____ ADDED _____   |
| 5. Check axle planetary oil level           | OK_____ ADDED _____   |
| 6. Change cooling system filter             | OK_____ REPLACE _____ |
| 7. Check all hydraulic pressures and record | OK_____ NO _____      |
| 8. Check fire suppression actuator          | OK_____ NO _____      |

**EVERY 500 HOURS OR QUARTERLY**

- |   |                       |
|---|-----------------------|
| 1. Repeat the 250 hour check  | OK_____ NO _____      |
| 2. Change fuel filters *  | OK_____ REPLACE _____ |
| 3. Change hydraulic filters *   | OK_____ REPLACE _____ |
| 4. Change transmission filters *  | OK_____ REPLACE _____ |
| 5. Take oil samples from transmission, axle,<br>and hydraulic system for analysis * | OK_____ NO _____      |
| 6. Inspect brake system & components  | OK_____ REPAIR _____  |

# Maintenance and Lubrication

## Maintenance Checklist (Continued)

### 1000 HOURS OR SEMI-ANNUALLY

- |  |                        |
|--|------------------------|
| 1. Repeat the 500 hour check             | OK _____ NO _____      |
| 2. Change transmission oil and filters * | OK _____ ADDED _____   |
| 3. Clean and flush cooling system        | OK _____ ADDED _____   |
| 4. Check pins and bushings for wear      | OK _____ REPLACE _____ |

### 2000 HOURS OR ANNUALLY

- |   |                      |
|---|----------------------|
| 1. Repeat the 1000 hour check           | OK _____ NO _____    |
| 2. Drain, flush and fill differential * | OK _____ ADDED _____ |
| 3. Drain, flush & fill planetaries *    | OK _____ ADDED _____ |
| 4. Change hydraulic oil and filters *   | OK _____ ADDED _____ |

\* Normal drain period and filter change intervals are for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. Change intervals should be adjusted according to the results of oil sampling analysis. Consult your WAGNER dealer for assistance in establishing an oil sampling program for your equipment.

---

**IMPORTANT:** Consult the engine manufacturer's Operation and Maintenance Manual for additional engine related checks and/or details.

---

Repairs:

Problem: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Parts: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Mechanic: \_\_\_\_\_ Hours Labor: \_\_\_\_\_

Operator: \_\_\_\_\_ Supervisor: \_\_\_\_\_

Machine Model: \_\_\_\_\_ Equipment No: \_\_\_\_\_

Date: \_\_\_\_\_ Shift: \_\_\_\_\_ Hour Meter: \_\_\_\_\_

## Maintenance Procedures

### General

The following maintenance procedures should be performed at the beginning of each work shift. The number before each maintenance procedure corresponds with the numbers given in the Maintenance and Lubrication Chart (Figures 1, 2, and 3). This provides an additional aid in locating each check point.

### Before Starting Engine

#### 19 Engine Oil Level

The oil level should be checked prior to starting the engine. Make sure that the area around the dipstick is clean and the machine is sitting on level ground.

NOTE: A 15 minute drain-back time is recommended if the engine has been running.

The oil level must be maintained between the "L" (low) mark and the "H" (high) mark, but as close to the "H" mark as possible.

**CAUTION:** Never operate the engine with the oil level below the "L" mark or above the "H" mark. Refer to the engine's Operation and Maintenance manual for detailed engine service information.

Use only approved engine oil (see Lubricant Specifications Chart, page 5-19). Do not over-fill. Check engine for leaks.

#### 9 Hydraulic Oil Level

Always check the hydraulic oil level prior to operation. The dipstick and fill pipe are located on the RH chassis deck, to the right of the operator's cab.

**CAUTION:** Always open the tank breather petcock (located on the breather pipe) before removing the dipstick, filler cap, or in-tank filter cover plate. Failure to vent the tank can result in injury or a substantial oil spill. Be sure to close the petcock before operating the machine.

The oil level should be checked with the hoist cylinders retracted (down). The oil level should be at or near the "H" (high) mark on the dipstick. Fill with approved hydraulic fluid as required (see Lubricant Specifications Chart, page 19). Do not overfill.

#### 2 Engine Coolant Level

Daily inspection of the coolant level is recommended. Cooling systems using anti-aeration baffles restrict visual observation of the true coolant level. Although the coolant can be seen, the system may not be full. To gain a true fill, add water slowly up to the bottom of the fill neck and allow a 30 second settling period. Remember to compensate for the loss of anti-freeze when adding water.



### WARNING

**Never remove the radiator cap if the engine is hot. The coolant will be under pressure and could flash to steam with explosive force, causing severe burns. Remove the radiator cap only when the engine is cool.**

NOTE: If the engine is hot, the coolant level will be higher than when it is cold.

Inspect the radiator daily for restriction caused by leaves, paper or bent fins. Inspect the radiator cap, hoses, and connectors for any signs of leakage or damage.

#### 10 Air Cleaner

The air cleaner is a cyclonic-type, dry air filter. A service indicator shows the condition of the filter. The indicator will show in the green zone when the filter is clean. The indicator will show red when the filter is restricted. If red appears in the indicator window, clean or change the element and press the reset button on the indicator.

The air cleaner is also equipped with a pre-cleaner dust cup. It should be emptied daily. Never allow the dust level to come within 1/2 inch of the pre-cleaner tubes. Be sure that the dust cup seals are in place and in good condition. Complete sealing here is essential.

#### 18 Engine Belts

Check the tension of the drive belts by pressing with the thumb halfway between the pulleys. The belts should not deflect more than the values shown in the table (Fig. 4). If any belt is loose or worn, report to maintenance for corrective action.

# Maintenance and Lubrication

| Engine  | Belt Deflection Inches (mm) |
|---------|-----------------------------|
| Cummins | 3/8 to 5/8 (9.5 to 15.9)    |
| Cat     |                             |
| Detroit | 1/2 to 3/4 (13 to 19)       |

**Fig. 4 Engine Belt Deflection**

## **17** **21** Wheels and Tires

Visually inspect the tires for low air pressure and damage. Also check the wheel assemblies for cracks, loose or missing lug nuts, broken studs, etc. Report any problems to maintenance.

## **5** Hydraulic Brake Fluid

Check the fluid level in each of the two brake reservoirs. Each reservoir must be full. Clean the area around the filler cap before removing. Fill the reservoirs with transmission fluid. Do not use automotive brake fluid.

## After Starting Engine

### **3** Engine

After starting, check that the engine runs and sounds normal. It should come up to operating temperature within a few minutes after starting. If you notice unusual noises or excessive smoke, have maintenance check it out.

### **13** Instruments

Check all instruments for normal readings immediately after starting the engine. Make sure that pressures and temperatures are within acceptable limits. Also, check that all controls function properly. They should be smooth and responsive.

### **10** Air Intake System

Inspect all connections for damage and air leaks. Look for damaged fittings and loose connections. Do not operate the machine if leaks are present. Dirt could enter the engine intake and cause severe damage.

## **8** Exhaust System

Check for exhaust leaks. Make sure that exhaust gases are not entering the operator's cab. Mounting brackets must be in place and all connections tight. Check for excessive smoke.

## **12** Transmission Oil Level

The level should be checked after engine warm-up, with 180° to 200° showing on the transmission temperature gauge. The dipstick and fill tubes can be reached through an access opening on the chassis deck, directly above the transmission. Check the level with the engine running at idle, at operating temperature, and with the transmission in neutral. The level should be between the "H" (high) and "L" (low) marks. Fill with approved fluid only. See Lubricant Specifications Chart, Page 21. Do not overfill. Inspect for leaks.

## Grapple Bearing & Pinion Lubrication

### Turntable Bearing See Fig 2.

The turntable bearing is externally lubricated by means of Zerk fittings around the bearing ring. It is necessary to distribute the grease into the shell-ball portion of the bearing by injecting grease through the fittings as the grapple is rotated. The grapple should be rotated from left to right as far as possible and one (1) pump of authorized grease gun should be applied in 30 degree intervals as the grapple is rotated in its full swing.

Lithium base grease with EP additive and rust inhibitors is acceptable. A No. 2 grade should be used at temperatures above 32 degrees F. and a No. 1 grade should be used below 32 degrees F.



## **WARNING**

**NOTE:** Turn off the power supply to prevent accidental activation of the hydraulic control levers.

### Swing Gear Pinion See Fig 2.

Lubrication of the swing gear pinion(s) and the gearing around the face of the turntable bearing may be accomplished at ground level. It is necessary to distribute the lubrication around the gear face of the turntable bearing and pinions.

## Grapple Lubrication Instructions

### Turntable Bearing See Fig 2.

Grease the race through any fitting as the machine is rotated. (Preferably every thirty degrees). Rotate at least every two complete revolutions. When complete revolution is not possible, use each fitting, rotating the grapple back and forth as far as possible as each fitting is greased.



## WARNING

**NOTE:** Personnel should be clear of area around grapple as it is rotated.

Lithium base grease with EP additive and rust inhibitors is acceptable. A No. 2 grade should be used at temperatures above 32 degrees F. and a No. 1 grade should be used below 32 degrees F.

### Pinion And Ring Gear See Fig 2.

OPEN TYPE RING GEAR - Lubricate weekly or as required. Inspect daily.

CLOSED TYPE RING GEAR - Lubricate yearly or as required.

### Swing Gear Reducer See Fig 2.

The oil level in the swing drive gear box should be checked monthly if there is no sign of leakage. The fill plug and the level plug are located on top of the gear box and oil must be visible in the level plug. If there is any visible leakage around the gear reducer assembly the unit must be serviced and resealed. Also check the swing gear pinion for wear.

## Boom Assembly

### Cylinder See Fig 3.

Cylinders are greased through the fittings located on the boom.

### Wear Pads See Fig 3.

Lubricate as needed. If the boom jerks during extension or retraction apply several squirts of grease to the wear pads as the boom is moved in and out slowly.

**NOTE:** In sandy areas the boom should be dry.



# **Maintenance and Lubrication**

---

## Operator Troubleshooting

The following table lists the most common problems that may be encountered by operators. If the problem cannot

be solved using the corrective actions listed in this table, notify maintenance personnel.

### Engine \*

| SYMPTOM                                     | PROBABLE CAUSE                         | CORRECTIVE ACTION   |
|---|--|---|
| Engine turns over but fails to start        | Emergency shutdown control pulled out. | Push control in.  |
|   | Fuel tank empty                        | Fill tank   |
|   | Fuel shutoff valve at tank closed      | Open valve  |
|   | Fuel filter blocked                    | Replace filter  |
| Engine fails to turn over                   | Battery disconnect switches open       | Close switches  |
|   | Transmission not in neutral            | Place lever in neutral  |
|   | Battery low                            | Have charging system checked  |
|   | Battery terminals corroded or loose    | Clean and tighten terminals   |
| Engine runs unsteadily and power output low | Insufficient fuel supply               | Clean fuel strainers, replace filter, fill tank, tighten fuel lines |
|   | Contaminated fuel                      | Drain tank, lines, clean strainers, and replace fuel                |
|   | Wrong fuel                             | Drain tank and fill with proper fuel                                |
|   | Air intake restricted                  | Remove restriction  |
| Exhaust smokes badly                        | Too much oil in sump                   | Drain to proper level   |
|   | Air intake restricted                  | Remove restriction  |
| Engine overheats                            | Radiator fins restricted               | Clean fins  |
|   | Low coolant level                      | Check coolant level   |
| Engine oil pressure low                     | Low oil level                          | Check oil level   |
|   | Oil leaks                              | Tighten connections   |
|   | Contaminated oil                       | Change oil and filters  |

\* Also see manufacturer's Operation and Maintenance Manual for additional information

# Maintenance and Lubrication

## Transmission/Converter \*

| SYMPTOM                             | PROBABLE CAUSE                    | CORRECTIVE ACTION              |
|-------------------------------------|-----------------------------------|--------------------------------|
| Transmission or converter overheats | Low oil level                     | Fill to proper level           |
|                                     | Oil cooler restricted             | Remove restriction             |
| Lack of power                       | Low engine rpm at converter stall | Have engine checked (governor) |

## Air & Brake Systems

| SYMPTOM                    | PROBABLE CAUSE                | CORRECTIVE ACTION                         |
|----------------------------|-------------------------------|---|
| Brakes won't release       | Low air system pressure       | Allow system pressure to build to 120 psi |
| Loss of braking efficiency | Air in hydraulic brake system | Check fluid level<br>Bleed system         |
|                            | Low air system pressure       | Have maintenance check air system         |

## Hydraulic System

| SYMPTOM                                    | PROBABLE CAUSE                  | CORRECTIVE ACTION  |
|--|---------------------------------|--|
| No response to controls                    | Closed tank shutoff valve       | Open valve   |
|  | Low oil level                   | Fill tank to proper level                                      |
| Sluggish operation or response to controls | Hydraulic oil cold              | Allow adequate warm-up time                                    |
|  | Low oil level                   | Fill tank to proper level                                      |
|  | Suction leak                    | Correct suction leak   |
|  | Plugged tank breather           | Replace breather   |
|  | Restriction in circuit          | Remove restriction, check filters                              |
|  | Pump speed too slow             | Check engine speed   |
| Excessive noise                            | Cavitation                      | Eliminate restriction in suction line<br>Replace tank breather |
|  | Aeration                        | Fill tank to proper level<br>Correct suction leak              |
|  | Tubing vibrating                | Tighten mounting clamps  |
| Hydraulic system overheating               | Low oil level                   | Fill tank to proper level                                      |
|  | Operating over pressure reliefs | Correct operating procedure                                    |

\* Also see manufacturer's Operation and Maintenance Manual for additional information

**Electrical System**

| SYMPTOM                       | PROBABLE CAUSE                        | CORRECTIVE ACTION                         |
|-------------------------------|---------------------------------------|---|
| Engine fails to turn over     | Battery disconnect switch(es) open    | Close switches                            |
|                               | Neutral start switch open             | Place transmission shift lever in neutral |
|                               | Battery low                           | Have start/charge system tested           |
|                               | Battery terminals corroded or loose   | Clean and tighten terminals               |
|                               | Other connections loose               | Tighten connections                       |
| Voltmeter indicates discharge | Alternator drive belt slipping        | Tighten or replace belt                   |
|                               | Loose or corroded battery connections | Clean and tighten terminals               |

# Maintenance and Lubrication

## Maintenance Specifications

### Hydraulic Pressure Relief Settings

**NOTE:** Hydraulic pressures should be set at 1500 rpm (unless otherwise specified) and double checked at maximum rpm. Override should not be over 50-100 psi on control valves. Check or set pressures in sequence shown and only when hydraulic oil is hot (above 120°F). Calibrate your gauge periodically.

#### Steering

|                   |          |
|-------------------|----------|
| Main . . . . .    | 2500 PSI |
| Circuit . . . . . | None     |

#### Hoist

|                     |                                 |
|---------------------|---------------------------------|
| Main . . . . .      | 2000 PSI                        |
| Circuit . . . . .   | 2100 PSI (Base) 1000 PSI (Stem) |
| Load Lock . . . . . | 3000 PSI                        |

#### Tilt

|                   |          |
|-------------------|----------|
| Main . . . . .    | 2000 PSI |
| Circuit . . . . . | 2100 PSI |

#### Extend

|                   |          |
|-------------------|----------|
| Main . . . . .    | 2000 PSI |
| Circuit . . . . . | 2100 PSI |

#### Clamp

|                   |                            |
|-------------------|----------------------------|
| Main . . . . .    | 2000 PSI                   |
| Circuit . . . . . | 1200 PSI 600 PSI (Unclamp) |

NOTE: Set main reliefs with engine at 1500 rpm.  
Set circuit reliefs with engine at 1000 rpm or less.

### Wheel Lug Nut Torque

|                 |                       |
|-----------------|-----------------------|
| Front . . . . . | 500 lb/ft (678 N • m) |
| Rear . . . . .  | N/A                   |

### Tire Inflation Pressure

|   |                           |
|---|---------------------------|
| Front (Driver) 29.5 x 29 - 34PR . . . . . | 85-90 psi (586 - 621 kPa) |
| Rear (Tail) 23.5 x 25 - 20PR . . . . .    | 60-65 psi (414 - 448 kPa) |

NOTE: The specifications shown in this manual are based on information available at the time of publication and are subject to change without notice or obligation.

---

**Component Capacities & Lubricants**

---

| Component or System                 | Refill Capacity (Approx.) |             | Lubricant Type *     |
|-------------------------------------|---------------------------|-------------|----------------------|
|                                     | U.S. Gallons              | Liters      |                      |
| Engine crankcase (includes filters) | 7                         | 26          | Engine oil           |
| Fuel tank                           | 450                       | 1703        | Diesel fuel          |
| Cooling system                      | 10.5                      | 39          | Water/antifreeze * * |
| Hydraulic system                    | 350                       | 1324        | Hydraulic oil        |
| Transmission system                 | 12                        | 83          | Transmission oil     |
| Differential                        | 50                        | 189         | Gear lube            |
| Planetary hubs (each)               | 12                        | 45          | Gear lube            |
| Brake resevoirs                     | —                         | As required | Transmission oil     |
| Chassis grease fittings             | —                         | As required | Chassis grease       |

\* See Lubricant Specifications, Page 21

\* \* Some engines require additional coolant treatment. See engine Operation and Maintenance Manual for specific information

NOTE: The specifications shown in this manual are based on information available at the time of publication and are subject to change without notice or obligation.

# Maintenance and Lubrication

## Lubricant Specifications

|              | MANUFACTURER<br>&<br>SPECIFICATIONS  | RECOMMENDED<br>VISCOSITY   | PREVAILING AMBIENT TEMPERATURES  |   |
|--------------|--|--|--|---|
|              |  |  | (FAHRENHEIT)   | (CELSIUS)   |
| ENGINE       | CUMMINS<br>MIL-L-2104D<br>(API CE)   | SAE 10W-30<br>SAE 15W-40<br>SAE 20W-40   | -13 ° F to 95 ° F<br>14 ° F and Above (Normal)<br>32 ° F and Above                     | -25 ° C to 35 ° C<br>-10 ° C and Above (Normal)<br>0 ° C and Above                      |
|              | DETROIT DIESEL<br>MIL-L-46152<br>(API CD II)   | SAE 30<br>SAE 40<br>NOTE: Multi-Grade oils are not recommended in Detroit Diesel Engines   | Below 32° F<br>Above 32° F   | Below 0° C<br>Above 0° C  |
|              | CATERPILLAR<br>MIL-L-2104D<br>(API CE)   | SAE 5W-20<br>SAE 10W-30<br>SAE 15W-40  | -13°F to 50° F<br>-4°F to 104° F<br>5°F to 122° F(Normal)                              | -25°C to 10° C<br>-20°C to 40° C<br>-15°C to 50° C (Normal)                             |
| TRANSMISSION | CLARK<br>MIL-L-2104D<br>(API SE)<br>TYPE C-3   | MIL-L-46167<br>SAE 10W<br>SAE 30   | -65 ° F to 0 ° F<br>-10 ° F to 140 ° F (Normal)<br>30 ° F to 140 ° F                   | -54 ° C to -18 ° C<br>-23 ° C to 60 ° C (Normal)<br>- 1 ° C to 60 ° C                   |
|              | ALLISON<br>MIL-L-2104D<br>(API SE)<br>TYPE C-3   | SAE 5W-20<br>SAE 10W<br>SAE 15W-40<br>SAE 30   | Below -10° F<br>Below 10° F(Normal)<br>Below 30° F<br>Below 35° F                      | Below -23° C<br>Below -12° C (Normal)<br>Below - 1° C<br>Below 2° C                     |
|              | NOTE: Preheat transmission fluid to indicated minimum temperature before operating transmission...or if preheating equipment is not available, operate transmission in NEUTRAL for minimum of 20 minutes prior to engaging FORWARD or REVERSE ranges |  |  |   |
| AXLE         | TWIN-DISC<br>MIL-L-2104D<br>(API SE)<br>TYPE C-3   | SAE 5W-20<br>SAE 10W<br>SAE 30   | -60° F to 0° F<br>-10° F to 140° F(Normal)<br>30° F to 140° F                          | -51° C to -18° C<br>-23° C to 60° C<br>-1° C to 60° C                                   |
|              | CLARK<br>MIL-L-2105C<br>(API GL-5)   | SAE 75W<br>SAE 75W-80<br>SAE 80W-90<br>SAE 85W-140   | -40 ° F to -10 ° F<br>-40 ° F to -0 ° F<br>-13 ° F to 100 ° F (Normal)<br>Above 10 ° F | -40 ° C to -23 ° C<br>-40 ° C to -18 ° C<br>-27 ° C to 37 ° C (Normal)<br>Above -12 ° C |
|              | RIMPULL/BRYAN<br>MIL-L-2105C<br>(API GL-5)   | SAE 75W-90<br>SAE 80W-90<br>SAE 120  | -65° F to 20° F<br>-20° F and Above(Normal)<br>-90° F to 120° F                        | -54° C to -29° C<br>-29° C and Above(Normal)<br>-32° C to 49° C                         |
| HYDRAULIC    | WAGNER<br>Premium Grade<br>Anti-wear<br>Hydraulic Oil<br>(Mobil DTE 13M)   | NOTE: Mobil DTE 13M is recommended for use in Allied Wager hydraulic systems operating at very low to widely varying ambient temperatures. It provides a high viscosity index with a low pour point and improved fluidity at sub-zero temperatures.<br>IMPORTANT: As a condition of new machine warranty, Mobil DTE 13M must be used in hydraulic system during warranty period. |  |   |
| CHASSIS      | WAGNER<br>Multipurpose<br>Chassis Grease<br>w/EP & MoS <sub>2</sub>  | NLGI-1<br>NLGI-2   | Below 10 ° F<br>Above 10 ° F   | Below -12 ° C<br>Above -12 ° C  |