

1980 SEAGRAVE TRIPLE - (11 in-service)

APPARATUS STATISTICAL INFORMATION

Model H.B. 50DD

Laden Weight 32,000 Front 14,400 Rear 23,000
Make of Engine DETROIT DIESEL Model 8V71TAC

Horsepower	<u>370</u>	
No. of Cylinders	<u>8</u>	
Cubic Inches	<u>568</u>	
Fuel	<u>50 gal</u>	
Crankcase	<u>23 qts SAE 15w-40 + 2 qts for filter</u>	
Road Transmission	<u>8 gal SAE-50</u>	
Pump Transmission	<u>22 pts SAE Dextron II</u>	
Differential	<u>28 pts SAE-90-140</u>	
Power Steering	<u>*ar pts SAE 10w</u>	*ar = As required
Water Tank	<u>500 gal</u>	

Transmission HT 740 ALLISON AUTOMATIC
Main Pump - WATEROUS CMUXCX Type 2-STAGE CENTRIFUGAL
Rated Capacity 1500 gpm @ 150 psi
Priming Pump WATEROUS Type ROTARY VANE-POSITIVE DISPLACE ENT

Transmission	<u>Allison Auto - 4 speed</u>
Gear Start	<u>I - 4 Normal</u>
Operating Range	<u>RPM 1900</u>
Fuel Tank Capacity	<u>50 gallons</u>
Water Capacity	<u>500 gallons</u>
Operating Oil PSI	<u>25 to 30 psi</u>
Minimum Oil PSI	<u>25 psi</u>
Operating Water Temperature	<u>160-185 Warning @ 212</u>
Pumping Gear	<u>I - 4 Green Light</u>
Priming Pump	<u>Rotary Vane</u>
Spring Brake	<u>Anchorlock</u>
Minimum Brake PSI	<u>90 psi, Warning @ 60</u>
Relief Valve	<u>Waterous</u>
Relief PSI	<u>75 - 300 psi</u>

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ENGINE: Detroit Allison

2 cycle, 8 cylinder "V" type.
568 cu. inch. 350 horsepower
Engine is turbocharged & after-cooled.

- ◆ Engine must not be shut down if excessively hot > 200 degrees. This can transfer heat to the turbo and cause the bearings to seize. -
- ◆ Governor controls engine idle speed & limits the maximum operational speed of the engine.
- ◆ During prolong idling, maintain at least **800 RPM.**
- ◆ Let engine run between **900 & 1000 RPM in neutral** until the temperature returns to normal and then stay at idle for about 30 seconds before shutting down.
- ◆ Excessive idling allows engine temperature to fall below normal operating range.
- ◆ Incomplete combustion of fuel in a cold engine will cause:
 1. **Plugged fuel injectors**
 2. **Crankcase dilution**
 3. Formation of **lacquer or gummy deposits** on the valves, pistons & rings
 4. Rapid accumulation of **sludge** in the engine.

TURBOCHARGER

- ◆ Makes air charge more dense so it can:
 1. Burn fuel more efficiently
 2. Create more horsepower
 3. Burns cleaner and allows engine to be more efficient at higher altitudes
- ◆ A high volume, low pressure air compressor which uses exhaust gas as a power source.

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ROOTS BLOWER

- ◆ Supplies fresh air for combustion and this continues throughout the compression stroke and facilitates scavenging.

SCAVENGING

- ◆ Do not over-rev on cold starts. Oil lag or oil starvation to the turbo will cause premature wear on the bearings.
- ◆ A process in which a charge of air is forced into the cylinder by the blower and thoroughly sweeps out all of the burned gases through the exhaust valve ports. This air also helps to cool the internal engine parts particularly the exhaust valves.

ENGINE LUBRICATION SYSTEM:

- ◆ Observe the gauge immediately after starting, if there is no pressure within 10 to 15 seconds and the low oil 12-pressure light stays on - IMMEDIATELY STOP ENGINE.
- ◆ Oil pressure should be 25 psi @1200 RPM, 30 psi @ - 2100 RPM.
- ◆ CAUTION: The oil level should never be allowed to drop below the low mark on the dipstick.
- ◆ Overfilling the crankcase may contribute to:
 1. Abnormal oil consumption
 2. High oil temperatures
 3. Oil may leak past the crankshaft rear oil seal.
- ◆ Due to the inherent design of the DETROIT diesel engine, the dash oil pressure gauge will read low and the dash oil warning light may flash off and on at idle speed. This condition is considered normal.

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AIR CLEANER

- ◆ If clean, call shops for immediate filter element replacement.
- ◆ If gauge on dash reads 10 Inches or more, check for restrictions at the filter Intake screen.
- ◆ An aftercooler is a device in the engine intake system designed to reduce intake air temperature and/or preheat intake air temperature to improve combustion.
- ◆ When washing the apparatus with water hose, DO NOT direct stream at filter intake.

COOLING SYSTEM

- ◆ The deaeration tank purges air, which could become trapped in the cooling system. Air in the system can cause hot spots, cavitation, and electrolysis which decreases water pump and impeller life.
- ◆ Radiator cap is a pressure relief type with a 7 psi rating. This allows water temperature to reach 233 degrees before boiling.
- ◆ Oil cooler; this system has a combination transmission oil and engine cooler.
- ◆ Cooling fan is belt driven with the clutch pneumatically operated and thermostatically controlled.
- ◆ Engine heater uses 120 volts AC and maintains the engine temperature **at approximately 140 degrees**. This shall be connected whenever apparatus is parked on the apparatus floor.
- ◆ If a grease fitting is noted on fan clutch, lube with two cubic inches of general-purpose grease every **15,000 miles**.

Water filter

- ◆ Offers protection to the cooling system through a constant addition of chemicals as rust inhibitors and a sacrificial plate to help in electrolytic protection. If water appears rusty or dirty, notify shops.

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ELECTRICAL SYSTEM

- ◆ DO NOT switch battery master switch and ignition switch to "OFF" before engine stops. This can damage the voltage regulator and destroy the alternator diodes.
- ◆ The alternator is a DELCO with silicon diode rectifiers, it produces the maximum capacity 160 amps at 14 volts.
- ◆ The starting motor is 24 volts heavy duty. Do not crank the engine for more than 30 seconds @ a time and then hesitate about 30 seconds before making another attempt.
- ◆ Fuses and breakers protect electrical system. Operating and cooling of breakers will produce clicking sound. If this happens, notify shops.
- ◆ See Training Bulletin #65 on the Six Pack batteries.

AIR RESERVOIR SYSTEM

- ◆ It is Lubricated by engine oil and cooled by engine coolant.
- ◆ BENDIX air compressor, creates 15.5 cu ft per minute.
- ◆ Air storage tanks:
 - 1 primary
 - 3 secondary, separated by a regulating valve.

Secondary tanks will not fill until primary reaches 90 - 120 psi

This provides a rapid buildup of air pressure in the primary tank for immediate use.

MISCELLANEOUS INFORMATION

- ◆ DO NOT REMOVE OR PAINT the ID Tag which is located on the left side of the Engine's valve cover. This tag is a "Parts Book" for the Detroit diesel engine that is installed on this apparatus.
- ◆ DO NOT use air outlet for operating spray gun.
- ◆ Matching Tires: Problems are likely to result if tires on a dual assembly differ by more than ½" in diameter.

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BRAKE SYSTEM

- ◆ Brake is applied by absence of air by spring pressure.

3 Primary Uses

1. **Emergency brake** will automatically bring rig to a safe gentle stop if air pressure loss.
2. **Low pressure starting protective device** - will hold rig firmly in place until air pressure rises to safe operating level.
3. **Parking brake** - PULL YELLOW button to apply - PUSH to release

- ◆ Anchorlock spring brake system on rear brakes only.

Adjusting procedure:

- ◆ Start engine and achieve full system pressure (120 psi)
- ◆ Depress brake pedal fully and hold for one second
- ◆ **Repeat four or more times.**

Air reservoir gage

- ◆ Mounted on dash, has two indicator hands red and green.
Red hand indicates amount of air in primary tank
Green hand indicates amount in secondary tanks.
- ◆ RED hand reaches **90 psi**, rig may be moved.
- ◆ When air pressure is below 90 psi, the red hand will move to 90 psi before the green hand will begin to move.
- ◆ NOTE: Only the rear brakes will have FULL BRAKING POWER. Full power to all brakes happens when the Secondary tanks have 90 PSI.
- ◆ Moisture ejection system is a desiccant type filtration system that removes both liquid reservoirs. Serviced yearly at shops.
- ◆ A low-pressure buzzer and light on driver's panel will operate whenever the system pressure falls below 60 psi & ignition on.
- ◆ Automatic bleeder valve- operate valve by hand weekly to insure it is functioning correctly.

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TRANSMISSION

- ◆ Under NO CIRCUMSTANCES should you allow this apparatus to **coast in NEUTRAL.**
- ◆ Down shifting should be avoided when the apparatus engine speed is above the maximum speed attainable in the next lowest gear.

- ◆ Equipped with HT 740 ALLISON automatic transmission

- ◆ **Four forward** speeds, one reverse

- ◆ **Discontinue operation if transmission temperature rises above 300 degrees.**

- ◆ Normal transmission operating temperature is 160 to 220-degrees.

- ◆ **Full throttle upshifts** should occur at approximately 1900 RPM in each gear.

- ◆ Oil must be changed every 1000 hours or sooner depending on the operating conditions. Oil must be changed whenever it shows traces of dirt or metal contamination or the effects of high operating temperatures, such as discoloration or strong odor.

- ◆ If transmission overheats during normal operation, check oil level, add oil if necessary.

Draining Transmission:

1. Remove the drain plug from the right side of sump.

Checking fluid level:

- ◆ Hot:
 1. Check oil level with engine running at 1000 RPM transmission in neutral and oil at normal operating temperature.

- ◆ Cold:
 1. Engine not running - purpose is to see if sufficient oil is transmission to safely start the engine.

THE ENGINE CANNOT BE BY TOWING OR PUSHING. Before towing or pushing beyond a fee blocks: **THE DRIVELINE MUST BE DISCONNECTED.**

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Torque converter is a single-stage three element unit consisting of a pump, turbine, and stator.

Torque converter-serves two primary operations:

1. Acts as a **fluid coupling** to smoothly connect engine power through oil to the transmission gear train.
 2. Multiplies the torque, or twisting effort, of the engine when additional performance is desired.
- ◆ When STARTING OFF ON A SEVERE GRADE. Use the foot brake with your left foot. The engine should be accelerated until the converter is in a stall condition before the foot brakes are released. This will allow smooth acceleration and eliminate any rollback, which could damage driveline components.
 - ◆ Shifting down hill - The Governor WILL NOT control engine when descending hill. Back wheels are driving engine. 200-300 RPM above maximum range will cause valves to float - causing valve contact with pistons.
 - ◆ If engine coolant leaks into the transmission oil system, immediate action must be taken to prevent malfunction and possible serious damage. Transmission must be completely disassembled, inspected and cleaned.

PUMP

- ◆ Acceptable pump packing leakage is from **10 drops per minute to 1 to 2 drops per second**. (i.e. 10 to 120 drops per minute.) ***This leakage cools and lubricates packing.***
- ◆ Rated capacity - 1500 gpm @ 150 psi.
- ◆ WATEROUS centrifugal, 2 stage pump, chain driven. Series/parallel type
- ◆ Hydrostatic test at 600 psi.
- ◆ High pressure - 150 gpm @ 600 psi.
- ◆ Pump should be operated at least once each month for 10 minutes @ 150 psi.
- ◆ Two position manual transfer valve, controlled by handle on panel.
- ◆ **Priming** is accomplished by using the **Electric driven rotary vane priming pump**.
- ◆ The PUMP TRANSMISSION is located behind the Road Transmission. The control lever is located on the floor to the right of the engineer in the cab.

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PUTTING PUMP INTO OPERATION

1. With engine at idle, transmission in neutral, shift pump transmission to pump position. (If pump shift will not engage due to butt-tooth, shift momentarily to reverse and then back to NEUTRAL while keeping pressure on pump shift lever).
 2. Shift transmission to **1- 4** (pumping gear).
- ◆ **DO NOT** add water to the radiator unless necessary and avoid overfilling. This will **dilute and weaken** the balance of corrosion inhibitors in the cooling system,
 - ◆ CAUTION: Do not open throttle to start pumping unless the green light is **ON**. This indicates pump is engaged and it is safe to pump.
 - ◆ A Radiator Fill Valve has been provided for the purpose of filling the radiator from the discharge side of the pump.

RELIEF VALVE

- ◆ Discharge pressure cannot be controlled to an amount lower than suction pressure plus 50 psi. (From a hydrant)
- ◆ A spring loaded, pressure actuated unit that is installed between the discharge and suction sides of pump.
- ◆ WATEROUS relief valve system consists of two units, the relief valve proper, and the pilot valve, which controls it.
- ◆ **WATEROUS** type
- ◆ Controls discharge of **75 psi to 300 psi**.
- ◆ When operating from draft or tank -no less than 75 psi.

Relief valve maintenance

- ◆ If relief valve is sluggish or erratic, usual cause is sand or foreign material clogging one of the valves or strainer.
 1. Remove strainer rod assembly and clean the strainer and the orifice in the rod end. Check condition of "O" ring.
 2. Turn throttle out ½. Provide ½" discharges of water to keep pump cool.
 3. With 4-way valve ON, turn pilot valve handle counter-clockwise all the way to relieve spring pressure. This will cause the discharge pressure to decrease.

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4. If no pressure drop, valve is stuck. Operate 4-way valve rapidly several times to flush assembly.
 5. If unable to free valve call shops.
- ◆ **Once a year** or as often as necessary, disassemble and clean pilot valve assembly. Notify shops to perform this.

WATERTANK

- ◆ **500 gallons** 3/16" steel tank with 3 baffles.
- ◆ **6 cathodic sacrificial rods.**
- ◆ Flow capacity from tank to pump is **600 gpm.**