

Type: Grout-Mate Super 80

Model:

Serial Number:

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Preface

The GroutMate – Super 80 machine manufactured by Strong Manufacturing Company, Inc. is specifically designed to convey, mix and pump cementitious slurries with a high concentration of sand aggregate. To best facilitate the handling of sand, a hydraulically powered skip bucket is used to transfer both the powder material and sand from ground level to the mixer, where it is then discharged.

This machine is also equipped with a dual hydraulic pump system. The Material Pump is powered by a variable displacement, pressure compensated piston pump, and you will have complete control over material pump speed without sacrificing mixer or skip loader performance. A fixed displacement gear pump powers the mixer and skip loader. The mixer and skip loader is preset for optimum performance and cannot be adjusted.

We have also incorporated a hydraulic oil cooler into the hydraulic system to insure proper hydraulic oil temperatures are maintained.

We are confident that your GroutMater – Super 80 will increase the efficiency of your work force. However, the service and life of the machine will provide depends greatly on the care and attention you give it during daily and routine use. This OPERATION & MAINTENANCE MANUAL has been provided to assist you in obtaining the utmost performance from your machine and to instruct you and your operating personnel in its SAFE and efficient use. This manual should be carefully read and its instructions followed by those who will be responsible for the operation, maintenance, transportation, and uses of the machine. You should remember that the nature of the business – that is, the mixing and pumping of gypsum or cement and sand aggregates, water and admixtures – creates the most severe conditions under which machinery can operate. It was with these conditions in mind that the components for the GroutMate – Super 80 were selected and designed.

A separate section immediately following this Preface contains specific SAFETY INFORMATION. No one should be permitted to perform any function on the machine unless he or she has read the safety section of this manual. The safety section is also available free of charge to owners of the GroutMate – Super 80 machines as a separate pamphlet by writing the Strong Manufacturing Company, P.O. Box 8068, Pine Bluff, Arkansas, 71611.

Include the serial number(s) of your machine(s) with your request. Additional copies of the entire Operation and Maintenance Manual can be obtained at the above address for charge of \$30.00 each.

Important General Safety Information

The GroutMate – Super 80 machine was primarily designed to mix and pump gypsum or cement, sand and water slurries. In addition to the usual hazards of machinery, several hazards are involved in these operations. Please read and pay close attention to the following SAFETY INFORMATION.

A. Material Hose

1. Caution: Always wear safety goggles when working with the material hose. Do not disconnect material hose with hoses under pressure. Always run pump in reverse until pressure gauge reads “0” PSI, or hoses become soft. Failure to do so could result in material blowing out under pressure and striking someone causing bruises, material enters eye. Caution: Although the pressure gauge may read (0) PSI material may exit under force when the hose is disconnected.
2. Because of wear and weathering that occurs on material hose, the following test should be conducted at the beginning of each day to determine the conditions of the hose. The field test consists of the following:

Attach all the sections of hose that will be used in the day’s operation together just as they will be used.

Pump water into the hose until it begins to discharge.

Stop the pump and cap the discharge end securely with a quick coupler cap to fit hose size to be used.

After advising all personnel to stand clear of the hose, operate the pump until the pressure indicated on the hydraulic pump motor pressure gauge registers the maximum pressure the pump will produce and hold this pressure for 30 seconds.

Reverse the pump until 0PSI pressure indicates on the gauge or the discharge hose becomes soft.

Remove the cap. Operate the pump until the water has been discharged and then proceed with the pumping of the slurry.

This field test should be repeated if any damage or accident befalls a section of the hose or if, for any reason, a section is suspect.

All replacement material hose and fittings should be rated for no less than 600 PSI. Such hoses can be obtained from Strong Manufacturing Company.

Do not use other hoses unless specifically advised by the Strong Manufacturing Company.

Caution: All hoses should be fitted with “Full Flow” connections. Connectors, which reduce the hose ID, will cause increased pressures and reduced flows. Do not operate machine unless properly functioning hydraulic pressure gauges are in place. The pump gauge registers pressure required by the hydraulic motor to turn the pump. A sudden rise in pressure indicates a blockage is about to occur and alerts the operator to stop pumping, reverse pump and remove blockage. While pumping material the rotor-stator pump can develop higher pressure than it does while pumping just water. Failure to stop the pump could cause the hose to rupture or uncouple possibly striking someone causing severe bodily injury such as cuts bruises, broken limbs or possibly death.

Caution: Never use weathered, rotten, damaged hoses or hoses with damaged fittings in conjunction with pumping operations. They represent a hazard to operators, bystanders, and persons handling the hoses. If a hose or a fitting should burst under pressure, persons could be injured.

B. Pump

1. When removing a section of hose, pressure must be relieved before undoing a fitting. This can be done by putting the pump in reverse and running it slowly until the discharge hose at the pump becomes soft. Failure to do this will result in the hose being under pressure when the fitting is undone and material being blown out when disconnected, striking the face and eyes with the danger of injury or blindness. Also, the hose could whip about and cause an injury.

2. When pumping in reverse, be sure that material is flowing back into the hopper as evidenced by the materials level in the hopper rising. Watch the discharge hose to avoid collapsing it and causing the pump to run dry.
3. Never run the materials pump dry because just a few minutes of running dry will ruin the pump stator. Always have water or slurry in hopper when running pump.

C. Hydraulics

1. Only qualified hydraulic mechanics should be allowed to work on any portion of this machine's hydraulic system.
2. Each hydraulic system is provided with four preset relief valves. The first valve is located directly after the hydraulic pump. It is the main system relief. The other three valves are incorporated in the mixer, pump, and skip loader valve bodies. These valves are preset at pressures low enough to protect all the components of the machine from pressures higher than they are rated. Again, **Only** Strong Manufacturing personnel or persons with experience in hydraulics should adjust relief valves. Relief valve are factory set at the following maximum values:

Main System Relief...2000 PSI

Material Pump Valve Relief...2500 PSI

Mixer Valve Relief...1400 PSI

These values should not be exceeded!

Caution: Hydraulic components can rupture or explode in a high-pressure situation if any of these valves are exceeded. A motor, or hose exposed to greater pressures than it is rated, can become a deadly projectile, resulting in broken bones, cuts, bruises or even death.

3. Properly operating hydraulics pressure gauges should be on the machine at all times. These gauges provide an instantaneous read-out of hydraulic pressures required to power the system.

4. Relief valves can malfunction. If hydraulic pressure to any of the portion of the system ever exceeds the pressures listed in the above paragraph, the machine should be stopped immediately. The valve in question should be examined and properly adjusted only by Strong Manufacturing personnel or by a person experienced in hydraulics. A malfunctioning valve should be replaced immediately. However, without functioning pressure gauges, malfunctioning relief valves cannot be determined: thereby exposing personnel to potentially injury caused by a component rupturing or exploding.
5. It is possible for excessive hydraulic pressure to develop if a hydraulic line is blocked. Extreme care should be exercised while working on this hydraulic system- damage to equipment and/or injury may result from misuse or careless operation of these components. Never loosely block off a hydraulic line. If a pipe plug or cap is used when testing hydraulic components, be sure it is tight – it can become a deadly projectile.
6. Always check to see that hydraulic valves are in neutral or off position, prior to starting engine.
7. Never disconnect a hydraulic line with engine running. When working on hydraulics, shut down the engine and disconnect the battery or remove the key. Never reset hydraulic relief valve to a setting above those listed in paragraph 2 of this section.
8. Inspect hoses regularly for wear. Replace if breaks, tears, or soft spots appear. For pressure hoses, replace with hoses designed to operate at or above 2000 PSI pressure and for return hoses, replace with hoses designed to operate at or above 1000 PSI.
9. Replace all components with same, or equal manufactured products.
10. Keep hydraulic oil off hot parts such as engine exhaust as the oil will ignite at high temperatures.

Caution: Failure to observe the above warnings can result in severe bodily injury, including eye injury and burns with loss of eye sight or limbs, cuts, bruises or possible death. Eye protectors should be worn at all times when operating or working on the equipment.

Guards

Be sure all machinery guards are in place before operating the GroutMate – Super 80. The guards provided with this machine consist of the following:

- Mixer inlet grate
- Wet materials hopper grate/screen
- Valve handle guards
- Engine cover

Never operate the machine without all of these guards in place. The machine should be kept as clean as possible. Material should not be allowed to build up on warning signs, instructions, gauges, etc. It is also possible that material buildup could interfere with operation of the valves, thus presenting hazards of a general nature.

Skip System

1. Do not stand under or near the skip bucket at any time. Possible injuries such as cuts, bruises, broken limbs, or death could occur if struck by the skip while it is being raised or lowered.
2. Never place hands, arms, etc. above the mixer inlet while the skip-loader is in operation, as they may become pinned and crushed between the skip-loader bucket and the mixer inlet grate.

Notice:

- Do not operate skip system without first removing travel pins. Damage to machine components could occur.
- Do not move or tow machine without travel pins in place. Skip system could fail if hydraulic hose failed.

- Do not work on machine without travel pins in place. Skip system could fail if a hydraulic hose failed or was disconnected if a valve was engaged, if necessary maintenance may be performed with the skip system in the lowered position.

Danger: Keep hands and limbs clear of moving components as they may become trapped or caught causing severe injuries such as cuts, bruises, broken limbs or even death.

Mixer

1. **Caution:** Always wear safety goggles when operating or working around the mixer. Never wear loose clothing or have loose articles around the mixer. Always test the safety kill switch before mixing begins. Keep hands and clothing clear of mixer area. Mixer paddles can catch hands or clothing as they turn, causing severe bodily injury by being pinned between the mixer blade and mixer walls. A loose article or clothing, if caught in the mixer blades, can pull an operator into the mixer.

It is very important to keep the mixer inlet grate in place during operation and clean-up.

2. While operating mixer, keep hands clear of the skip loader bucket. Hands or other body members could be trapped between moving parts causing severe bodily injury.
3. The safety kill switch stops the engine if the mixer inlet grate is removed. This switch is crucial to the safe operation of the machine. **Never** under any circumstances remove, dismantle, or hinder the use of this switch in any way.

Eye Protection

Always wear safety glasses, goggles or a face shield when operating machine as dust and sand particles become airborne and could get into the eyes causing severe irritation or even permanent loss of sight.

D. Machinery

1. Read all **Warning** and **Caution** sign before starting machine.
2. Do not remove any guards or grates while engine is running. Stop engine, disconnect battery cable, and remove the key. Before removing a guard, or doing any work on machine.
3. Never operate machine with worn parts or loose parts or parts that need adjustment.
4. Make sure all guards are in place before starting motor or engine.
5. If using a gasoline or diesel engine, never pour fuel into a hot engine. Allow engine to cool prior to filling fuel tank. Do not overflow fuel tank and spill into engine. If spill occurs, wash away with water, making sure spillage is taken up with some type of absorbent. If nothing else, use a bag of cementitious mix. After containing spilled fuel, remove materials containing fuel from area.
6. Never operate equipment without having a BC dry chemical fire extinguisher available that is charged and in good operational condition.
7. Never operate equipment with excessive load.
8. Overloading the hydraulic system can be detrimental to hydraulic components as well as dangerous.
9. Inspect material hoses daily for wear or damage and replace with equal quality.
10. Keep empty bags out of area to prevent creating a tripping or fire hazard.

11. Loose clothing should not be worn by operator, or anyone working on, or around machine.

Caution: Failure to observe the above warnings can result in severe bodily injury, including loss of eyes and possibly death.

E. Water

1. Never connect water to machine when line pressure is over 150 PSI.
2. Always flush water lines prior to connecting to machine as damage to the float valve may result from sand or other foreign particles getting into the system.
3. Use only potable water that is suitable for drinking.
4. Disconnect water from machine at the end of shift: drain tank and lines, if possibility of freezing exists.

Caution: Failure to observe the preceding warnings can result in severe bodily injury, including loss limbs. Eyes and possibly death.

Cleaning, repairing, servicing and adjusting prime movers, machinery and equipment Section 3314 – General Industry Safety Orders.

Machinery or equipment capable of movement shall be stopped and the power source de-energized or disengaged, and, if necessary, the movable parts shall be mechanically blocked or locked to prevent inadvertent movement during cleaning, servicing, or adjusting operations unless the machinery or equipment must be capable of movement during this period in order to perform the specific task. If so, the employer shall minimize the hazard of movement by providing and requiring the use of extension tools (e.g., extended swabs, brushes, scrappers) or other methods or means to protect employees from injury due to such movement. Employees shall be made familiar with the safe use and maintenance of such tools by thorough training.

Engine

The GroutMate Super 80 can be powered by one of two standard engines:

1. Duetz F3L-1011 air-cooled diesel engine
2. Ford VSG-413 water-cooled gasoline engine

These thirty+ horsepower engines are designed for industrial applications. The engine that supplies the GroutMate – Super 80 its power is the single most costly component on the machine. When referring to the engine manual for service recommendations, use those given for the most severe conditions.

The manual for your particular machine's engine has been included with this booklet. Read it carefully before operating machine, making sure all workers are aware of how the unit operates as well as the engine manufacturer's recommended safety precautions.

Engine speed is factory set at 2700 RPM. Never slow the engine RPM down when pumping under full load, as this will cause the engine to "lug", setting up high cylinder head temperature and causing engine damage.

Gasoline engines are equipped with full range, variable speed governors. This means that a given throttle setting, the engine will maintain a given RPM unless overloaded. When the engine RPM falls off, it is caused either by load being greater than the engine can carry or the engine is not developing its required horsepower. When this occurs, check to see that the pumping pressure is not too great as caused by a restriction in the lines or a mix too dry. Another possibility to consider is that the engine may not be getting fuel properly, or the ignition is bad (points, plugs etc.). During normal full load operation, the engine will slow to about 2600 RPM.

The engine has been serviced with break-in oil, which should be changed after 40 hours of service and replaced with a good grade of HD oil (10-W-30) or according to engine manufacturers recommendations found in the operator's manual.

Caution: Failure to observe the cautions and warnings outlined by engine manufacturers warranty can result in severe injury, including eye injury, and burns with loss of sight, limbs or possibly death.

2.5-20 Mixer

The Strong-Mate Mixer, is a completely unique and patented idea in mixers...designed for mixing most varieties of cementitious materials. The mixer is designed to give a maximum amount of agitation, and complete disbursement of the cement sand, and admixtures in as short a mixing cycle as is possible.

To accomplish this, two interconnected fixed drums are attached and include two self-wiping, ribbon paddles that counter-rotate. The mix is brought to the center where it is subjected to an extremely turbulent mixing action. The amount of mixing time to bring the mixture into a completely homogenous mix, under normal conditions, is 15 to 30 seconds.

When pumping lightweight mixes, it is necessary to stop the machine or to delay discharging a mix, the mixer should be stopped from rotating. Continued mixing of lightweight mixes will entrain an excessive amount of free air, which may cause weak spots in the finished product. The mixer should be thoroughly cleaned after each day's use to prevent a buildup of materials on blades and walls of the mixer.

The mixer has a set of packing chambers with rings of packing at either end of the paddle blade shafts to prevent water and the mix from getting into the flange bearings. One fitting, on each of the flange bearings, is for greasing the seals inside. These fittings are located on top of the bearing housing and marked "Grease Twice Daily". These fittings should be greased every four hours of operation and at the end of each day's operation. Enough grease is injected to show at the end of the packing housing inside the mixer after the washing up operation. This ensures that any materials that have worked past the seals are discharged out and cannot harden inside and prevent the sealing action necessary to protect the shaft bearing.

Grease the fittings on the sides of the bearing housing every 150 hours of operation. These fittings are provided for greasing the race of the bearings, which are repacked at the factory. Too much grease here can shorten the life of the bearing more than not greasing it at all.

The natural rubber in the stator is very sensitive to any petroleum product. In any grease is introduced to the stator or is accidentally sent through the pump, the stator will swell and lock up on the rotor. For this reason, never allow grease to fall on the inside of the mixing chamber or in the pump hopper.

Caution: Do not remove mixer guard or put hand in mixer under any circumstances without stopping the engine, removing the keys and disconnecting battery cables. Always put mixer hydraulic control valve in neutral prior to stopping engine and check to see if it is in neutral prior to starting engine. When cleaning mixer at end of day's operation, and washing out loose materials removed during clean-up extreme caution should be used to assure the safety kill switch is operating properly after the mixer guard is replaced. Replace the mixer guard before starting engine. Failure to do so could result in severe bodily injury. Electrically powered equipment should be disconnected from the power source and locked out procedures followed to prevent accidental start up before any clean-up or service is performed.

Mat'L Pump

The Strong Master Pump consists of three (3) principle parts; the pumping elements, the suction housing for material storage and the drive assembly to transfer power to the pumping elements.

The Pumping Elements

The pumping elements for the grout machine consists of a 2.5L08 rotor and stator connected to the suction housing. This rotor-stator combination is capable of producing up to 800 psi of pressure when new. Pressure of this amount will not be encountered during normal operations, unless a “plug-up” in the hose has occurred.

When pressures of this amount are encountered (following the instruction laid out in the safety section) stop the pump; put it in reverse to relieve the pressure. Find the “plug” in the hose. Remove and clean the plugged section of hose.

As the pump is operated the rotor and stator will wear, causing the pressure to drop and the discharge rate to fall off. Should either the rotor or stator have excessive wear, it will shorten the life of the other part considerably. Worn parts cause slippage within the pumping elements, which accelerate the wear. Generally, the stator wears first. With coarse grades of sand, the life of the rotor and stator will be shortened considerably. A drop in pump pressure indicates wear.

To prolong the stator life when wear is noticed remove the stator and flip 180 degrees then replace it. With some grades of sand, the rotor may wear out at about the same time, therefore you should check the rotor for wear when the stator is removed to see if it has uniform wear. If the wear excessive, the chrome will be worn off the lobes of the rotor. When this occurs, replace the rotor. A worn rotor will shorten the life of a stator by one-half or more. Never use a new stator with a worn out rotor.

When wear is excessive, the material flow from the pump will decrease and become intermittent. When flow breaks, a small puff of vapor comes out. At this point, the rotor and stator should be examined and one or both replaced if wear is observed.

The Suction Housing

The suction housing has the wet materials hopper welded to it. A connecting rod connects the rotor to the drive shaft at the hub end of the suction housing.

These parts when operating in sand-gypsum or cement slurry are subject to severe wear. The connected rod should be inspected for excessive wear at the pinholes after every 100 hours of operation. This is easily done when the rotor is removed at one end of the connecting rod is

exposed then. The wear at the rotor end is usually greatest. When the connecting rod is inspected of any wear is evident it is a good idea to replace pins, seals, boots and connecting rod to delay any future problems. There are two sets of holes in both the rotor and drive hub so that an alternate pair of holes can be used when wear is excessive on one set of holes. When both sets of holes are worn, the drive shaft hub or rotor should be replaced.

Disassembling Pumping Components.

To examine the pumping components for excessive wear you must disassemble the pump. To remove the stator, loosen the “U” bolt clamp and break the stator loose with a pipe wrench by turning it in a counter clockwise direction. Once the stator has cleared the threads on the suction housing it may necessary to rotate the stator in a clockwise rotation in order to get it worm-off the rotor.

If the rotor shows excessive wear it is a very good idea to replace it. To remove the rotor from the pump assembly you must first separate it and the connecting rod from the drive hub located in the rear of the suction housing. There will be either a clamp or a stainless steel sleeve or a combination of the two depending on the type of pump you have. If your pump only has a clamp, remove the clamp, if it has a stainless steel sleeve you will need to drive the sleeve back so you can access the pin. Knock the pin holding the connecting rod in the drive hub out. You will need a hammer, punch and safety glasses (the pin may not come out all the way so it may be necessary to rotate the pump 180 degrees to remove the pin). Once the pin is out you should have no trouble removing the connecting rod and rotor from the suction housing. To remove the connecting rod from the rotor, follow the same procedure you used to remove the connecting rod from the drive hub. To replace the rotor, stator and connecting rod, reverse this procedure.

The Drive Assembly

Connected to the suction housing is the drive assembly, it houses the packing chamber, drive shaft and bearings. The bearings are greased from the factory and should never need to be greased. Check for leaks around the bearing seals daily. If a leak is detected it may be necessary to replace the seal in question and re-lube the bearings. The packing needs to be greased twice daily or after every four hours of operation. Always grease immediately at the end of the day. If you start to notice fluid leaking from the packing area, first try to stop it by greasing the packing. If this doesn't stop the leak you will need to adjust the packing retainer (only tighten it enough to stop the leak, over tightening will crush the packing and cause excessive wear on the drive shaft).

After a period of time you will run out of adjustment space on the packing retainer. If this has happened and you cannot stop liquid from leaking through the packing chamber by greasing, it is time to replace the packing and possibly rebuild the drive assembly.

Drive Assembly Removal and Disassembly

To disassemble the drive assembly for service or repair you must remove it from the suction housing.

1. Remove the rotor, stator and connecting rod.
2. With the engine off and the battery cables removed, disconnect the two hydraulic hoses that are connected to the pump motor. Cap the hoses and put plugs into the open ports on the pump motor.
3. Remove the four bolts holding the drive assembly to the suction housing. At this time, you should be able to remove the drive assembly from the suction housing. If there is any buildup of the material around the drive hub it should be removed, as it will make the drive assembly difficult to remove.
4. Once the drive assembly has been removed from the machine, find a clean flat surface to work on. Remove the four bolts holding the pump motor to the drive assembly and remove the pump motor. You will now be able to access and remove the jaw coupling located on the end of the drive shaft. With the jaw coupling off remove the four bolts holding the pump adaptor to the drive assembly. Remove the pump adaptor. You will now be able to examine the rear seal.
5. Now you will have to remove the drive hub from the drive shaft. The drive hub is held in place with two setscrews. With the setscrews removed you will need to pry the drive hub off the drive shaft, you can do this with a two-jaw gear puller.
6. With the drive hub removed you can now access the brass packing retainer. The retainer has two small Allen head set screws locking it into place which will need to be removed. With the set screws removed you can now unscrew the retainer and remove it, this can be done with a spanner wrench.
7. With the brass retainer removed you can now press the driveshaft and bearing assembly out of the drive assembly housing. To do this you will need a hydraulic press. Place the drive assembly in the press with the bearing side facing downwards. Start to apply pressure to the end of the drive shaft.

Caution: Once the drive shaft has moved downwards about two (2) inches it will fall out of the housing. The drive shaft and bearing assembly will come out as one unit and could cause injury if you were stuck.

With the shaft and bearing assembly removed you can now remove the bearing from the drive shaft. Remove the nut holding the bearing on to the shaft, this nut has a locking washer securing it to the shaft which will need to be freed. With the nut off you can now place the assembly in the hydraulic press with the small bearing facing downwards and separate the bearing from the shaft. Take care when pressing on the drive shaft as not to damage the threads. With the drive shaft and bearing assembly removed you can now access the packing area. Remove the packing retainer and tee bolts. With a small pick, you can now remove all the old packing material and lantern ring.

At this point your drive assembly will be completely disassembled and you can inspect all parts for wear or damage.

Loading System

A hydraulically powered bucket is used to transfer powdered material and aggregate from ground, up to, and discharged into the mixer.

The bucket is hydraulically operated. A directional control valve is used to divert oil flow to a cylinder. The operator engages the control valve handle to determine direction of bucket travel.

Note: See hydraulic section for more details.

The bucket should be operated slowly to prevent injury to personnel and damage to the machine. If operated too quickly, as the skip loader arm reaches its maximum and minimum limits, it can slam against its stop and cause the machine to shake.

The bucket is raised to the upper limit to travel and the valve released. The discharge valve is then engaged and the bucket unloads the material into the mixer. The procedure is then reversed for lowering the bucket to ground level.

Caution: Do not stand under the skip bucket at any time. A failure may result in skip bucket falling, striking someone causing bodily injury or possibly death.

Notice:

Do not operate skip system without first removing travel pin to machine components could occur.

Do not move or tow machine without travel pin in place. Skip system could fall if hydraulic hose failed.

Do not work on machine without travel pin in place. Skip system could fall if a hydraulic hose failed or was or if a valve was engaged.

Lower bucket and arms, stop engine and remove key or disconnect the battery before performing maintenance or repairs on this machine.

Machine Operation

A. Mixing and Pumping

1. Mixer Controls: A hydraulic motor via chain and sprockets powers the mixer paddles. The Hydraulic control valve that starts and stops the hydraulic motor is mounted on the operator's side of the machine and marked "Mixer". By pulling the valve lever out, pressure is sent to the hydraulic motor causing the mixer paddles to rotate.

Caution: At no time should the mixer be in operation without first verifying that the mixer is clear of any foreign objects, tools or debris, and importantly, that all guards and safety devices are in place and operating properly.

A safety kill switch is attached to the mixer in conjunction with the mixer inlet grate. If the mixer is removed, the machine will not crank. This switch should never be dismantled or hindered in any way or from its correct operation. If the switch is ever damaged or does not operate correctly, it should be replaced immediately.

Caution: A dust mask, goggles and protective gloves must be worn at all times by the machine operator while machine is in operation.

2. Mixing Procedure: Start machine as previously outlined. With mixer paddles turning and mixer door closed, meter required gallons of water into the mixer. Refer to materials supplier recommendation for the correct amount of water to be used per bag. The last gallon will not be added to batch until all materials are in the mixer.

Note: In order to reduce pumping pressure, a lubrication batch should be mixed and pumped through machine and hoses. The batch should consist of one bag of cement or gypsum only (no sand). Water should not be added until mixture is creamy, but still fluid. This batch should be discharged into pump hopper. Do not pump the lubrication batch until a proper batch is mixed.

3. **Loading Dry Material:** Start engine, bring bucket to its utmost position or until travel pins are centered in holes. Standing to one side and not under the arms or bucket remove the travel pins. With skip bucket released from travel position, lower the bucket to lowest position by pushing in on handle marked "Skip Bucket". If handle is released, skip system will stop in position it is in at that time. Valve handle must be held engaged to raise or lower skip bucket. With skip bucket in down

position, load with proper amount of sand and powder required per batch. With water is mixer pull out on skip control valve handle and raise skip bucket to discharge position.

Note: Skip bucket may try to tilt when raising. To stop this, engage discharge valve, which will tilt the bucket back to level plane where material, will not spill. With skip bucket in raised position, engage skip discharge valve which tilts the bucket forward and unloads material into the mixer.

Do not discharge all the material into the mixer at one time, as this may stall the paddles.

Discharge slowly. Do not discharge more than 1/3 of the material at one time. Be sure mixer paddles are revolving before discharging material into the mixer. After all materials are in the mixer, allow mixing until slurry is uniform (usually 15-30 seconds of mix time is sufficient). Add water, as necessary to obtain desired batch consistency. Once batch has mixed, start the material pump and pump the lubricate batch into hose.

B. Pump Controls

A hydraulic motor powers the material pump. A hydraulic control valve controls the start/stop and reversing of pump rotation. Pulling up on handle marked "PUMP" starts the pump in forward direction. This valve will stay in position without holding in place. To stop the pump, locate valve to center or "OFF" position. To reverse pump, lower the handle to its lowest position. A Flow control valve controls pump speed, this valve is located on the operator's platform near the operator's feet.

Warning: Never run the pump in reverse without material in the hose so that it can be pulled back by the pump. If the pump is ever operated without water or material slurry, the stator will be damaged in a matter of seconds.

With lubricate mix out of hopper, stop pump and discharge batch from mixer into the hopper. With the paddles still turning, the mixer will empty itself in just a few seconds. Close mixer door when mixer is empty, mix next batch and engage pump in forward position. The mixer can be left running continuously.

Machine Clean-up

The following is the recommended procedure for cleaning of the machine and material hose, after operation has been completed for the day.

Throughout the day, the machine operator has had sufficient time to keep the exterior of the machine clear of any excessive build-up of material caused by spillage during the mixing operation. A wash-down hose and spray nozzle are a part of the water system. This hose should be used to keep the exterior of the machine clean and for machine clean up at the end of the day.

1. Machine Clean-Up

In order to minimize waste of material, the machine operator should run water into the mixer and start clean up immediately after last batch is mixed and discharged into the pump hopper. Continue pumping until wet materials is being discharged at end of hose. This prevent leaving good material in the hose.

With mixer discharge door closed and paddles turning, fill the mixer about 1/3 full of water. At the same time, spray water through mixer grate onto any material buildup inside. **DO NOT REMOVE MIXER GRATE WITH MACHINE RUNNING.**

Warning: Never stick the wash-down hose or nozzle through mixer inlet grate or discharge door while the engine is running.

Wash as much material buildup off inside mixer and paddles with water from wash-down hose as possible. Let mixer run at least two minutes with water in mixer, or until material level in hopper is low enough to see agitator blade. Continue pumping and discharging water into hopper.

The hose operator should continue pouring until the material becomes too wet to use. The machine operator should warn the hose operator when water is being pumped. This alerts the hose operator to watch for wet materials.

The mixer operator should pump the remaining water out of the hopper through the hose until approximately one inch of the agitator blade is visible. With hopper almost empty, place all controls in neutral position, kill the engine and the key or detach battery cables. Tag engine to make other parties aware that the engine has

intentionally been stopped. Remove mixer and hopper grate and wash thoroughly using a stiff scrub brush. Using a scrapper, remove any set material inside mixer, hopper and on exterior of machine that cannot be removed by washing.

Open the trap door on the pump slurry through to allow loose chips to escape without being pumped through the rotor/stator. Remove the bell reducer off of the end of the stator. Chip the set material from the interior of the bell, being careful not to damage the interior of the bell reducer. A build-up of material in the bell reducer can restrict flow to the material hose and cause a backpressure on the pump. Since this backpressure precedes the pressure gauge on the material hose, it does not register on the gauge. High material pressures caused by restrictions, coupled with a stiffly mixed batch of material, will reduce high hydraulic pressures to turn the rotor. If this hydraulic pressure rises over 2000 psi the material pump will stall.

With mixer and hopper clean, replace all grates being sure the safety kill switch is properly operating. Make sure no tools are left in the mixer or hopper, and crank engine. Operate mixer and flush all materials into hopper. Run 5 more gallons of water into mixer for final rinsing. Spray with wash-down hose as necessary.

Pump final clean-up water through hose, rinsing hopper with spray hose as water is being pumped. Stop pump when water level exposes approximately one inch of agitator blade.

Never run the rotor/stator pump without water or material slurry. Running the pump dry will damage the stator within seconds.

2. Clean-Up of Material Hose

Reverse the pump and remove all hose pressure. Disconnect the material hose from the end of the pump assembly. Saturate a sponge with water and insert it into the male quick coupler. Recouple hose and discharge water into the hopper. Pump water until sponge comes out discharge end of hose. Repeat as many times as necessary until clear water comes out preceding the sponge.

After hoses are clean, drain, roll up and couple the ends of the hoses and lines together. This protects fittings and also keeps foreign materials out of hose. Wash exterior of hose off with wash-down hose.

3. Application of Debonding Agent to Machine

The machine should be thoroughly sprayed with a non-flammable and non-oily debonding solution after cleanup every day. There are many such commercial debonding agents available. The debonding solution facilitates cleanup of the machine at the end of the day because most buildup of product can be easily washed away with water pressure. The mixture is poured into a garden sprayer and spray-applied to all the machine surfaces, including inside material hopper. Apply at least two coats. Follow manufacturer's directions for application and necessary safety precautions.

Caution: The debonding solution is applied wet; therefore, may be slippery immediately after spraying. Allow sufficient time for the solution to dry before using the machine.

Follow manufacturer's instructions for safe handling and use of debonding solutions.

Machine Maintenance

Note: No work of any kind should be done without killing engine, removing the key, or disconnecting the battery and placing all valves in neutral.

A. Hydraulics

Hydraulic fluid level must be maintained between the high and a low level as shown on “fluid level gauge” which is on the skip bucket side of hydraulic tank. Replenish oil with Mobil AW-68 Oil.

The hydraulic filter should be changed once a month. An LHA brand (spec: SPE-15-25) filter cartridge is furnished with machine. Replace with the same, or a minimum 25-micron industrial equivalent. One crossover replacement filter is the Michigan Fluid Power S-29.

Hydraulic fluid should be changed after first 100 hours of operation, thereafter, change hydraulic fluid once a year under normal operating conditions. Disconnect suction line, drain oil and reconnect line. Replace with 30 gallons of Mobil AW-68, Texaco Rando HD-46, or Equivalent crossover.

Before adding new fluid, remove strainer located at bottom of tank. Remove lid of tank – strainer is then accessible. Wash strainer with a good cleaner and inspect for breaks in screen. If breaks appear, replace strainer. An LHA SHE-10-1 strainer is furnished with machine. One crossover for this strainer is the Michigan Fluid Power #SU355F16.

All Hydraulic hoses should be inspected routinely for cuts, weathering, bulging, and leaks. Replacement of any damaged hoses should be done immediately and before the machine is used again.

Replacement high-pressure hoses should be designed to work at or above 2000 PSI, with return line hoses designed to work at 1000 PSI. All pressure lines from the pressure compensated pump require 3000 PSI.

B. Mixer

The greasing of the four alemites on the mixer that are marked “Grease Twice Daily” require strict enforcement. Inject three shots of a good grade all-purpose grease into each fitting. These fittings are used to grease the packing mounted behind the mixer bearings. This grease prevents the slurry inside the mixer from getting to, and ruining the bearings. Always grease immediately at the end of each day.

Note: At no time should the mixer operate more than four hours without greasing.

All keys, taper lock bushing and Allen screws should be inspected at least once a week to determine condition of each.

On mixer paddles powered by separate hydraulic motors an unbalanced load on each paddle will cause the paddles to get out of phase or time. Do not be concerned, as system will correct itself within a few seconds.

The rubber wipers on the paddles will wear and need replacing. The rubber is attached to the paddles by screws and a metal backing plate. Remove the screws and backing plate. Insert screws through backing plate, new rubber and bolt in place.

The seals are located in the housing behind the bearings. They do wear and need replacing. An indication of wear is when cement appears in bearings. Remove motors and bearings. Pull housings off paddles. Remove old seals. Refer to manual for instructions on how to install new seals. The stainless-steel sleeve should be changed at the same time.

The grease fittings on bearings not marked “Grease Twice Daily” are for greasing the bearing only and require one shot of grease every 150 hours of operation.

C. Pump

A packing gland on the pump drive assembly requires greasing at least every two hours. This usually requires at least two-three shots of good grade all-purpose grease.

An adjustable packing gland is a part of the pump drive assembly. When leakage starts appearing through the packing, tighten the packing gland evenly from both sides. Tighten until leakage stops. Do not over tighten as unit will run hot. When packing gland bottoms out, new packing is required. Refer to pump section of manual for instructions on how to change packing. Grease until leakage stops. If addition of grease will not prevent leakage tighten.

Pins and connecting rods wear with use. An indication is slack in connecting rod. Follow procedure outlined in Pump Components Section for replacement procedure. The pump components wear and will need replacement. An indicator of worn pump parts is failure to produce pump pressure, or more noticeably, output at end of the hose will drop considerably with same engine RPM. If this happens remove stator following procedure outlined in pump section.

With some sand mixes, the rotor and stator wear at about the same rate. Rotor needs replacing when wear mark shows on chrome. Refer to the Pump Components section of this manual for a procedure to change the rotor.

Never allow grease to come in contact with stator. Make sure any grease that accidentally falls into the mixer or pump hopper is wiped out completely before it has a chance to be passed into the pump stator. Grease any other petroleum product will cause damage to the rubber in the stator.

D. Material Hose

Hose and couplings require routine inspection, making sure hose gaskets are in good shape and in place.

Hose should be inspected for cuts, weathering and soft spots. Replace with hose of equal specifications.

Couplings should be thoroughly cleaned and oiled regularly.

E. Water System

The water tank should be drained daily to protect from freezing. Remove the inlet water line and open the discharge valves.

F. Skip System

One-two shots of grease daily should be injected to all the grease points on the system.

Cylinders should be inspected daily, making sure that cylinder seals are not cracked or torn as sand/powder will quickly pit cylinder rod causing failure of cylinder.

Check slip bucket tilt bracket and discharge cylinder rod pin daily for wear. These items take a lot of abuse and can wear fast.

Trip Preparation Checklist

There are number of simple rules to follow in caring for your trailer axle assembly that can add to its life – and in the case of some of these rules, you may be protecting your own life as well. Using the following checklist before starting a trip with your trailer is highly recommended. Some of these items should be checked 2-3 weeks prior to planned trip to allow sufficient time to perform maintenance.

1. Check your maintenance schedule and be sure you are up-to-date.
2. Check hitch. Is it showing wear? It is properly lubricated?
3. Fasten safety chains and breakaway battery is fully charged.
4. Inspect towing hookup for secure attachment.
5. Load your trailer so that approximately 10% of the trailers total weight is one the hitch. For light trailers, this should be increased to 15%.
6. Do Not Overload. Stay within your gross vehicle rated capacity. (Consult your trailers identification plate).
7. Inflate tires according to manufacturer's specifications; inspect tires for cuts, excessive wear, etc.
8. Check wheel mounting nuts/bolts with a torque wrench. Torque, in proper sequence, to the levels specified in this manual.
9. Make certain brakes are synchronized and functioning properly.
10. Check tightness of hanger bolt, shackle bolt, and U-bolts nuts per torque valves specified in manual.
11. Check operation of all lights.
12. Check that your trailer is towing in a level position and adjust hitch height is required.

Trouble Shooting

Problem: Hydraulic System

When trouble in the hydraulic system exists, it is actually accompanied by excessive heat. The major sources of trouble are:

1. Worn parts in the hydraulic pump and/or hydraulic motors.
2. Oil too thin and breaking down causing excessive slippage.
3. Worn valve parts or broken “o” rings causing a by-pass.
4. Contaminated hydraulic oil.
5. Restricted oil filter or strainer.

When the hydraulic system is not operating properly., isolate the problem by adhering to the following procedures step by step:

- Only a trained hydraulic mechanic should be allowed to work on the hydraulic system.

Caution: Do not plug line or components parts between hydraulic pump and pressure relief valve. If this is done; the components housing will explode because of the high pressure the hydraulic pump is capable of pumping.

When hydraulic pump is replaced, always check and adjust the relief valve before operating.

When replacing hoses use only hoses with the same SAE rating and size supplied with equipment. Use hoses, which are already coupled for national pipe thread. A water hose clamp arrangement will not withstand the pressure the hydraulic system is capable of pumping.

Turn engine off, remove the key, or disconnect the battery before disconnecting any hoses or fittings in a hydraulic circuit.

Notice: If trouble in the hydraulic system exists, it is recommended that a qualified hydraulic mechanic makes the following checks:

Checking the hydraulic pressure relief settings.

The following sequence applies only to the Mixer and Skip loader system. Any adjustment to the material Pump setting should be referred to Strong Mfg. The following sequence of operations should be followed exactly and in the order specified to protect the mechanic from personal injury.

Warning: Only qualified hydraulic mechanics should be allowed to work on any portion of this machine's hydraulic system.

Caution: Make sure fitting is tight as a loose fitting can "Blow Off" when system is pressurized and becomes a deadly projectile.

With the engine turned off check the Main relief valve first by disconnecting one end of one of the hoses that transports oil from the Mixer Valve to the Mixer Drive Motor. Cap the hose and plug the port that the hose was connected to. Start engine. Turn the Mixer Valve "ON" and then "OFF" very quickly. The Mixer Gauge should reach 1400 PSI. If it does not, remove the acorn nut from the skip-loader valve relief adjustment and turn the adjustment screw until a reading of 1400 PSI is achieved.

If problems still exist contact a qualified mechanic or Strong Manufacturing for assistance.