General Information

This is an introduction to the Steiger Series III Hydraulic System. The purpose of this material is to provide the Service Technician with the working principles, proper diagnostic and repair procedures relating specifically to this system.

The typical system illustrated here is used on ALL Steiger Series III tractors, however, the arrangement or location of the major components does vary among tractor families. The working principles that apply to this system are identical on all Series III tractors. (See Fig. 1)

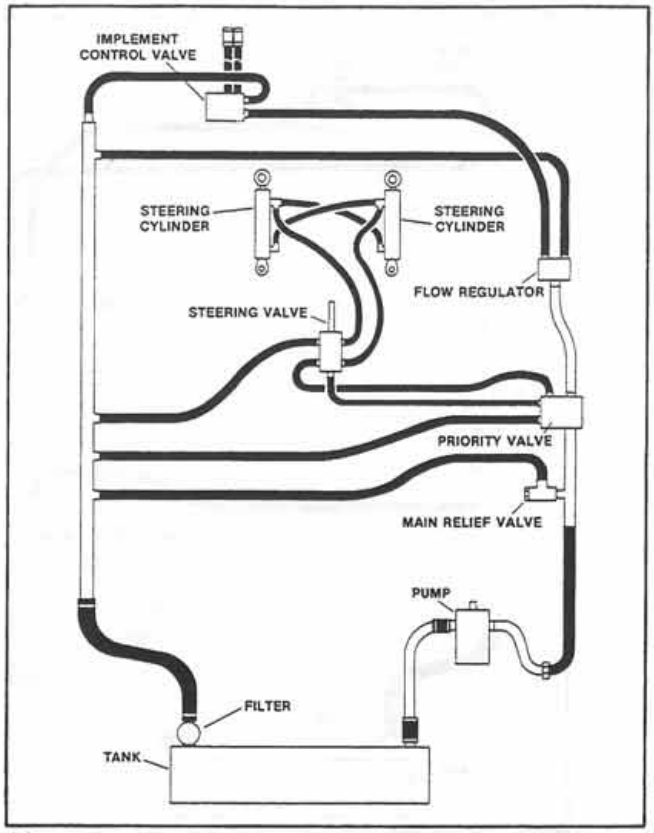

Figure 1:

If we were to explain the "type" of hydraulic system used in the Series III Steiger, we would first of all say that it is a "priority" system—by this we mean the system employs a single stage positive displacement gear pump to handle both steering and implement demands. And since it is a "single stage" pump, Steering receives the first fluid demand. (See Fig. 2)

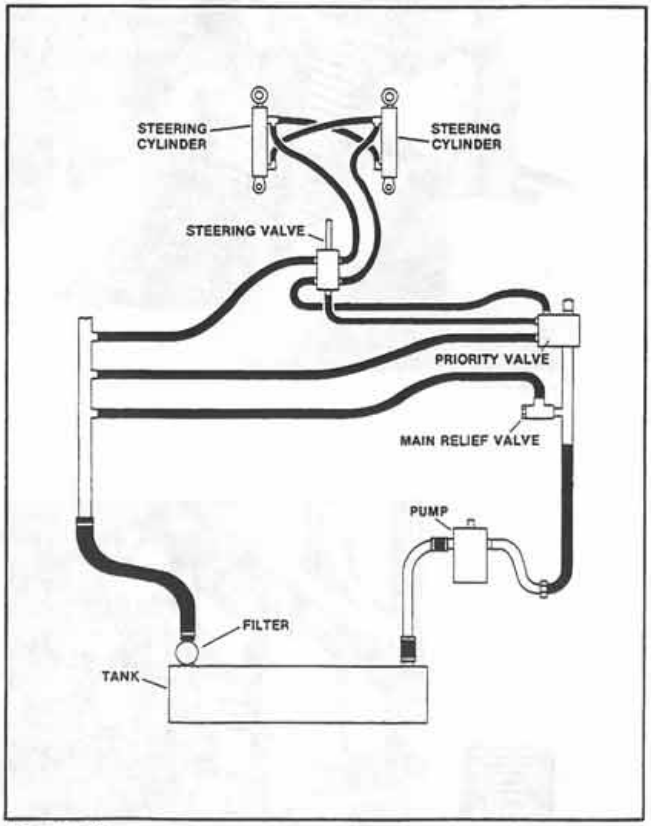

Figure 2:

Secondly—we would say that it is an open center, closed port system. This means that when the implement control valves are in the neutral position, the valve "ports" are closed and hydraulic oil flow circulates through the control valve back to the tank, helping to provide constant fluid filtration. (See Fig. 3)

For the service technician to accurately troubleshoot or diagnose any hydraulic system he must—

1. Know what the customer responsibilities are.
2. Be familiar with the hydraulic system and components that make up the system and know exactly how these components relate to one another.
3. He must be able to analyze "pressures" and "flow."
4. He must establish a logical troubleshooting sequence—starting with the easiest things first.

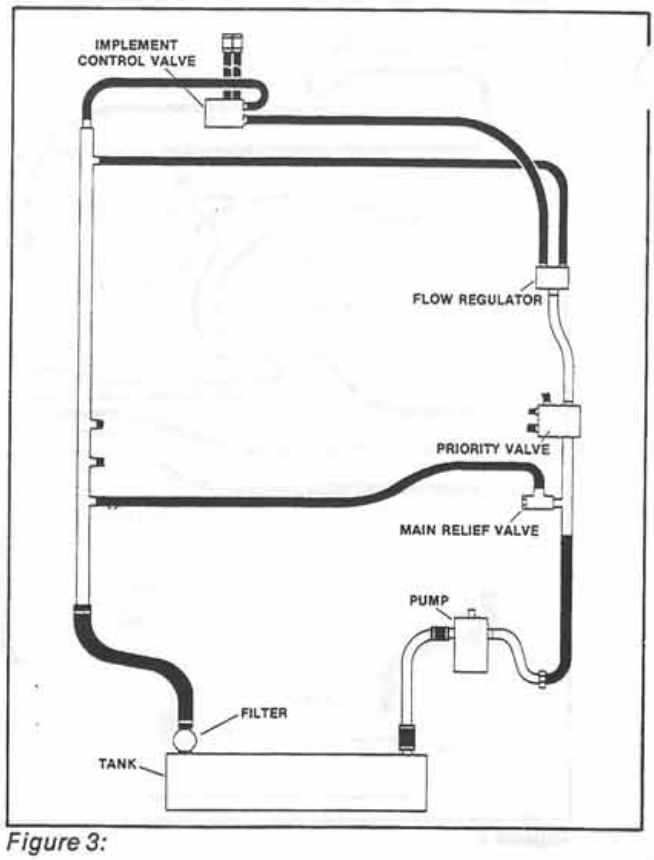

Figure 3:

System Maintenance

Gaining optimum performance and service life from any hydraulic system begins with proper care and routine service and maintenance. (See Fig. 4)

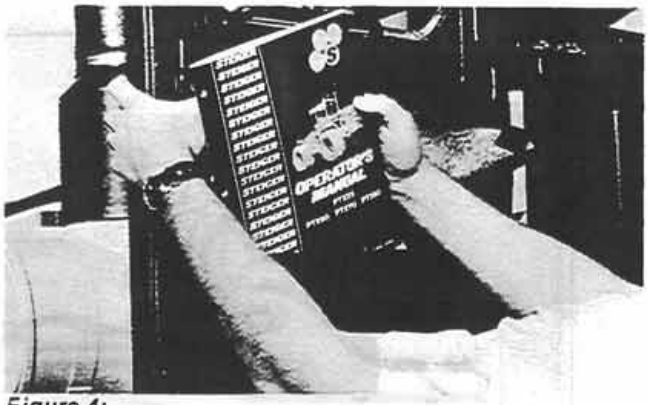

Figure 4:

Daily service includes—checking the hydraulic reservoir oil level and adding oil when necessary. If oil is required, a visual inspection must be made to explain this oil loss. Many times the technician is called upon to answer questions of this type, so it's a good idea to study the system and be ready! Are there external leaks in the system? How about the implement's circuits? If not, is the engine oil level high and if so, why? Would YOU have the answer? (See Fig. 5)

The hydraulics system's worst enemies are "heat," "contamination" and "air." Contamination can be present in the form of dirt, water, metal particles and even improper fluid.

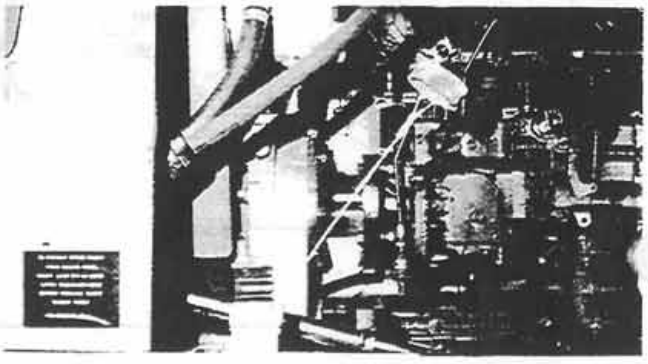

Figure 5:

Figure 6:

Periodic service is required to rid contaminants from the system because they gradually accumulate. Dirt and water can slowly enter a system through cylinder rod seals, reservoir vents and through the "quick" couplers when implements are attached. When dirt and water circulate with the fluid, they cause rapid wear and corrosion of metal parts, thereby producing metal contamination. So, to maintain system life and performance, occasional attention is required to stop problems before they can start. (See Fig. 6)

Figure 7:

The system and reservoir is designed to dissipate more heat than that generated through normal usage. However, oftentimes things are done either "knowingly" or "unknowingly" that will cause a system to generate excessive "heat." Some examples of this might be using continuous operation hydraulic motors not designed for the tractor system, incorrect plumbing to implements or wrong filters. When excessive heat is generated within the hydraulic system it will cause rapid hardening of "seals" and O-rings within the system and may cause oil "breakdown" or oxidation. (See Fig. 7)

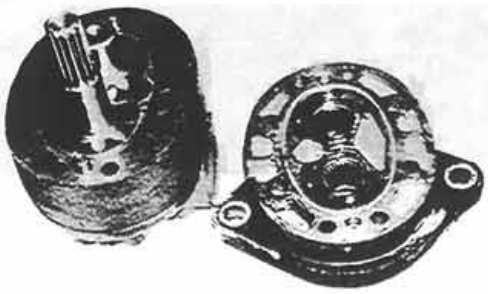

Figure 8:

"Air" in any hydraulic system will cause the system to react softly and slowly like a sponge and cause the oil to "foam," which will in turn damage the system. One of the greatest sources of air in the system usually is entry on the "suction" side of the pump, either from loose fittings or poor seals. The first component in the system to fail because of this usually is the hydraulic pump. (See Fig. 8)

Customers must be made aware that the hydraulic filters require changing at the first "100" hours on a new machine. After that they should follow the recommended 500 hour change interval outlined in the tractor operator manual. (See Fig. 9)

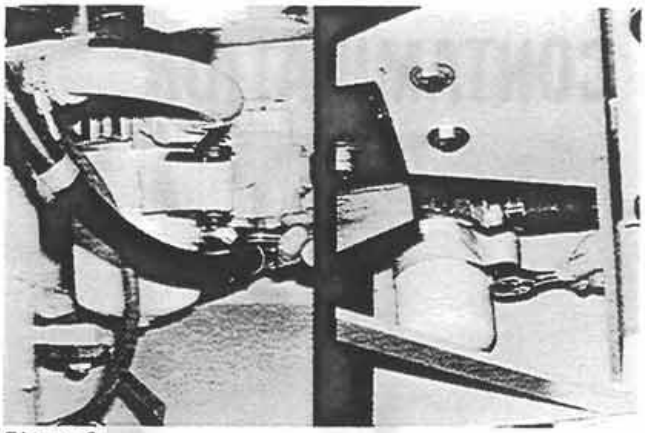

Figure 9:

Hydraulic oil requires draining and new oil installed every 1000 hours. This should be done while the oil is "warm." The cost of scheduled maintenance rarely equals the cost of downtime and repairs. (See. Fig.10)

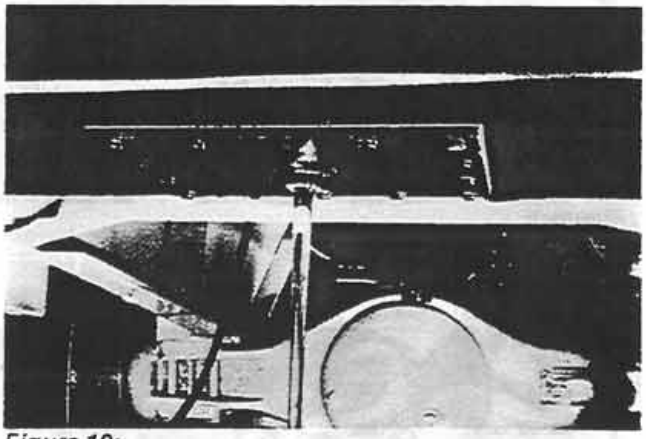

Figure 10:

After the oil is drained, remove the access cover from the reservoir and remove the suction screen for cleaning or replacement. Whenever the access cover is removed for suction screen cleaning or replacement, the floor of the reservoir should be checked for contamination and cleaned with solvent, if necessary, before installing the suction screen. If severe contamination is found, complete system "flushing" may have to be considered. (See Fig. 11)

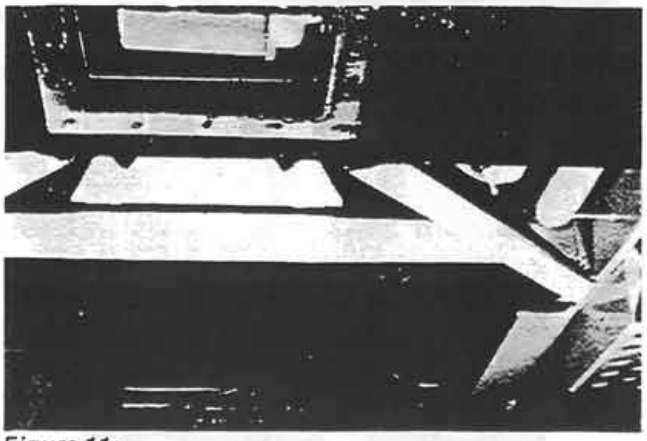

Figure 11:

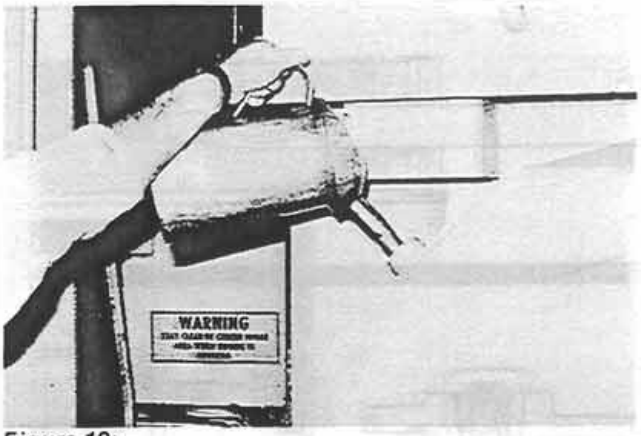

Figure 12:

Stress on your customers the importance of storing and handling hydraulic fluids properly and when refilling the system to use ONLY perfectly clean containers. When checking hydraulic oil reservoir fluid levels, the oil level should reach the "full" mark on the dipstick with "warm" oil and the engine "stopped." "Recheck" the level again after all the hydraulic circuits have been filled. (See Fig. 12)

Figure 13:

Service and maintenance procedures are a valuable tool for the technician to use in respect to judging what type of care the system has had, and a "probable cause" when diagnosing system problems. Customer satisfaction is "important" and YOU hold the key by using these basic tools of knowledge coupled with good customer communications for the purpose of failure "prevention" or "analysis." (See Fig. 13)

SYSTEM PRINCIPLES AND DIAGNOSIS

Because the pump is gear driven by the engine, the hydraulic system is always active to some degree when the engine is operating. Two basic variables govern the system. They are "flow" which is affected by pump speed and size, and "pressure" which is affected by restrictions and/or demands that are placed upon the system.

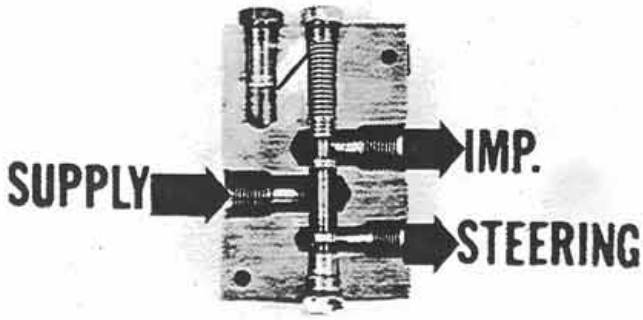

Figure 14:

But, here is where the commonality with other systems must stop. The single element pump must furnish oil to two separate systems, the "steering" and "implement" circuits. To accomplish the energizing of two circuits properly with a single pump, a "priority valve" is used to route oil flow where it is needed. The priority valve is designed to permit oil flow to the steering circuits whenever there are steering demands. Proper steering control must always be available so the demands of the steering circuit are satisfied before all others. When there are no steering demands, all the pump flow (except 1/4 to 1/2 gallon per minute) (1-2 liters) is directed toward the implement circuit.(Fig. 14)