GPM
Hydraulic Consulting, Inc.
P.O. Box 689
Social Circle, GA 30025
(770) 464-0777
gpm@gpmhydraulic.com
www.gpmhydraulic.com

CONSULTING REPORT

To:

From: Al Smiley – GPM Hydraulic Consulting, Inc., Social Circle, Georgia

Date: October 21, 2005

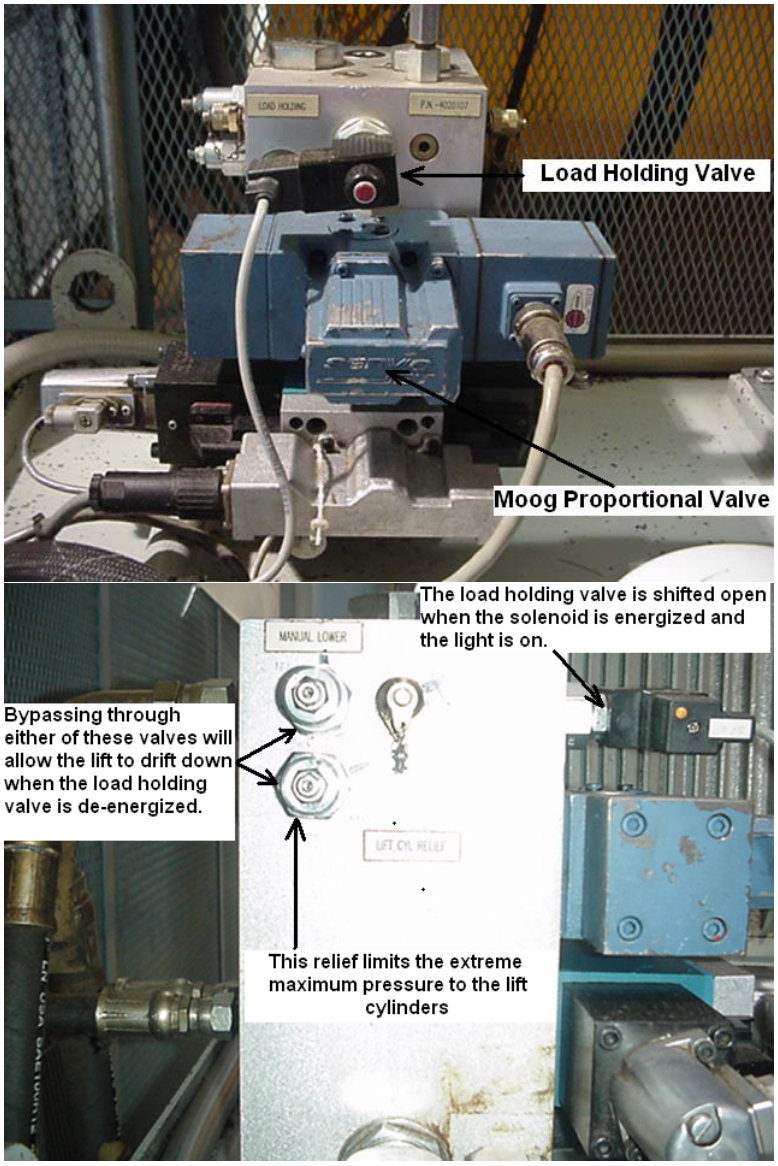
Reason for Consult

The Marquip stacker was drifting down when in the raised position. I was asked to identify the problem and make recommendations for stopping the drift.

Stacker Drifting Down

The system contains a two position, single solenoid "locking valve" that, when de-energized, locks oil in the two cylinders. A Moog valve, D661-4732-6, is used to port oil for raising and lowering the stacker. The valve is controlled by a positive and negative, variable 0-10 volt signal. The D.C. voltage controls both the direction and speed of the lift.

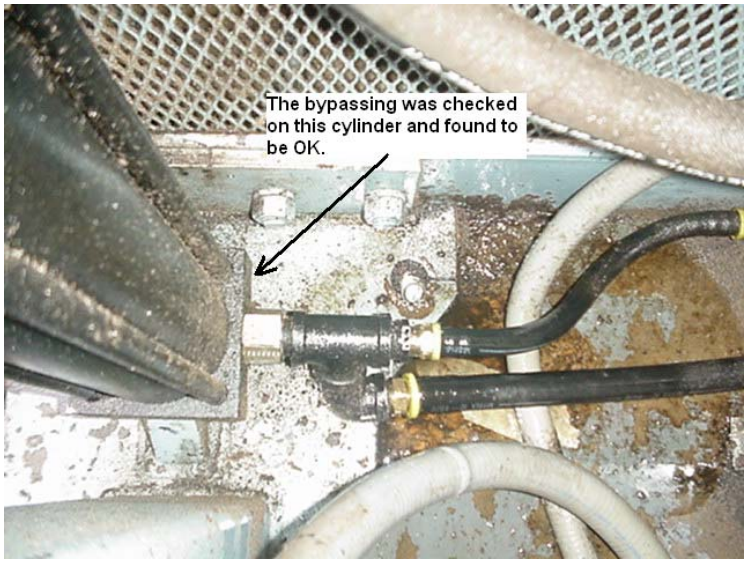
Marquip has designed the system so that when the stacker is raised the locking valve remains energized for a designated period of time. Once the solenoid de-energizes the valve locks oil in the cylinders. There is a manual valve for lowering the stacker and a relief valve that is used for shock connected downstream of the locking valve.



When observing the lift with the locking valve solenoid de-energized, the cylinders retracted, allowing the stacker to drift down. This meant that the problem had to be with the locking valve, the manual or relief valve, or bypassing in the cylinders. I was told that the cylinders had been recently rebuilt.

The hose connected back to the reservoir from the full piston side of the cylinders was warmer than it should have been. The original print showed that the line went into the reservoir and terminated below the fluid level. , you mentioned that the line actually terminated above the level of the oil. Therefore this line should have been relatively cool. This indicated that one or both of the cylinders were bypassing. Bypassing in either cylinder would allow the lift to drift down.

The line was first removed from the left cylinder and only a small amount of oil initially poured out then stopped. The right cylinder was then checked and found to have a continuous flow of oil. This cylinder should be repaired or replaced.



It was also mentioned that the previous week the stacker had *not* been drifting down with the locking valve solenoid de-energized. This would indicate a problem with the Moog valve or bypassing in the manifold.

You should first verify that the Moog valve is nulled properly. This means that the valve spool should be in the closed position with no command signal to the

valve coil. The command signal can be checked at the valve amplifier card. With no command input, the pan screw on the end of the valve housing should be removed to access the allen head adjustment. On most Moog valves this is a 4 turn maximum adjustment. Rotating the adjustment clockwise should shift the spool towards the A position.

When the valve is properly nulled there will be a very minor amount of leakage across the spool from the cylinders back to the tank. The stacker should not be drifting at the present speed when the Moog valve is good.

The part number of the valve on the machine should be checked with the original manufacturer's number. I checked the spare valve's number with the part number on the original print (D661-4762-6). The number of the valve on the machine was not visible due to the mounting configuration.

There is also a "type" number as well. The "type" number on the spare valve is P80HDAM*NSF2. The * indicates the pilot pressure and drain connections but was unreadable on the spare valve. It looks like it could possibly have been an "A". I would call Marquip and have them give you the "type" no. to make sure that the correct valve is installed.

These setting of these valves will determine the setting that the pump will compensate. This also limits the maximum system pressure.

It was also mentioned that the drifting stopped when the high pressure setting was selected. Since the low pressure setting is not high enough to hold the stacker up, the oil could be flowing through the "P" port of the Moog valve and bleeding down through the pump. The check valve CXHA-LCN would have to be stuck open for this to occur. This check valve can be removed from the housing and checked or replaced. Make sure the stacker is fully lowered and the pressure is at 0 prior to removing the valve.

The other possible flow path for the oil to flow to the tank is through a worn manifold. On some rare occasions I have seen defective manifolds. It should be removed from the system and all valves taken off and inspected to determine if this is the problem.

The oil temperature on the day of the consult was 159^0 F. This exceeds the normal operating temperature of any hydraulic system (140^0). Oil will start breaking down at temperatures above 140. More bypassing will occur across the valve spool with the higher oil temperature. The heat in this system is created in two main locations in the circuit. The first is when the stacker lowers, the Moog

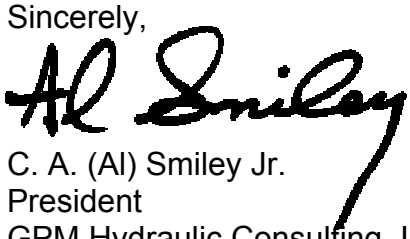
valve restricts the oil returning to the tank. This generates heat. The oil that bypasses the internals of the pump does no useful work so heat is generated here as well. The best method of removing the heat would be to mount a small pump, approximately 10 GPM, on the reservoir and continuously re-circulate oil through an air or water cooler. A water cooler will remove more heat than an air cooler.

Summary

I appreciate the opportunity to come to your plant and assist you with your in plant hydraulics. I hope the information contained in this report assists you in solving your problem.

I appreciate your help as well as assistance from and during my visit. I hope that we can develop a training program specific to your systems for the coming year. Please don't hesitate to call if you have any questions about this report or other hydraulic issues in your plant.

Sincerely,



C. A. (Al) Smiley Jr.
President
GPM Hydraulic Consulting, Inc.