

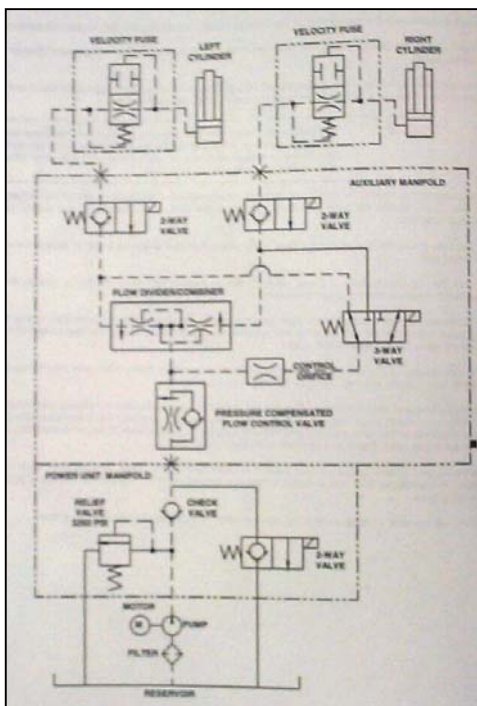


F.S. New Products (A.K.A. Alpine Engineering & Design) engineers have had their hands in hydraulic circuits and components for many years. So, when a client of ours was having some failure problems with the hydraulics on a car lift in their product line, they asked us to help out.

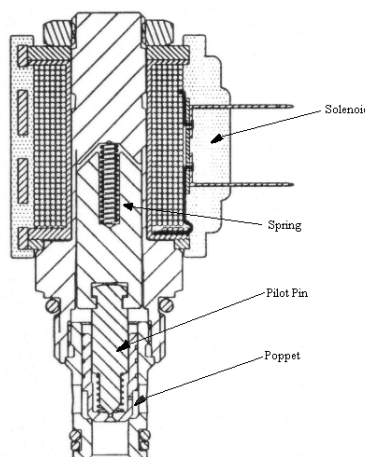
They knew that one of the cartridge valves was failing in the hydraulic circuit. The question was, Why? Technicians at Delta Fluid Power and HydraForce performed failure analyses and came up with differing opinions as to the cause of the failure. Vickers Fluid Analysis Service showed that the hydraulic fluid was contaminated in the failed units, but, was that the problem? At this point the F.S. New Products engineers got involved. The objective was simple:



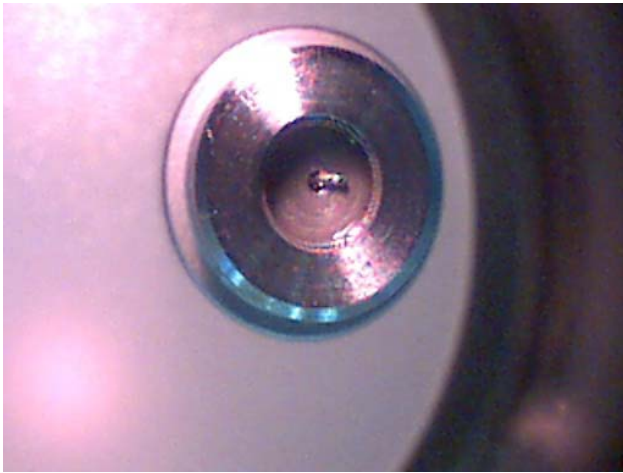
Find out what the problem is and fix it.



Our first step to identifying the problem is always the same; go to the source. After a quick trip to see the car lift and review the hydraulic circuit, we accumulated a bunch of valves that had failed to begin our investigation.



Just to cover our bases we tested the electrical components to make sure the valves were shifting. Next, we started to disassemble the valves looking for clues. F.S. New Products engineers went through the failed valves, part by part, orifice by orifice.



It didn't take much digging to find the problem. All of the valves had failed for the

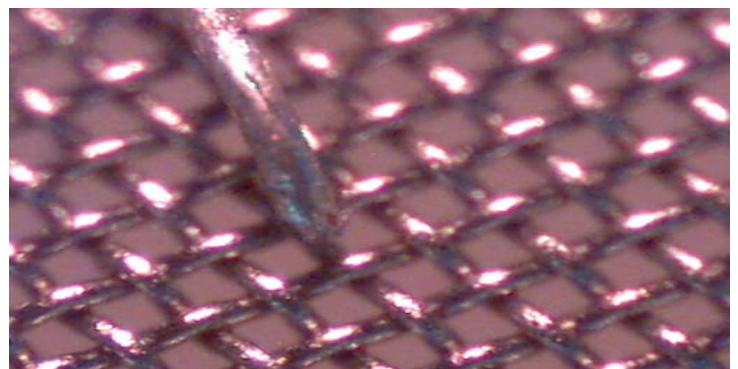


same reason.

The orifice in the bottom of the poppet on the failed valves was plugged with a non-magnetic wire. We found some other debris in the valves, but the common thread to all the failed valves was the same small wire. We looked at the clogged poppets at 20X, 60X, and even 100X magnification to make sure we hadn't missed anything. The objective was half complete; we knew what caused the failure. The harder question: Where was this small wire coming from?

The failed valves came from car lifts all over the country. Whatever produced the small wire contamination was likely part of the original hydraulic circuit. We had a sample of the small metallic wire tested by American West Analytical Laboratories to determine its composition, and found that it was an aluminum alloy.

Our engineers began to rule out the possible sources of contamination one by one. Wire reinforcement in the hoses, roll of threads from the valve block, valve screens, suction strainer



screens were all ruled out on the basis of size alone.

Finally, we found it. The support mesh for the screen in the suction strainer matched the size of the small wire contaminate exactly. American West Analytical labs confirmed that it was the same material. A little strainer that costs less than \$10 was bringing the system down.

A new brand of suction strainer and some minor changes to the filtering strategy and the problem was solved.

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