

Chapter Fourteen

Dirt

Hydraulic fluid must remain uncontaminated because it acts as a lubricant for the system. Never, never, never change fluid during dusty conditions, reuse fluid, or store extra fluid in an open or dirty container. Dirty hydraulic fluid is like using sandpaper for a lubricant. At best, dirt in the system reduces component effectiveness and will lead to component and system failure.

TROUBLESHOOTING

There are a few general principles to keep in mind when troubleshooting any hydraulic system. Because pumps make fluid flow, an inexplicable reduction in flow means a pump or pump-drive problem. No flow and no pressure mean no pump, but the absence of pressure alone doesn't necessarily indicate an inoperative pump. Remember that resistance is required to generate pressure. Fluid flow with little or no pressure means there is no resistance. Find out where the fluid is going; it's leaking out somewhere!

If you have system flow and an actuator doesn't move, only one of three things can be happening. The first possibility is that the fluid may be bypassing the actuator through an internal or external leak. Look for traces of a fluid leak. The second possibility is that the fluid may be returning to the reservoir. If this is the case, the culprit will probably be bad seals or a relief valve that is stuck open. If neither of these appear to be the problem, then the only logical reason remaining is a mechanical failure somewhere in the system.

One of the more common hydraulic system problems is a noisy or chattering pump. If you experience this, there are two likely culprits: pump cavitation or the pump drawing air. *Pump cavitation* is the sudden formation and collapse of low-pressure bubbles resulting from pump rotation. There are several possible causes of cavitation: too low an operating temperature, a dirty inlet strainer, an obstruction in the inlet tubing, or too high a viscosity fluid. All of these will cause the fluid to move more slowly than it should, causing the pump to cavitate. A pump that's drawing air does so if there is insufficient fluid, a leak in the intake tube, a bad pump shaft seal, or if the fluid is foaming in the reservoir. There are also a number of actual pump parts that can fail and cause similar symptoms, but low fluid level is the most common cause.

If the system is overheating, first check to see if the heat exchanger is clogged. Otherwise, a relief valve may be operating continuously, creating excessive heat, or the wrong viscosity fluid could have been put into the system. Slow or erratic pump operation indicates air in the fluid, internal leakage in an actuator, or simply a bad pump. Low system pressure could be a result of dirty fluid, a relief valve stuck open, or the pressure control set too low. Absence of pressure could be the result of a relief valve that is stuck open, a faulty actuator bypassing fluid or, most probably, insufficient fluid in the system. None of these, with the exception of a low fluid level, are easily diagnosed by the pilot, and any such problems should be referred to a mechanic.

Spongy actuation, most noticeable in brakes, is the direct result of air in the lines. Bleeding the lines of the trapped air will cure the problem. Finally, if the hydraulic