

# LOOK, LISTEN, LEARN: WALKABOUT HELPS FIND, FIX FLUID CONNECTOR SYSTEM LEAKS

GARY SCHAEFER

## *STOPPING HYDRAULIC LEAKS IN MILLS*

---

**S**TOPPING HYDRAULIC LEAKS IN A MILL IS A THREE-STEP process. The first step is learning about hydraulic componentry and system design. Second is understanding the mill's hydraulic system, including knowing where trouble spots may be and what to look for during routine inspections. Third is knowing how to find a leak, identify the cause and fix it.

The March 1996 issue of *TAPPI JOURNAL* included a story, "Having a fit over your fluid connector fitting?," (p. 133-134) that provided a rundown of common hydraulic system connectors and their strengths and weaknesses in system design. That story roughly equates to the first step in stopping hydraulic leaks — learning about componentry and design. This story provides guidelines for the second step encompassing how to inspect a mill's hydraulic system and what to look for.

### **A SYSTEM "WALKABOUT"**

Many paper mills have maintenance or safety people who regularly walk the mill to check machine systems, and checking hydraulics should be a part of their routine. Weekly hydraulic system inspections should be sufficient to identify potential trouble spots. In-depth inspections that include analyzing system routing, inspecting for abrasion and running diagnostic tests should be performed monthly.

Your role during the weekly system walkabout is that of a detective. From talking to operators and your experience, learn which areas need to be watched for problems. It may not be necessary every week, but

inspect these tough application areas thoroughly. Finding problems and learning what is at their root will prepare you to make the right repairs.

### **WEEKLY "WALKABOUT" CHECKLIST**

These are some tips on what to look and listen for during a weekly hydraulic system inspection.

1. Before beginning your inspection, review your notes from previous inspections and look for additional wear and tear that has occurred.
2. Look for machines with parts that move constantly and check for hoses that move or jump around. Too much hose movement can cause fittings to loosen and hose damage.
3. Look for hose abrasion where hoses touch other hoses or structural members.
4. Look for oil leaks as well as oil dry, oil socks and other home remedies that operators use to soak up or repair leaks.
5. Listen for unusual noises or sound that cannot be readily identified like banging and hammering sounds that might be made by loose hose and tube assemblies.
6. Listen for grinding sounds that are made by pumps and motors, which could indicate they are failing.

7. Check oil reservoir levels and smell the oil. A burnt oil smell means the oil is oxidizing and needs to be replaced. This could be the result of a plugged relief valve or filter, lines that are too small, or an undersized cooler.
8. Talk to machine operators and, to determine if oil leakage is occurring, ask if any oil has been added to the system since the last time it was checked.
9. Check maintenance logs and ask operators if any machine maintenance has been performed since the last inspection. Even if the maintenance was unrelated to the hydraulic system, hose and connectors may have been moved to obtain access.
10. If maintenance was performed, make sure every thing was assembled correctly and all clamps, ties and guards were reinstalled.

The right repairs are not always the obvious ones. A truck operator who kept a large inventory of one-wire hose explained that the inventory was required because a particular hose failed regularly. At the same time, he said he had no hydraulic hose problems. Actually, he had a problem, and his solution was frequent hose replacement. Purely from a pressure standpoint, it was correct to use a one wire hose in that cement truck application. However, when looking at the number of operating cycles, it became clear that a two-wire hose could provide an extended life.

The lesson learned is, if you find a lot of leaks during your inspections, look beyond the obvious. Sometimes, you even may have to question the quality of the system. For example, if much of the hydraulic plumbing has pipe threads which are leaking, repairing the leaks may not be the answer. It may be time to upgrade to new hose, tubing and fittings.

Evaluating the quality of a fluid connector system is a complex process and required routine in-depth inspections. A good way to look in-depth at a fluid power system is to look at it in the same way the hose, tubing and fitting manufacturers do when they design, select and install new systems. Their rule of thumb is, if it looks bad, it probably is bad. It might function, but not that well.

### IN-DEPTH "WALKABOUT" CHECKLIST

Following are items that should be included in in-depth inspections or during scheduled shutdowns. In addition to helping you preempt problems, these will help you evaluate the quality of your fluid power system.

1. Perform a "system EKG". The diagnostic information obtained should include input measurements, differential pressure readings and other data that

will help you understand how effectively the system is operating.

2. Compare the diagnostic readings with past readings and look for any changes.
3. Review failure records. This may help you forecast future failures.
4. Talk to the operators to learn how often they have to put oil into the system.
5. Check how operators put oil into their system and where and how oil is stored. Ensure that oil is filtered before it is added to the system.
6. Ask operators how often fittings come loose and need to be tightened.
7. During shutdowns, inspect inaccessible areas that cannot be inspected while the machines are operating, such as areas where guards have to be removed.
8. Inspect for hoses that are twisted or bent more than the minimum bend radius and to ensure that lines are square and parallel and line sizes are not mismatched.
9. Inspect newly installed machinery and recently repaired machinery, keeping in mind that even well designed equipment can be installed improperly.
10. Listen to how much and how often pneumatic compressors run. When one company shut down a plant, two 2,000 horsepower compressors continued to run because of air leaks in the system.

Be an observer when you conduct your inspections. Look, listen and learn about your hydraulic system. Use these checklists when performing routine inspections - they will enable you to find and fix many leaks before they cause a problem.

However, there is a big difference between old pipe-threads and new O-ring face seal fittings, and finding a fixing leaks is not a replacement for new technology.

To learn more about new connector technology and to better understand how to inspect and analyze fluid power systems, contact your local hose and fittings dealer. They and some fluid system manufacturers can provide training customized for you and your mill.

---

*Gary Schaefer is technical services manager for Parker Hannifin. For more information about new system technology and inspection and routing procedures, contact Parker Hannifin Fluid Connectors Group, 17325 Euclid Ave., Cleveland, OH, 44112, (216) 531-3000.*

### **WHAT TO LOOK FOR IN NEW EQUIPMENT DESIGN**

Hydraulic systems on new equipment are not always equal. Some manufacturers use the latest in fluid power system technology while others don't. Here are some things you should look for when purchasing new equipment.

- New machines should incorporate plumbing that uses elastomeric seals and SAE or ISO flange ports.
- Line velocities and pressures should not exceed four feet a minutes for suction, 15 feet a minute for pressure and 10 feet a minute for return.
- Hose should not be twisted or bent beyond the minimum bend radius. Remember that hose is specified by pressure spikes.
- There should be no unclamped hose or unprotected abrasion points.
- Clamped hoses should be routed so that they can expand and contract (or "breathe") +2 to -4 percent, because they will expand and contract in use.

Finally, remember that some fluid connectors manufacturers will work with the manufacturer to custom design hydraulic plumbing for machinery, and they provide special warranties to purchasers of the equipment. Don't hesitate to ask the manufacturer to call in specialists to improve a hydraulic system that does not meet your expectations.