The FABRICATOR®

How to keep hydraulic presses running

Know thy press: In sickness and in health

By Thomas Lavoie and Carl Jean

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Several preventive maintenance steps can help extend hydraulic press life. Press operators who stay in tune with their press and establish good, consistent maintenance practices from the beginning will benefit the most.

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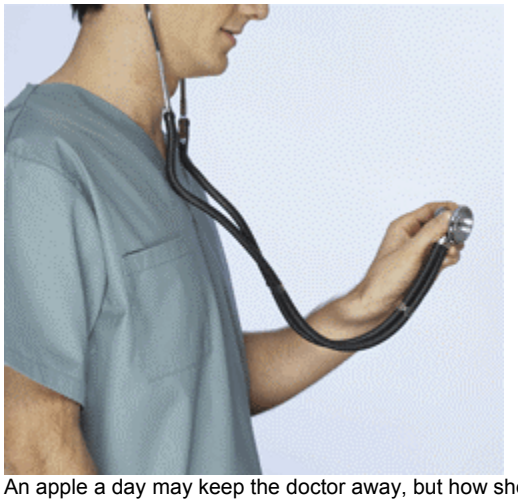

An apple a day may keep the doctor away, but how should press operators keep their hydraulic presses healthy? By knowing when the press is running well or needs attention, and by performing regular maintenance.

Knowing Your Press

To find out if your hydraulic press is performing as it should, you can check several factors. To start, a hydraulic press should not run above 150 degrees.

Hydraulic presses in good working condition have no leaks and will get up to pressure quickly. For example, it's a good sign if the press takes 0.5 to 1 second to build to the maximum required pressure. If it takes more than 2 or 3 seconds a problem with a pump, valve, or motor may be the culprit.

Typically, pressure problems are pump-related. However, sometimes the relief valve may be working too slowly. You should look for dirt or grit in the line or check to see if the valve is open too far. Also, if the motor is not producing sufficient revolutions per minute (RPM), a drop in pressure could occur.

You should be tuned into various processes on your hydraulic presses to ensure good operations. For example, valve shifts should be smooth from one speed change to the next—you should not hear any banging noises during speed changes. Any sounds that are not considered normal should be investigated promptly.

Also, it is critical that you continually check for loose wires and fittings and frayed hoses. You should also look for leaking seals around the ram. If any of these defects are evident, proper press operation can be affected. While checking seals, also look at lubrication and keep it at the correct levels.

Check It Out: Daily Preventive Measures

To keep your hydraulic presses running at peak performance, consider adopting a daily maintenance check list similar to the one below.

- **Oil leaks.** All hydraulic lines should be checked, because a small leak can turn into a very big mess. Any loose fitting should be tightened and wiped clean of spilled oil. Keeping the press clean will help you locate new leaks.
- Oil level. If necessary, top it off. To determine the type of oil needed, refer to the oil tag affixed to most machines.
- **Loose bolts.** Some dies can cause vibration and shock that can loosen bolts. Look around the tooling area for bolts that have fallen out.

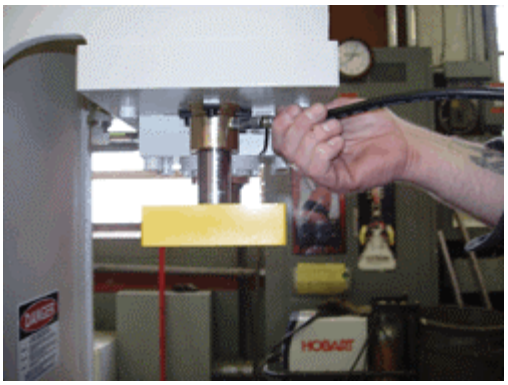

Figure 1

- **Lubrication on guided platens.** Some bushings have fittings that should be greased to maintain a thin film of lubrication over the rod (see **Figure 1**). Avoid overgreasing because these fittings can accumulate dirt, causing bearings to wear prematurely. Other bushings have a check valve-type fitting. These bushings have graphite impregnated into the bronze and require very little maintenance. Mobil Viscolite® or a similar oil is best, but only a small amount is needed to spread the graphite onto the rod. Never put grease into this type of bearing.
- **Oil temperature.** After the machine has warmed to its operating temperature, check the oil temperature, which ideally should be 120 degrees F.
- **Press ram.** The ram should be moist but not dripping oil.
- **Light curtains.** Break the beam while the ram is on a downstroke; the press should stop immediately. Breaking the beam on the upstroke may not stop the press—always refer to the owner's manual for proper function.
- **Cleanness.** Check to be sure the work area is clean.

Key Maintenance Issues: Oil, Electrical

Oil. Keeping a press's oil in new condition is a simple way to extend its life. Low oil levels and dirty oil will rapidly reduce the life of a press. Dirt and heat also are common culprits.

Oil temperature can be maintained near the ideal 120 degrees F by an air or water cooler. Probes are inserted into the oil reservoir, and the temperature is maintained with a thermostat. The air cooler uses a radiator to separate the heat with an electric fan moving the air through the cooler.

Figure 2

The radiator should be kept clean, as it tends to collect dirt and dust in the vanes, which hinders airflow from traveling at maximum capacity. Attaching a common filter, such as the kind used in heating and air-conditioning units, to the heat exchanger will help keep the unit clean (see **Figure 2**).

A water cooler works similarly, except water travels through the vanes instead of air. Water can come from the city, chillers, or rooftop-mounted exchangers. Running city water through an exchanger can be expensive and has a tendency to rust the exchanger. Also, many municipalities discourage the use of city water, depending on local water restrictions and codes. Inspection should be performed yearly.

Rooftop-mounted units also tend to collect dust and dirt, resulting in clogging and rusting of the exchanger. It's a good idea to inspect this equipment on a yearly basis. Placing a filter inline will help remove fine particles. Water chillers are the best means of heat dissipation, because the inlet temperature can be adjusted and antirusting agents can be added to the water.

The next step in good oil maintenance is oil sampling. This should be done at least once a year, and the results can tell you when you need to change filters (see **Figure 3**). From this sample, you can judge oil lubricity, see how many different-sized particles are in the oil, or if the oil has water in it.

Figure 3

In most cases, it's not necessary to change oil; however, certain additives may be needed. Oil sampling also can determine if the oil filters are being changed at proper intervals. You can tell if the correct micron level of filtration is being used from the sample.

Simple hydraulic systems require code 10 filters, which result in a cleanliness level of 20/18/15. More complex systems that have proportional or servo valves require code 03 filters, which have a cleanliness level of 16/14/12.

Electricity. Electronics is another critical area to be maintained. Coils on valves normally have a life cycle of 3 million strokes, and relays normally have a life cycle of 1 million strokes. Replacing them before they fail can eliminate or reduce hours of troubleshooting and downtime.

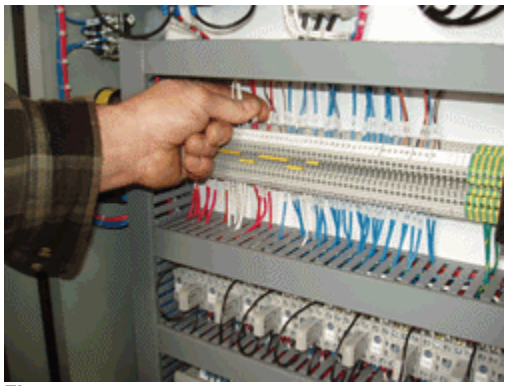

Figure 4

Installing an hour meter and nonresettable cycle counter will help to maintain accurate records and can help with scheduling maintenance. Control wiring should be checked annually to make sure all connections are tight and that the wiring is in good condition (see **Figure 4**). Loose wiring should be placed in wireways or tied with wire ties. All spares or unused wires should be capped off or removed. Dust and dirt should be removed from enclosures.

Every press operator should develop his own custom check list—daily, monthly, and yearly, for all the equipment in the shop. This is critical for detecting problems early on and avoiding potentially expensive fixes later.

Taking several simple preventive maintenance steps can help you get the maximum life from your press. If you stay in tune with the press and establish good, consistent maintenance practices from the beginning, you will benefit the most.

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Knowing When to Replace a Press

Knowing when to replace a press is key to ensuring accurate and consistent part production. Despite following good maintenance practices that will prolong the life of a hydraulic press, some signs indicate a replacement may be in order. Some of the signs are:

- **The press no longer can build up pressure.** Key areas to investigate are the pump, press motor, and valves. However, if the pump is found to be faulty, you may be able to keep the press alive by replacing the pump.
- **Cracked frame.** These fractures can be subtle or obvious. A temporary fix is to possibly weld the frame, but ultimately the press will need to be replaced.
- **Critical hydraulic or electrical problems.** Intermittent operation problems can signify an electrical short or loose wire. Make sure all wires are tight and have ferrules to prevent cross contact with other electrical

components. Frayed hoses and incorrectly crimped fittings can cause plumbing failures. For example, hoses should never touch each other and fittings should be crimped by an authorized facility to ensure they can withstand the system pressure being used on an individual press. Also, listen for abnormal sounds from the hydraulic tank, which could be a sign of pump failure.

If you ignore any of these warning signs and continue to run the press, several performance sacrifices may occur. When dealing with a pressure delay, cycle times will increase as well as downtime.

Additionally, part accuracy may be adversely affected because varying pressure can cause inconsistently formed parts or parts that may not even be able to be punched out. In one example of part inconsistency (the bearing outside diameter was oversized and sleeve inside diameter was undersized), a customer was trying to press fit a bearing into a seat and it could not be seated properly on some assemblies. The parts were run on a new hydraulic press with consistent results. This helped the customer determine that the old press was not achieving the same pressure from stroke to stroke.