TOP 8 THINGS TO CHECK WHEN MAINTAINING A PRESSURE REDUCING VALVE

By Mark Gimson

Maintenance tips for eliminating valve failures

Like every piece of mechanical equipment we use, a control valve requires some maintenance. Because budgets are stretched and time is tight, it can be tempting to ignore checking on valves, which often are located in underground vaults and give years of operation without complaint, but eventually, like everything else, they will fail. This article looks at eight simple steps that, if undertaken occasionally, will help eliminate the valve failures that always seem to occur at the most inconvenient times.

Here is a simple checklist to use every time you look in on a valve:

STEP 1: CHECK FOR BROKEN OR LEAKING PILOT SYSTEMS

The valve pilot system relies on a supply of pressurized water. Leaks and cracks in a pilot system will certainly have an effect on how a valve operates. Unfortunately, the very nature of pilot systems makes them susceptible to damage from simple accidents like tools being dropped or the mistaken notion that they can be used as a stepping point. The small bore tube and fittings can break. Overtightening of flare fittings often results in a small crack that will fail over time. Whenever you inspect the valve, take a close look at the entire pilot system. Are the fittings tight? Is there water seeping from a joint? In some parts of the country it is not uncommon to find that the minerals in the water will even wear out copper tubing on the bends. Take a close look and ensure that everything still looks like it will hold pressure. Remember, the pressure you have in the main water line is the same pressure going through the pilot system. Inspect and rectify any potential issues you find.

STEP 2: CHECK FOR AIR IN THE PILOT SYSTEM

Unlike water, air is compressible and, if allowed to remain in the pilot system, it will give erroneous readings. The pilot will have trouble maintaining a stable valve and therefore it is generally a good idea to get rid of air that will collect in the pilot system. Air loves to collect at high points, which typically means the pilots and tubing in the control valves. If the valve is installed with a wet type position indicator, you will see air collected in the sight glass, and the water level will be part way down the glass tube. There will be either a small plug or bleed valve installed on the top of the indicator, and opening or removing it will vent the air. Remember—when venting the indicator you are effectively venting the main valve bonnet, so the main valve will begin to open.

STEP 3: CLEAN DIRTY STRAINER SCREEN

A plugged strainer is a common cause of control valve failure. A dirty strained screen is essentially chocking the water supply to the main valve bonnet, which means the main valve will either have a lot of trouble closing or may not even close at all. Most strainers are installed with plugs, which allow for a blowdown of the screen without removing it. A good solution is to remove the plug and install a nipple and ball valve, which allow for simple blow down whenever you are around the valve. Usually only a few seconds is all that is required to keep a screen clean.

STEP 4: REPLACE PLUGGED FITTINGS

Even if the strainer is clean, do not assume that everything else in the pilot line is free and clear. Restriction fittings (those small orifices that all pilot systems rely on), can and do get blocked. Depending on the mineral quality of your water it is possible for these to become plugged solid. This requires the fitting to be drilled out, soaked in a solution to clean it or simply replaced. Typically, replacement ends up being the most cost-effective choice, as time is worth a lot more than having the luxury of messing around with a fitting while you have the water system shut off.

Any time a valve struggles to open or close and the strainer has been cleaned—assuming all needle valves, etc., are OK—then a plugged or partially blocked line is worth exploring.

STEP 5: TEST MAIN VALVE DIAPHRAGM

Depending on system pressure, usage and minerals in the water, main valve diaphragms can last for years. Generally they do not catastrophically fail instantly unless there is something in the line that does not belong there. Typically, diaphragms just wear out over time or due to mineral buildup. A simple test to ensure your diaphragm is still intact is to isolate the pilot system so no water can get into the valve cover, and remove the bonnet top plug or open bleed valve on top of the position indicator. The main valve will open, discharging all of the water in the bonnet as it does. Once the valve is wide open, the water should stop flowing. If water continues to flow even with valve wide open, it would be an indication that the diaphragm is leaking. This would require removing the main valve bonnet and closely inspecting the diaphragm.

STEP 6: CHECK PILOT DIAPHRAGM

Anytime you see water dripping out of the control pilot it is not a good thing. An exception to this is an altitude pilot, which is installed with a copper tail tube to signify that it is designed to relieve water during valve operation.

Most pilots are supposed to keep the water on the inside, however, so if you come across a pilot with water leaking out of a vent hole or through the adjusting screw threads, then you have a problem. Make sure that the water is actually running and is not simply condensation; a quick wipe with a cloth and a few minutes of observation will confirm a leak.

If water is leaking, it is an indication that you have water in the spring casing, meaning that there is a problem with the pilot diaphragm. The solution is to take it apart and replace that part.

STEP 7: PERFORM PILOT CHECK

Pilots typically sit in the same position with little internal movement for years of trouble-free operation. Just like the main valve, however, there are things that can cause sluggish behavior or erroneous readings that will affect the system eventually. A simple pilot check is to make slight adjustments to the pressure settings while the valve is in operation. By slowly adjusting the setting screw clockwise and observing the downstream pressure gauge, it is possible to see that the pilot still has operation of the valve. A small move on the adjustment screw should be seen on the pressure gauge needle. Increase the setting by approximately 5 psi. Then, assuming the pilot has performed this, turn the adjustment screw counter clockwise and lower the pressure past the normal set point so the gauge now reads 5 psi lower than normal. Did the pilot and gauge work together? If they did, then slowly bring the pressure back to normal by turning the adjusting screw clockwise and setting the lock nut. This simple exercise proves the pilot is still working and controlling the valve. If for some reason the gauge did not track your adjustments, then it is time to take a closer look internally at the pilot to ensure that nothing has worn out.

STEP 8: INSPECT BALL VALVE

First, make sure the ball valve is open. If it is supposed to be left closed, it will typically have a tag informing you that this is normally a closed valve. It will not hurt to actually give each ball valve a quick turn just to ensure it still moves, but ensure you leave it in the same position you find it.

Of course, this is assuming you still have handles on your ball valves. Plated steel handles on ball valves often rust away, leaving a valve without any means of closure. Try to ensure you have solid stainless steel handles on all of your ball valves.

These eight simple steps can alleviate future problems, and, if performed at least once, will give a benchmark for maintenance frequencies required in your system valves. Unfortunately, no two water systems are alike and often even in one network, two valves can require differing amounts of attention. Hopefully these simple steps will allow you to eliminate problems before they occur and focus on all the systems issues that you may be facing. WWD

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