

# Maintaining valves the right way

**Valve maintenance is the best way of managing control valves, in order to control fluid flow. When making repairs on valve types, use the available manufacturer's technical manuals. As soon as a leak is detected quickly determine the cause, and then apply the corrective maintenance. Maintenance may be as simple as tightening a packing nut or gland. A leaking flange joint may need only to have the bolts tightened or to have a new gasket inserted. Scale if allowed to collect, will cause leakage. Loose hangers permit sections of a line to sag, and the weight of the pipe and the fluid in these sagging sections may strain joints to the point of leakage.**

By Nwaoha Chikezie of CASEI

Whenever a valve is to be installed, be sure to know the function the valve is going to perform, that is whether it will start flow, regulate flow, stop flow, prevent back flow, or regulate pressure. The valve body must be inserted according to the information that is stamped upon it by the manufacturer-like type of system (gas, oil, and water), direction of flow, operating pressure etc.

The valve operating characteristics should be known, the type of end connections with which it is fitted, and the metal from which it is made. These operating characteristics and the material are the factors that determine the length and kind

of service that a valve will give. Remember that end connections indicate whether or not a particular valve is suited to the installation.

When a valve is installed, ensure it is readily accessible and allow enough headroom for operation. Install valves with stems pointing upward if possible. Stem positions between straight up and horizontal is acceptable, but avoid the inverted position, because if allowed, sediment will collect in the bonnet and score the stem. Also, in a line that is subjected to freezing temperatures, liquid that is trapped in the valve bonnet will freeze and rupture it.

Control valves, properly used and maintained can improve process efficiency and reduce costs. When a control valve is in use, an as-found test should be carried out on the valve. This is a diagnostic test that determines the performance of the valve in its current operation. It compares the transducers output and input signals, and also accesses the positioner input versus the air pressure applied by the actuators. It is wise to apply the basics of proper valve maintenance, in order to improve fluid flow control and operating efficiency. There are 5 basic control valve maintenance steps:

- **Control Valve Connection:** Proper valve connection procedures should be taken into due consideration during installation on piping systems. In other words, the pipe should be properly aligned before the installation of a control valve. The valve must not be relied upon to pull the piping into alignment. If this is not adhered to, valves will not operate smoothly, because the misalignment stresses causes twisting of the valve body. Attention must be paid in particular to the installation and operation of diaphragm valves when they have to operate within specified time windows. This is to ensure no hang-ups due to valve body twisting caused by piping misalignment.
  - **Ensure Valve Is Clean Before Installation:** In good process operations, prior to installation, control valves must be free from all dirt, and foreign matter. In some cases, the valve and the line should be blown out with clean instrument air, steam, or clean water. This removes grit and dirt that might interfere with valve operation or shorten control valve life. The type of blow out system applied is dependent on the type of fluid flowing through the piping system.
  - **Proper Control Valve Storage:** Control valves should be kept in a safe place, away from weather, dirt etc. Valves must be in protective covers and kept in place until the time of installation. In some cases, control valves are shipped with the disc fully open, and others fully closed. In any case, the disc must be left in the shipping position if possible, until installation is completed. This is aimed at protecting the seating surfaces.
  - **Control Valve Inspection upon Receipt:** Whenever a valve is received, thorough inspection should be carried out on it, because this is always the critical time in
- **Understanding Control Valve Markings and Components:** Valves are identified by markings inscribed on the body, rims of the hand wheel, or to the adjacent piping. Examples of such markings are color codes, ratings, arrows etc. Arrows cast on the body of the valves is used to indicate the flow path through the valve. A code on the operating lever indicates the type of fluid flowing through it, like color code for hydraulic is orange. On the other hand, valves are made of different materials because flowing matter such as gases and liquids are often corrosive, or highly contaminated. For maximum efficiency and control, valve materials must fall into the same category of the fluid flowing through it.

the management of the valve. Upon receipt, the control valves must be inspected for in-transit damage. And inspection should be focused on the valve actuator; valve stem, and valve ends etc. It is also advisable to dismantle the valve when received, for the inspection of its internals. This is done to remove any anti-movement restraints installed for protection during transit.

**Trouble shooting**

The first step to trouble shoot a control valve problem is to make sure it is installed properly. Table 1 (see right) provides guidance on troubleshooting three common control valve problems.

**Conclusion**

In summary, it is imperative that valves and their respective pipe connections are properly aligned at initial installation. When in doubt, always refer to the valve manufacturer for proper use and installation. In addition, for adequate fluid flow control, team work between the unit operator and panel operator is essential.

**About the author**

Mr Nwaoha Chikezie graduated with a bachelor's degree in Petroleum engineering in 2008 from the federal university of technology, Owerri, Nigeria, and has recently completed a term as an operator (student trainee) with Port Harcourt Refining Company (PHRC, [www.nnpcgroup.com/phrc.htm](http://www.nnpcgroup.com/phrc.htm)) in Nigeria, and is currently working on an initiative with the Caribbean African Student Exchange Initiative (CASEI). As part of his research, Mr. Nwaoha Chikezie has authored a number of engineering articles in leading international journals. Mr. Nwaoha Chikezie is a member of SPE, ASME, AIChE, IMechE, ICE, IGEM and Nigerian Gas Association (NGA). He can be contacted via [chikezienwaoha@yahoo.com](mailto:chikezienwaoha@yahoo.com). +234-703-135-3749



1. CONTROL VALVE SEVERE PLUGGING	
Possible cause	Remedy/Solution
a) Is flow rate higher than normal?	a) Adjust handle stem to achieve desired/normal output.
b) Is pressure gauge functioning?	b) Replace faulty gauge.
c) Is particle of debris caught in the port under the valve flap?	c) Check for obstruction. If so, duplicate the cam opening to flush the ports.
d) Is pump discharge filter installed?	d) Confirm filter is installed and without any fault.
e) Is piston/orifice blocked?	e) Perform back flush of orifice/piston until fluid flows freely and normal.
2. THERE IS EXCESSIVE NOISE.	
Possible cause	Remedy/Solution
a) Is valve seat faulty or worn out?	a) Replace the valve seat assembly
b) Is oil viscosity too high?	b) Check for oil purity, separator efficiency and status.
c) Is an improper spring installed behind the valve?	c) Ensure proper number, proper alignment and correct thickness of springs.
d) Is pressure setting too close to that of another valve in the circuit?	d) Adjust pressure gauge.
3. THERE IS IMPROPER FLOW	
Possible cause	Remedy/Solution
a) Is the fluid too hot?	a) Check the status and operation of fluid cooler.
b) Is valve not adjusted properly?	b) Check for proper installation. And adjust properly.
c) Is orifice restricted?	c) Clean the orifice.

Table 1. Common Control Valve problems and solutions