AS SEEN IN THE SPRING 2005 ISSUE OF...

Valve MAGAZINE

TIPS & TECHNIQUES

BY COOPER ETHERIDGE

Don't Overlook Linear Actuators on Gate Valves

At a recent sales meeting in California, I was surprised to discover the lack of awareness regarding linear valve actuators. In fact, one veteran of the valve industry remarked, "I didn't know you could operate a gate valve using compressed air and a linear actuator." Most folks in the valve industry are familiar with operating globe valves in this manner, but typically, multi-turn electric actuators have been used when automating gate valves. However, if the control application calls for faster stroke speed, mechanical failure position, precise positioning, or higher thrust, linear pneumatic or hydraulic actuators may be preferred.

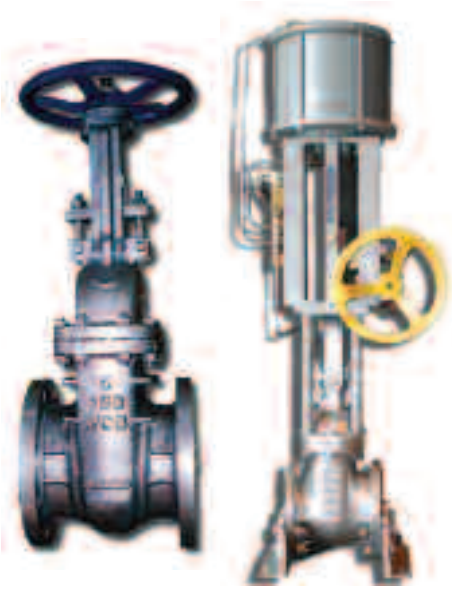
The basic principle behind linear actuators is simple: a piston in a cylinder. This type of actuator is very simple and reliable; after all, it only has one moving part. Such a mechanical device has been around for more than 200 years. Pistons in cylinders first saw use in steam engines. Scotland's James Watt crafted the first good ones during the 1770s.

Attaching a linear actuator to a gate valve is fairly straightforward. First, the handwheel and drive nut comes off, exposing the threaded stem. Then, a coupling is used to connect the stem to the piston rod. This allows the linear actuator to move the stem up and down directly. The before-and-after pictures on the left and right, respectively, show the change from a manual valve to an automatic valve with the linear actuator (the picture on the far right includes a manual override).

Of course, the actuator is now producing "thrust" not "torque," and this is a critical specification for linear actuator design. As it turns out, the size of the cylinder is a function of the required valve thrust and the available supply pressure (pressure x area = force). The cylinder is larger for a higher required thrust and a lower supply pressure. And since the actuator price increases as the cylinder size increases, engineers must verify that the supply pressure given is the highest available at the project site.

Moreover, if the calculated thrust is based on the maximum differential pressure rating across the valve (as defined by ANSI) and not actual operating design conditions, the specified thrust might be much higher than actual, which would require a larger cylinder and thus a higher price. Therefore, it is best to specify thrust based on actual design conditions to get the best price.

Linear actuators can be an effective automation solution for gate valves. As automation increases, so should our choices. That the linear actuator has proven reliable in many applications outside of the valve industry is testament to the enduring design of the pneumatic and hydraulic cylinder. **VM**



PHOTOS BY AUTOMATION TECHNOLOGY, INC.

This issue's Tips & Techniques column was contributed by **COOPER ETHERIDGE** of Automation Technology, Inc. (www.atiactuators.com). If you have a suggestion for a future topic to be covered or would like to contribute a column, please send an e-mail to Judy Tibbs at jtibbs@vma.org.