ASSOCIATE MEMBER SPOTLIGHT

PRODUCTIVITY AND EFFICIENCY IMPROVEMENTS IN WATER PLANTS BY RETROFITTING MODERN AUTOMATION.

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The existing water treatment infrastructure in rural New York is gradually aging. Although good maintenance practices and careful operation can extend plant life by decades, the productivity and efficiency of a plant can still be improved by automation.

The reasons for automating gates and valves are multiple. Valves may be located in confined spaces, they may be hard to reach or in remote locations. Sluice and slide gates may take a significant time to manually operate, especially larger sizes.

Quite often, valves in a line function well, but their operation could be made easier and more efficient by retrofitting one of the many types of actuator available today. In these cases it may be possible to adapt the valve, using custom hardware, to accept a new actuator. This often can be accomplished without removing the valve from the line. The adaption process however requires not only a good working knowledge of the valve, but also the selection of the correct actuator as well as knowledge of the methods of mechanically adapting the actuator to fit the valve or gate.

Some valves are easier to adapt than others. For example a valve or gate that already has a manual gear or other form of actuation will likely have a mounting flange of some sort. Direct hand wheel operated valves however will need the addition of a mounting flange and sometimes a replacement stem.

A water filtration plant at the Finger Lakes was such an application. Their isolation valve was below grade and in order to operate the valve, a grating had to be removed and the plant operator was required to climb into the shallow valve pit and turn the hand wheel. This was time consuming, and caused the passageway to be blocked during the operation.

The solution was to automate the valve with an electric multi-turn actuator mounted at grade level, driving a spur gearbox that was adapted to fit the valve using a retrofitted power flange and new stem. After initial measurements were taken and consultation with the valve maker, UVC designed and fabricated the valve adaption and extension pedestal to positon the actuator at a convenient grade level. The offset of the gear on the valve allowed a clear path in the passageway.

This solution allowed both local and remote operation without disruption of the working environment. The valve can now be operated conveniently and quickly.

Isolation valve in pit, showing manual hand wheel.

Electric actuator, pedestal. mounted

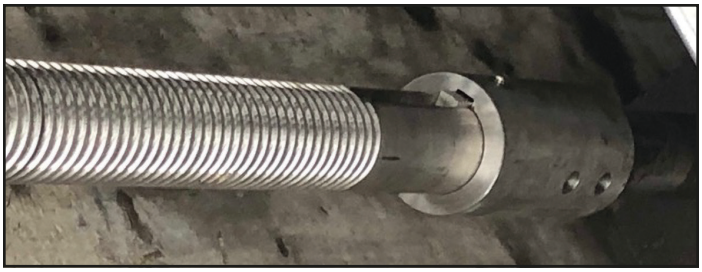
There are many sluice gates in the NY rural area that have been in operation for some time. The gates themselves are usually robust and functioning as designed. However there are many hydraulic actuators with central hydraulic power units on these gates that are now obsolete and difficult to maintain or repair.

One viable solution is to replace the old hydraulic cylinders with new electric actuators. There are many advantages to this retrofit, not only the reduction in maintenance hours required but also the improved gate protection afforded by the actuator diagnostics.

The actual retrofit operation requires the hydraulic cylinder and piston rod to be replaced with a new threaded stem and electric operator. Care has to be taken to ensure there is proper constraint to prevent the stem rotating under the action of the rotating stem nut of the actuator. This can be achieved by replacing the thrust collar in the gate pocket with a thrust nut. Alternatively the new stem can be machined with a long key slot. A mating key, mounted in a special torque plate, runs in the slot to prevent stem rotation.

Both methods have been utilized in Upstate NY to bring gate automation up to current technology standards.

Old hydraulic cylinder actuators.

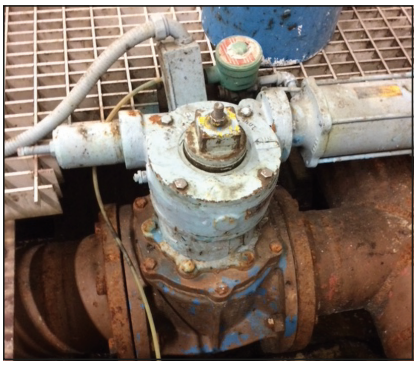


Replacement threaded stem.

There are some installations where the valves may not be salvageable. This may be because of corrosion, wear, seat failure or other problem. In these circumstances the valves may need to be replaced. Often the condition of the valve may not be apparent at first inspection.

On one waste water plant several old plug valves needed automation to facilitate remote operation. Measurements were taken and hardware designed and fabricated to perform the retrofit. Two of the valves however were found to be faulty and leaking through damaged seats. UVC was able to procure and deliver new valves. These were modified to accept the new actuators and the automation project was completed with minimal delay. >>>

New electric actuators.



Old pneumatic actuator at floor level.

There is a wide variety of actuators available that can be used to automate existing valves. The selection of the actuator, design of the adaption and help with installation makes the difference on a successful retrofit.

New pneumatic actuator on pedestal for easy access.

UVC specializes in this type of work and the personnel at UVC are able to provide a turn-key solution to any valve automation challenge.