

Face Water/Wastewater Industry Challenges Confidently

Introduction

Although the water and wastewater industry has long endured the same task – to ensure increased productivity and output quality at the lowest possible cost – recent global environmental and economic issues have intensified the challenges.

Experience has shown you that maintenance issues, lack of process insight, and operation errors affect your water-supply and waste-treatment facilities. Solutions exist, however to permanently solve the problems and attain even greater reliability.

Issues Facing the Water/Wastewater Industry

According to the American Water Works Journal, “Freshwater sources are increasingly at risk from numerous natural and manmade causes that include population growth, climate change, land-use change, and pollution.” In fact, fueled by population growth, agriculture, and industrialization, the global water demand could outstrip supply by 40% in 2030*. This single possibility will increase global demand for clean water and wastewater treatment.

Demand will increase while the industry struggles with high and rising operational and maintenance costs. Operating plants will undergo increased costs due to chemicals, enhanced treatment procedures, and energy expenditures. The industry also must adapt more easily to meet changing environmental regulations, and comply with existing and future federal water regulations.

As facilities address these additional difficulties, they continue to face the common challenges of increasing the lifespan of treatment plants, improving infrastructure, and expanding or upgrading treatment plants. Replacing aging facilities will require businesses to overcome potential funding shortfalls.

Clearly, the industry needs to consider new solutions for the intensified challenges faced now.

**By 2030, the demand for water would have increased by 40%.
Are your facilities ready for this?**



Potential Solutions to Meet the Challenges

Improvements to current industry practices present great potential for meeting the challenges. In fact, water/wastewater facilities have seen significant returns when they consider improvements to their valve configuration process, valve diagnostics, and valve monitoring.

The heart of the solution is to make complex valve-operating systems less complex. Because proper valve operation and maintenance contributes to smooth operation of water/wastewater facilities, a simpler solution will lead to a vast improvement in results.

Specifically, these three areas are trending up and are ripe for improvements and strong returns:

- Optimal and efficient valve configuration
- Direct and accurate valve diagnostics
- Real-time and long-term valve health monitoring and prediction

Optimal and Efficient Valve Configuration

While increased valve automation reduces costs and enables facilities to manage complex operations, optimal and efficient valve configuration sets up the facility to run smoothly. Certain roadblocks can arise during configuration, for example, if the configuration tools are difficult to use or if the equipment itself is cumbersome and adds to the installation costs.

Emerson’s new valve actuators – the TEC2 and new Model 500 – eliminate those roadblocks and ease installation and configuration tasks.



Small and lightweight. The Model 500, a more compact, lighter weight, and non-intrusive actuator can be ideal for smaller valves. This type of actuator also saves money in installation by avoiding large overhung loads that need additional support for the weight.

Non-intrusive, streamlined setup. In Emerson's TEC2 and Model 500 models, local control knobs do not penetrate the housing. Because the control knobs and the limit and torque switches are not electro-mechanical switches, the control compartment doesn't need to be opened for setup, routine maintenance, and operation.

Easy information setup. Users benefit from detailed setup for easy access to every parameter. Tag management and batch task manager tools simplify tasks, and the scheduler assists in managing and scheduling multiple tasks.

Security/User Privileges. Protect sensitive data.

Similarity of equipment. A wide variety of electric actuator sizes are available to serve torque and thrust requirements across water and waste industry plants. This means less stocking is required to meet various needs as they arise.

Easy upgrade. As the industry approaches significant global changes, good actuator design should not become obsolete every ten years. Treatment plants are designed to last more than 25 years. Firmware upgrades to electric actuators need to be simple and non-intrusive, as are upgrades to the TEC2 and Model 500. In fact, the TEC2 Series design flexibility allows advancements to be incorporated into existing TEC2000 electronic actuators – protecting users' investments. In addition, the reliable mechanical torque and limit sensing design is not subject to software changes.

Direct and Accurate Diagnostics

Valve diagnostics become especially important in difficult conditions (such as floods), when so many water and wastewater facilities experience outages and when personnel should be sent out sparingly. In addition to environmental dangers, the industry faces a general shortage of experienced people. With fewer people to send out to investigate problems, remote diagnostics becomes particularly important. For example, if an obstruction occurs, the valve can torque out. The operator will not know why the valve does not close. Without remote diagnostics, personnel will need to go to the potentially remote or dangerous location to investigate. And when they arrive on site – because they do not know the source of the problem – they might not have the right tools to address the issue.

When valve information, however, is integrated into DCS and SCADA networks, operators have better visibility to conditions when things are working as they should. Then abnormal conditions can be seen more easily, for example, if a valve's torque has changed and might need attention. If an operator then knows what the issue is, the right person can be sent out with the right equipment. In addition, with accurate diagnostics, if similar issues are occurring over time, personnel can analyze the data and can address difficulties before they cause problems in the process, allow runoff into rivers, endanger lives, or cause fines to the company.

To identify potential problems before they impact plant operations and productivity, Emerson Valve Automation Intelligent actuator diagnostics provide alarms, valve torque profiles, and prognostics.

Data integration with control systems and more. TEC2 actuators diagnostic capabilities can be integrated into the DCMLink software platform – the uniform solution for all electric actuators from EIM or Bettis. Based on human centered design, DCMLink provides advanced diagnostics and predictive analytics. The DCMLink intuitive program screen alerts users if the TEC2 or other electric actuators have an imminent problem. Users can diagnose, configure, calibrate, and monitor all electric actuators from a central location, independent of the digital communication protocol, actuator or host system thus improving maintenance efficiency and reducing maintenance cost.



Common diagnostics. Users can access a valve's current torque profile as well as its archived torque profile. In addition, partial stroke tests are available. This remote testing capability enables control-room personnel to conduct tests to assess the movability of a valve – without going out into the field.

Database. Analysis – critical to predictive maintenance – is possible with archived diagnostic data as well as the import and export features. For example, intelligent diagnostic solutions help gain access to alarms, valve torque profiles, and over 4800 events logged with date and time stamp. Users can monitor and assess over 60 actuator functions and alarms.

Real-time and Long-term Valve Health Monitoring and Prediction

Efficient valve operation is critical to the water and wastewater treatment processes, therefore utilities must use better asset management to understand the full life-cycle cost of their systems. Plants limit asset life when failures occur. If valve monitoring is limited or not recorded well, each time the facility faces an asset challenge, it's like the first time. And when no health patterns are recorded, facilities are not able to predict issues or mitigate failures.

Lack of asset insight will prohibit the industry from achieving future needs and expansion and can lead to unplanned downtime impacting production and residential-demand fulfillment. There are ways to further extend the life of the plant by monitoring valve health while containing costs.

Real-time trending. Users see live operational data with real-time status of the device with pass/fail indication for accurate health determination and rapid action.

Logging. EIM TEC2 electric valve actuators monitor the operation of valves and keep operating personnel aware of valve performance. In fact, information can be collected and stored for analysis and diagnosis by using data logging with time and date information – across multiple actuators. The event log captures the data in an Excel file for later analysis.

Memory capture and report. Users effectively debug and resolve field issues and have at hand, custom or standard reports in Word or PDF format. In addition, the audit log assists in creating insurance claims.

Conclusion

Given the trends in the industry -- greater demand, higher expenses, and higher regulations -- the water/wastewater industry must find new technologies and methods to improve their processes.

Emerson expertise and products can fill those needs. With features such as trending in real-time, logging of history, and report creation options, the TEC2 and partner applications simplify the tasks for Emerson customers and position them to be ready for future demands.

About the Author

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References:

* - American Water Works Journal January 2015, volume 107, no. 1 –article "Focus on Total Water Solutions."



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