

How data analysis drives improved performance and site uptime

Information and data taken directly from flow control assets can be analysed by specialist systems to assist with appropriate maintenance actions to ensure optimum performance. Proactive maintenance driven by this data can directly match risk, show early failure prediction and allow for reduction in unplanned downtime.



Innovative analysis of flow control data.

The importance of the availability of crucial flow control systems can be seen across many different types of markets and industries. For example, within the oil and gas industry, isolating electric actuators offer routine flow control at tank farms. Fail-safe capabilities are undertaken by actuators for critical safety duties and modulating electric actuators are used for process valve applications. Electric actuators are invaluable within oil and gas production because they do not release fugitive emissions during their operation. Their use is an important step to achieving a net-zero future, reducing emissions created from other forms of flow control that are powered by the produced gas. In the water industry, electric flow control solutions are used for filtration, desalination, potable water treatment, environmental protection and distribution. Actuators contribute to the efficiency of water and sewage treatment processes by providing precise automation.

Efficient operation

Efficient operation plays an environmental role by preventing problems such as accidents and spillages. There are also financial considerations; profit can be impacted by loss of product in such situations. The financial impact of lost production because of unplanned downtime can be substantial, as can fines from regulatory bodies. Flow control assets often work daily in challenging operating and environmental conditions, with extreme temperatures and excess vibration (for example within mining, and oil and gas produc-

tion and processing). Conversely, sometimes they operate infrequently but need to provide the same degree of reaction, accuracy and reliability when called upon. In the power industry, actuators control valves and dampers, and steam and water isolation valves for safe and efficient operation.

Vital

Some actuators provide specialist process control. In applications that use industrial combustion (such as glass and steel making), the control of emissions is an essential consideration, and it can be aided by efficient flow control. For example, the exact ratio of fuel and air to produce the correct amount of heat (and reduce and prevent incomplete combustion and subsequent emissions) is vital.

Process control within this must be repeatable and reliable, with no process variability. When an actuator operates the correct injection of fuel and air (creating complete and efficient combustion) fugitive emissions are reduced and regulatory standards are met. Industrial furnaces often require continuous operation, usually running 24 hours a day and seven days a week, so any unplanned downtime due to lack of equipment availability can result in economic loss and reputational damage.

Flow control asset availability

Flow control assets are essential for a site to achieve its core objectives. Asset failure, obsolescence or inefficiency can result in reduced output, damage to reputation and financial loss. Even if a site is off-line briefly, the monetary impact can be severe.

About Rotork

Rotork is a market-leading global provider of mission-critical flow control and instrumentation solutions for oil and gas, water and wastewater, power, chemical process and industrial applications. We help customers around the world to improve efficiency, reduce emissions, minimise their environmental impact and assure safety.

Unplanned downtime is one of the most serious events that can occur.

The day-to-day availability of flow control assets is important enough that they must be carefully managed by dedicated maintenance services. Sites that have a complete life cycle asset management programme can see improved performance, increased uptime and a decrease in unplanned maintenance costs. This type of service plan should offer immediate fixes of an asset when required, supporting plant operators to work effectively every day. It is an investment that increases the productivity of the key equipment that keep a site running, with fixed costs to the operator.

But within the digital revolution in which we are living through, a proactive and dynamic service/maintenance plan must move beyond this. It must also offer management of assets in a way that provides a holistic view of the life cycle of an asset, using innovative technology to assist with the increases in availability and reliability which will lead to improvements in operational performance. Plant operators should take performance data from flow control assets and use analytical systems to understand what actions must be taken to extend lifespan and ensure optimum performance. Devices that are connected in this way play a key role in a worldwide digital revolution.

Digital revolution

“Connected” devices are increasingly common in our homes. “Smart” thermostats, lighting, dishwashers, washing machines, refrigerators and home security systems are popular and widespread. Connected devices also play a key role in manufacturing, industry and utility services.

The most useful benefit from connected devices arguably is the data they generate. When data is captured, analysed, and acted upon, operators can benefit. This applies to markets, industries and applications in which flow control plays a central role.

Increasingly, the data from intelligent electric actuators is valued because it allows for analytical service systems to review performance and allow for action before assets fail and to continue to support an asset’s performance throughout its life cycle. The existence of such predictive maintenance systems, based on data, is part of the phenomena of the Industrial Internet of Things (IIoT). Devices that connect and exchange data with other equipment are part of the IIoT. This includes intelligent flow control equipment. Information technology and operational technology combine to monitor, collect, exchange and analyse data.



Asset management systems can improve reliability and availability of flow control assets.

Ultimately, IIoT allows plants to have improved efficiency and reliability in their operations through the proliferation of data and data analysis that it enables. It is part of a digital revolution that is changing the landscape of industry, manufacturing and engineering operations. Proactive analysis of data to allow for informed maintenance decisions can mean significant savings in downtime and cost.

Valuable insights

Intelligent electric actuators are flow control assets that are valuable because of their reliability, efficiency, ease of use and their ability to capture vital historical data. Rotork has included a datalogger within IQ actuators since 2000, making them ideal for use within asset maintenance systems that are part of the IIoT.

Intelligent electric actuators have many operational benefits, but what is key in this context is that they can capture historical performance data for input into an asset management programme such as Intelligent Asset Management from Rotork. Intelligent actuator technology provides a large amount of data, such as the number of valve operations, alarms, valve torque profiles and unauthorised operation attempts. In particular torque profiles provide valuable information on the condition of the valve, while sudden changes in average and peak temperature and vibration can indicate an upcoming problem. This information is used to understand the health of actuators/valves and their ability to operate successfully.

Understanding asset health

Rotork’s Intelligent Asset Management is a cloud-based system that works across multiple operating systems. Temperature, vibration and torque data is taken from an actuator’s data log and presented in easy-to-understand visuals, with summary views and colour coded maps. Complex information is translated into simple and accessible

reports. There is no need to manually review data. Operators are then fully informed and able to make proactive decisions.

This data-based decision-making process enables predictive maintenance that plays a crucial role in prioritising service requirements, increasing plant availability and helping to avoid costly unplanned downtime. Early identification of anomalies can save extensive and expensive repairs further down the line. Asset management systems of this kind provide customers with the information they require to understand the health of their flow control assets and act to increase uptime. For example, at a power station in India, 36 critical IQ actuators were monitored by Intelligent Asset Management. Monitoring for causes of drive bush degradation or failure was used to identify early signs of potential failure of valve stems.

Conclusion

The IIoT has enabled plant operators to embrace the power of data to increase site uptime. Flow control assets are key pieces of equipment across a variety of industries, markets and applications.

Information and data taken directly from these assets can be analysed by specialist systems to assist with appropriate maintenance actions to ensure optimum performance. Proactive maintenance driven by this data can directly match risk, show early failure prediction and allow for reduction in unplanned downtime that is costly and damaging.

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