Artesis – simplifying predictive maintenance for the water industry

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The water industry is increasingly turning to predictive maintenance as it addresses the challenge of improving asset performance. Artesis has successfully combined advanced technology with a cost-effective implementation to meet their current and future needs.

The nature of the challenge

There is an increasing pressure on water companies to maximise the performance of their physical assets, a critical factor in optimising shareholder value and customer service. The water industry regulator (Ofwat) reviews the prices that companies charge, and takes into account the benefits of the capital investments planned and improvements in operating efficiency. This approach has forced water companies to focus on asset effectiveness in order to find the right balance between replacing existing equipment and developing new maintenance strategies.

Adopting predictive maintenance

Predictive maintenance initiatives in the water industry have become more accepted and widespread with the increased use of Reliability Centered Maintenance (RCM). This provides an analytical framework for the selection of maintenance strategies based on the identification of failure modes, their effects, and their impact on the business. For each asset, the most appropriate strategy might be to run to failure, to maintain based on fixed time or operating intervals, or to predict future failures based on measurements.

Although run to failure is a common strategy, both in the water industry and elsewhere, it can lead to high costs resulting from loss of availability, secondary damage, and excessive spares inventory. Planned maintenance is recognised as more cost-effective than run to failure for a wide range of equipment but often results in unnecessary maintenance interventions that can themselves introduce problems.

Predictive maintenance has become the preferred technique for critical assets in many industries, not only because it brings significant cost benefit advantages but also because it improves the level of control that engineers can exert over the future performance of their assets.

Predictive maintenance solutions

Predictive maintenance typically relies on the implementation of a condition monitoring system, used to collect and analyse the measurements that allow the diagnosis and assessment of potential failures. For machinery, vibration-based systems have successfully been used for large, critical assets but have often proved expensive and difficult to interpret when applied to wider populations of equipment. Specialist techniques like oil analysis, motor current signature analysis, and infra-red thermography have proved excellent for detailed fault analysis once a potential failure has been identified in specific types of equipment, although they are each limited by the range of faults that can be detected.

Artesis MCM technology

The recently-introduced Artesis predictive maintenance system aims to provide all the benefits of traditional condition monitoring systems at a fraction of the complication and cost. Artesis MCM (motor condition monitor) uses an intelligent, model-based approach to provide complete monitoring and diagnostic capabilities for most electric motor driven equipment.

Each small monitoring unit covers a complete motor and the equipment driven by it, and is typically installed in the motor control cabinet. Since connections are required only to the motor supply cables, installation costs are low with no need to access the driven equipment for any sensor installation. Once installed, the system trains itself to recognise normal performance, following which it continuously monitors the equipment for possible faults. When such a fault is detected, the system provides a diagnosis of one of a wide range of mechanical and electrical problems, and indicates severity so that the user can make decisions on the most appropriate intervention.

Artesis MCM has proved very attractive to water companies, and has also been successfully implemented in a very wide range of other industries. Because it is simple to install and requires little user intervention in operation, it combines low start-up costs with the significant benefits of predictive maintenance. Since it doesn't require any sensor installation on the equipment itself, Artesis MCM is a particularly good solution for inaccessible equipment like submersible and borehole pumps.

Water industry solutions

In a typical water industry application, Artesis MCM has been used to monitor a wide range of equipment providing water services to a major city. The water company, faced with the need to provide water to ever-higher standards and to become more cost-effective while coping with rapidly-increasing demand, embarked on a set of initiatives to move from breakdown to predictive maintenance. As they had little existing diagnostic expertise, they needed a system that would do most of the routine analysis for them. And because much of their equipment was located in remote sites spread out over a wide area, access problems meant that they required a permanently-installed system.

In the first year of operation, the system allowed the company to reduce maintenance costs by around 10% through avoidance of breakdowns and spare parts reductions. After three years, no unpredicted breakdowns had occurred on equipment covered by the system. These successes have led to extensive development of the retrofit program and to the inclusion of Artesis MCM units as a standard element in all new build specifications.

Trials and operational implementations of Artesis MCM are now taking place in many water companies in the UK and around the world. ✸

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