

Wessex Water Invests in Predictive Maintenance Solution

In these testing financial times and with Ofwat's continued focus on water companies to reduce operating costs, efficient and reliable asset management is crucial to the successful and continuous running of water plants throughout the UK. A careful balance between replacing existing equipment and developing new maintenance strategies is required to ensure consistent and reliable operating efficiency of all assets in a plant.

A 'run to failure' maintenance strategy is still widely found in the water industry but it often results in high costs when machinery is down for repair and can result in secondary damage and an excessive spares inventory. 'Fixed-schedule PM' (Planned or Preventive Maintenance) is another approach but also has major drawbacks as it frequently results in unnecessary maintenance interventions that incur unnecessary cost. It can also introduce unintended problems owing to re-assembly errors that can lead onto more serious problems. For water plants requiring a more cost effective and reliable program, predictive maintenance, which has long been recognised in theory as the best strategy, is now fast becoming the practice of choice for the maintenance of critical assets. Predictive maintenance avoids un-necessary work, avoids un-necessary downtime and cost, and also improves the level of control that engineers are able to exert over the future performance of their assets - a significant business benefit when setting budgets and forward planning.

Wessex Water, serving an area of the South West of England that covers 10,000 square kilometres and supplying 1.25 million people with around 353 million litres of water a day, is investing in new maintenance technology to ensure the company's plants continue to run at optimised levels with equipment that is running effectively. As part of Wessex Water's investment, the Artesis MCM (Motor Condition Monitor) was piloted over a period of 18 months in order to demonstrate its capabilities, particularly in the prediction of borehole pump failures. The easy to use MCM unit is installed in the motor control cabinet at the plant and only requires connection to the motor supply cables to continuously monitor the whole pump assembly, resulting in a low start up cost and no requirement to access the driven equipment for any sensor installation. On completion of training, the Artesis MCM system provides a report highlighting any pre-existing faults in the machinery. It then monitors for any deterioration and automatically recognises and alerts the user to a range of electrical and mechanical faults. Using GPRS technology, the team at Artesis are able to remotely connect to the MCM unit installed onsite and monitor the equipment to provide up to the minute, accurate asset diagnosis, 24 hours a day.

During the pilot with Wessex Water, Artesis installed MCM units into the motor control cabinets of 6 pumps including 2 borehole pumps at a pumping station near Yeovil. The condition monitoring of borehole pumps is especially challenging due to their location underground and the range of different potential failure modes, which many monitoring techniques would struggle to detect. However, as the MCM solution is installed in the motor starter panel and monitors both the electrical and mechanical parameters of the pump, it is ideal for inaccessible applications such as submersibles and borehole pumps.

Dave Durkin, head of operational services at Wessex Water said, "As a company we actively explore the latest technology in all sectors of our business particularly those that have the potential to improve customer service, reduce our process risks and save money."

Following the installation in early 2008, Artesis monitored the pumps remotely and provided Wessex

Water with detailed diagnoses on the performance of their pumps. Immediately following installation, the initial condition assessment reports identified a number of pre-existing problems with the pumps. The progressive deterioration of these initial faults was then monitored until the point at which corrective action could be taken.

Wessex Water's main interest in the pilot was in the monitoring of borehole pumps and it was in this area that Artesis proved their ability to accurately diagnose a variety of problems and pinpoint the exact time to carry out maintenance work. Artesis warned Wessex Water on the condition of both borehole pumps in March 2009 and following this, their condition was closely monitored. In July Artesis advised that one of the borehole pumps should be replaced due to an impeller related problem. To evaluate the predictive maintenance solution and demonstrate the accuracy of the MCM system the pump was left and failure occurred within a couple of days of Artesis' predicted date. This highly accurate diagnostic performance provided Wessex Water with a failure date within a few days that represents the potential for saving tens of thousands of pounds.

"The accuracy and reliability of this predictive maintenance solution proved remarkable. For a relatively low cost we will be able to install this equipment into our critical assets and save ourselves a considerable amount of money on maintenance and repairs. The technology will allow us to optimise our maintenance interventions, freeing up resources to carry out work in other areas," said Dave Durkin. "We are currently looking into investing in more MCM units for installation in our plants across the Wessex Water area."

"We are obviously delighted with the performance of our MCM solution in this joint evaluation with Wessex Water," said Geoff Walker, director at Artesis. "We always had the confidence that predictive maintenance would provide the water industry with the perfect strategy for the upkeep of critical assets and this demonstrates MCM's unrivalled ability to accurately and reliably diagnose problems and provide detailed maintenance information."

MCM - How it Works

Originally developed under a NASA contract, the [Artesis MCM](#) (Motor Condition Monitor) unit uses intelligent mathematical modelling to establish a norm for each item of equipment, after which it continuously monitors the machinery for potential faults. If a fault is detected the system provides a diagnosis of mechanical and electrical problems and indicates the severity of the fault. This saves time and significantly drives down maintenance costs by highlighting potential failures and providing diagnostics in advance to avoid secondary damage.