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Dublin Bay wastewater treatment works cuts pump maintenance time and costs

Maintenance costs and out of service hours of a critical pumping application at a Dublin Bay wastewater treatment works have been slashed by using a variable-speed drive's anti-ragging routine.

The Ringsend wastewater treatment works, operated by Celtic Anglian Water (CAW), features three 90 kW pumps used for transferring accumulated water from six storm tanks back to the plant for treatment. The 62,000 m^3 storage tanks are used during times of high rainfall to hold the storm flows and act as buffers within the plant.

The pumps were prone to ragging, caused by debris fouling the pump inlet and preventing the pump from operating normally. When this occurred, the pumps had to be removed, stripped down and cleaned, before being re-assembled and lowered back into their housing. At least one pump would need to be lifted every storm event, with all three sometimes needing attention simultaneously due to heavy ragging. The use of an overhead lifting beam, electric hoist and maintenance team, meant that the procedure was costly and time-consuming. The cleaning task is dirty and necessitates special attention to health and safety issues. Two fitters were needed for each lifting and cleaning operation, which could take a full day. This meant 16 hours labour costs, often at weekends, for each blocked pump.

An ABB industrial drive, ACQ810, features several intelligent functions, one of which is an anti-ragging technique. When the function is triggered, a cleaning cycle is initiated and operates in a number of user-defined cleaning cycles. The function enables the drive to automatically perform preventive maintenance on the pump. The ACQ810 cleaning trigger commands are very flexible and adaptable to each process.

Brendan Riley, CAW's Site Maintenance Engineer for the plant, asked ACS Drives and Control Systems, a member of the ABB Drives Alliance, to provide a solution to the problem. "We had worked with ACS on a small sludge transfer pump which also suffered frequent ragging. ACS installed a trial drive free of charge to prove the effectiveness of the ACQ810 which eliminated the problem. They then installed a 90 kW trial drive in a similar way and it delivered the same result"

During the month long trial period, no blockages were experienced and there was no reduction in flow. Following the trial, a permanent installation was provided for all three pumps, following which CAW have not had to lift the pumps once. This is a very significant result for the client.

Seamus Butler of ACS Drives says: "One of the major advantages of our solution is that the drive can take in a signal from an external flow meter mounted to measure the output from the pump. The standard way of detecting flow problems is to react if the pump is drawing a higher than normal current or torque as it tries to deal with the extra load. This method of detection is not always reliable and can be too late as the blockage has already reached a critical stage and cannot be undone easily. Equally the pump characteristic can be such that the load will actually drop, like deadheading, thus rendering this method unreliable. The ABB drive takes action before things get critical, instigating the cleaning cycle once the flow rate starts to drift away from the nominal rate. The ACQ810 has multiple cleaning triggers that can be programmed."

Adds Brendan Riley: “By preventing blockages in the storm return pumps, the ABB solution has improved the reliability of the whole storm return operation, cutting the labour required and reducing the risk of returning untreated water to the environment. Since installation in July 2012 we have not had to lift a pump for cleaning”.

The treatment works treats water for the Dublin area, serving the equivalent of 1.6 million people. Operated on behalf of Dublin City Council, it is one of the largest and most advanced water treatment works of its kind in Europe.

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Caption: Maintenance costs and out of service hours of a critical pumping application at a Dublin Bay wastewater treatment works have been cut by using variable-speed drive’s anti-ragging routine.

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For more information please contact:
Layla Hewitt
Marketing Communications
Phone: 01925 741517
Email: layla.hewitt@gb.abb.com

ABB Ltd.
Daresbury Park
Daresbury
Warrington WA4 4BT

Emma Jenkinson
Armitage Communications
Phone 020 8667 2218
Email: emma.jenkinson@armitage-comms.co.uk