Case study
Wastewater Transport

Butterknowle Pumping Station

How rural sewage pumping systems got smart

Looking to invest in technology to improve asset resilience, increase operational efficiency, reduce electrical consumption, deliver seamless capability to accommodate for future increases in pumping demands and make the wastewater infrastructure network smarter, cleaner and safer, Northumbrian Water decided to trial the world's first wastewater pumping system with integrated intelligence – Xylem's Flygt Concertor.

Project

Northumbrian Water is one of ten regulated water and sewerage companies in England and Wales, supplying potable and raw water to 2.7 million people across 18,593 miles of sewer network in the North East. As a business, it is committed to becoming the national leader in water provision and actively seeks to adopt new innovations as part of its 'RUN2Innovation' forum.

For this reason, Northumbrian Water decided to investigate ways in which smart technology could be employed to better manage Butterknowle Green Sewage Pumping Station. The key aims were to improve efficiency of the sewage works, while reducing unexpected breakdowns, and in turn, minimising the number of site visits required by staff and disruption to the general public.

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Solution

Flygt Concertor was chosen, as it is a fully-integrated system with an ultra-high efficiency motor and impeller. Designed to work independently, its intelligent XPC functionality means it is capable of sensing the operating conditions of its environment and adapting its performance in real time to suit the present needs of the station. Thanks to the Adaptive N-hydraulics and anti-blockage protocols, the pump actively detects and prevents potential blockages by running the impeller back and forth repeatedly under controlled conditions until debris is cleared. This reduces downtime and operator callouts, as the Flygt Concertor will carry out the anti-blockage task up to 22 times before alerting an engineer.

Comprehensive data from the Concertor XPC provides the water company with real time performance data including hours run, number of starts, kW consumed, current power, number of anti-clogging cycles, number of sump cleaning cycles and importantly the asset detail and serial number.

Above: Blockage materials entering the pump.

END USER: Northumbrian Water

COMPLETION: 2017

XYLEM'S ROLE: Pumping system installation and service provider

XYLEM SCOPE:
Design and install a reliable fully functioning pumping station for sewage.

Xylem installed a Flygt Concertor a wastewater pumping system with integrated intelligence after investigation into which smart technology could be employed to better manage the sewage station.

Above: Clean wet well at Butterknowle Green Sewage Pumping Station.

This provides Northumbrian Water with the facility to remotely track any changes of pump automatically, monitor the health of the station through the telemetry network and make smart decisions on service/operational needs.

Chris Harvey, market development manager at Xylem UK, comments: "Xylem has a long-standing relationship with Northumbrian Water and are always impressed by their openness to innovation. So we were delighted when they agreed to trial our new Flygt Concertor.

"We installed the Flygt Concertor in May 2017 for a six month trial and from then, until November, it ran the station alone, with one of the original pumps as a high level back-up only. Despite the pumping station being known for its high rag concentration, the site received no interventions or reactive visits during the trial."

Overall, Flygt Concertor conducted an average of 1.89 preventative anti-blockage cycles a day and ran sump and rising main cleaning programs at least once a day.

This reactive maintenance measure was crucial, as previously operations staff would physically lift the pump from the wet well and lay it on its side to clear blockages. Not only was this disruptive to the NWL teams planned work but also a potential cause of nuisance to the general public where the station is located.

Other benefits of the Flygt Concertor include its quick and easy installation and at Butterknowle Green no alterations to the wet well or guide rail systems were required.

Kenn Ayre, Mechanical Team Leader for Northumbrian Water central region also commented: "When we started the trial, we were targeting electricity savings of around £120 per month - however, in reality, we achieved almost 30% greater power savings than expected - over £2000 a year.

"These results speak for themselves. Smart technology definitely has a place within modern infrastructure, and it's something we're looking forward to investigating further throughout 2018."

Commenting on the success of the trial, James Potter, Maintenance Manager for the

"Smart technology definitely has a place within modern infrastructure, and it's something we're looking forward to investigating further throughout 2018."

Northumbrian Water central region concluded "We were intrigued to see what Flygt Concertor could do. As a business we are challenged to improve our efficiencies, reducing costs, protecting the environment and minimising any impact we may have in disrupting our client – the public. This is why we needed to make such a significant step change in our wastewater pumping approach with the trial of the Flygt Concertor.

"Not only is it simple to install with very few components, it can also deliver lower capital cost due to the small footprint of the control system. It's proven ability to deliver trouble free pumping means my team can now focus on delivering the benefits of a planned preventative maintenance program across an ever expanding asset base."

Flygt Concertor, a wastewater pumping system with integrated intelligence.

Above and below: Good as new advanced N hydraulics after trials.

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