

The world's first wastewater pumping system with integrated intelligence solves chronic clogging problems and halves energy usage at Heathrow Airport

London's Heathrow Airport is one of Europe's busiest airports catering for more than 200,000 passengers each day with an average of 1,200 flights arriving and departing from the airport daily. Heathrow Airport Water Services Department has an extensive network of 120 pumping stations to manage and has been a Xylem customer for 25 years.

Heathrow Airport Water Services Department agreed to install and trial Xylem's new state-of-the-art Flygt wastewater pumping system in an effort to solve chronic clogging issues at one of the airport's wastewater pumping stations.

As well as delivering consistently clog-free pumping, Flygt Concertor, dramatically reduced energy consumption by 53% at the pumping station.

The Challenge

The central Area Sanitation Unit adjacent to Terminal 1 is a receiving station for aircraft toilet waste which contains a high level of non-biological solids including various plastic material, wipes, nappies and clothing. This stringy material can be difficult to pump since it can easily get caught on the impeller and partially block the pump - leading to increased energy consumption and in the worst case, a full blockage of the pump.

This challenging wastewater application led to regular clogging and the sump requiring significant operational activity to try to keep it clean.

"We would usually have to deal with two or three clogging issues during a three month period," said Ian Jolly, Systems Specialist for Water, Heathrow Airport Water Services Department. "We also used to see a shelf of fat and material deposits build up on the walls of the sump as well as floating debris. This presented a very tough challenge to our existing wastewater pumps which we frequently had to de-clog."

New integrated clog-free technology

Heathrow Airport required a solution that would solve the operational costs and environmental problems caused by:

- High levels of floating debris on the surface of the wet well
- Higher than normal percentages of rag/non-biological solids in the wastewater.

As a loyal customer, the Heathrow team trusted Xylem's expertise in solving these particularly challenging problems and agreed to trial Flygt Concertor, a new wastewater pumping system with integrated intelligence: "We have used a number of Flygt technologies over the years and have found the Flygt team to be very willing to listen to our needs, always eager to find a solution to our particular challenge," said Ian.

Customer: Heathrow Airport Water Services Department

Challenge: To deliver clog-free pumping of aircraft wastewater - some of the most challenging wastewater to pump

System: Flygt Concertor™, the world's first wastewater pumping system with integrated intelligence

Results: Clog-free pumping with no emergency call outs | Energy consumption reduced by 53 percent | No extra investment in enlarged cabinets was required | Possibility to reduce inventory



Flygt Concertor™



One of Heathrow's aircraft wastewater vehicles, transporting sludge to the Central Area Sanitation unit.

As a world's first, Flygt's new wastewater pumping system combines built-in sump and pipe cleaning functionalities in a single integrated solution; capable of tackling sump floating debris as well as pipe sedimentation. Furthermore, the pump cleaning function together with Adaptive N-hydraulics effectively detects and solves clogging from large debris.

It is precisely the integration of "intelligent" functionalities and state-of-the-art technology that makes Flygt Concertor a unique wastewater pumping system; providing unparalleled results and long term positive benefits for many applications.

Since its installation at the Heathrow Central Area Sanitation Unit in November 2015, Concertor has provided absolute clog-free operation, as well as a remarkable improvement in the wet well environment. "Since installing Concertor we have had absolutely no clogging and the sump remains clean with no fat build-up," said Ian. "As well as peace of mind - which really is priceless - the cost savings are significant at approximately 87.5% of the annual costs in cleaning and servicing."

Energy reduced by over 50%

Clog-free operations and a clean wastewater pumping station are however, not the only ways that Flygt Concertor improves wastewater operations. The system aims to deliver proven reliability at the lowest total cost of ownership and to achieve this it also, among other benefits, drastically reduces energy consumption.

In the case of the once-troublesome Central Area Sanitation Unit pumping station, energy savings are up to 53%, which again, is a result of both sophisticated software and cutting-edge components.

The Energy Minimizer function, together with the patented Adaptive-N hydraulics and the IE4 efficiency motor, automatically ensure that all the pumps run at their most efficient duty point. Additionally, since there is no need for ventilation, cooling or heating of cabinets, customers benefit from substantial energy savings over the system's total lifecycle.

Compact design and more functionality

Flygt Concertor is proof that new and sophisticated technologies for wastewater pumping do not require more components or complexities. On the contrary, this groundbreaking new system is user friendly, simple to install, commission and operate.

"Concertor's compact design allowed it to fit into the existing position within the pump station, without any extra investment required to enlarge the cabinet. From an aesthetic and practical consideration the reduced panel requirement size will be of great benefit," said Ian. "It was simple to install and very user friendly. Actually, the trial pump was installed by one of the airport's water services mechanical technicians, who was not experienced in the commissioning of wastewater pumping systems and quickly gained confidence in the ease of installation and operation." he concluded.



Ian Jolly, System Specialist for Water Services at Heathrow Airport, pleased with Flygt Concertor's™ trial results.

"It is precisely the integration of 'intelligent' functionality using state-of-the-art technology that makes Flygt Concertor™ a unique wastewater pumping system"



Amble Marina Pumping Station

Standing the test of time with Flygt pumps

Day in, day out, Amble Marina is filled with people fishing, racing, cruising or sailing. For the owners at Amble Marina, this means they need to be confident in the reliability of their pumping station at all times and in all weathers.

Project

Located on the banks of the River Coquet in Northumberland, Amble Marina is a family-run business providing visitors with a range of marine-based activities, as well as 250 resident and visitor berths for yachts and boats, owned by those wishing to enjoy the beautiful countryside and sandy beaches of the North-East of England.

The marina office is open seven days a week throughout the year, and needs to ensure that its facilities are well maintained with large volumes of visitors, it is especially important that there is a reliable, fully functioning sewage pumping station.

The original pump within the pumping station was a Flygt 3085, which was installed by Xylem in 1986 alongside a comprehensive maintenance programme. The Flygt pump operated effectively for over 30 years, emphasising the reliability of pumps in its range, while also reinforcing why a regular maintenance programme was essential for pump longevity.

“Amble Marina decided to put its trust in Xylem’s expertise once more, investing in its latest technology, - the Flygt Concertor, a wastewater pumping system with integrated intelligence.”

Solution

After three decades of successful operation, Xylem’s service team spotted signs of fatigue during a routine maintenance check, and the decision was made to replace the pump. Having been impressed, not only with the quality and longevity of the Flygt technology, but also with Xylem’s maintenance and support over the years, Amble Marina decided to put its trust in Xylem’s expertise once more, investing in its latest technology - the Flygt Concertor, a wastewater pumping system with integrated intelligence.



END USER: Amble Marina

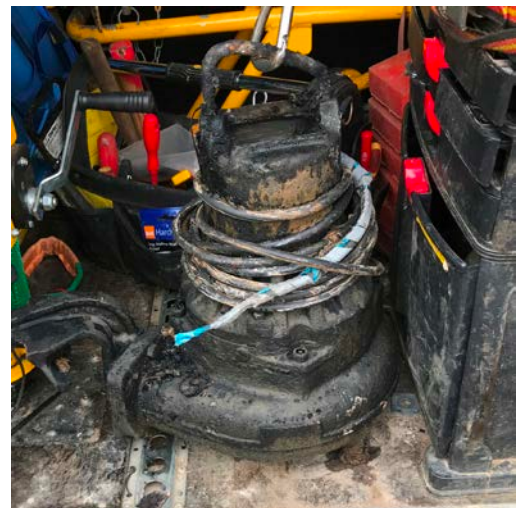
COMPLETION: 2017

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 3085 in 1986 operating effectively for over 30 years. Xylem’s service team spotted signs of fatigue in a routine maintenance check and replaced with the Flygt Concertor a wastewater pumping system with integrated intelligence.



Above and below: The original pump within the pumping station, a Flygt 3085, installed in 1986.

Grenville Graham, a Service Engineer at Xylem, commented: "Amble Marina is a busy leisure facility. This means the pumps are regularly faced with tackling a variety of mixed materials. Of course, this is to be expected when operating in this kind of public space. The key, therefore, is to ensure you have the technology in place that has been designed with these difficulties in mind. It is for this reason that the Flygt Concertor was the perfect choice for this installation."

With its built-in capabilities, the Flygt Concertor is capable of handling large amounts of material, adapting to different duty points and automatically adjusting its performance to cope with the changing conditions of the wastewater environment.

Amble Marina's busiest period often occurs at the weekends and across bank holidays, and it is at these times that the pump can be placed under pressure. Unexpected breakdowns can cause major disruption, but also result in additional expense for the business as the call out charges for engineers during these periods are often higher.

"Flygt Concertor will carry out the anti-blockage task up to 22 times before alerting an engineer."

The Flygt Concertor features ultra-high efficiency motor and impeller. Further, with Adaptive N-hydraulics, and anti-blockage protocols the pump can also actively detect and prevent potential blockages by running the impeller back and forth repeatedly under controlled conditions until the debris is shifted. 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.

Despite being technologically advanced, the Flygt Concertor is still simple to install. Tracy McIntyre, Service Coordinator at Xylem, says: "For a pumping station like Amble Marina, which is in frequent use, we needed a solution that could be quickly and easily fitted."

"With the Flygt Concertor, the process is simple. For starters, correct rotation is already ensured, meaning there is no need to physically check the rotation of the impeller, which is often both time consuming and tricky to do. It also has a compact footprint, which is ideal for stations with restrictive spaces to navigate."

Karl Brunton at Amble Marina Ltd concluded: "The Flygt Concertor was installed earlier this year, and we are already reaping the benefits of investing in this advanced technology solution."

"Xylem understands the needs of our business and keeps us confident in the knowledge that we can rely on our assets to perform. For this reason, our longstanding relationship has served us well time and time again, and we look forward to continuing to work with them in the future."



Flygt Concertor, a wastewater pumping system with integrated intelligence.



Amble Marina, located on River Coquet in Northumberland providing visitors with a range of marine-based activities.



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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.

"Flygt Concertor will carry out the anti-blockage task up to 22 times before alerting an engineer."

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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