

Xylem Modernizes Island Resort with Robust Wastewater Management

Singapore, an island city-state with over 5.6 million inhabitants¹ residing on a small land area of about 710 km², has a water demand of about 430 million gallons a day². In order to meet its water management needs, Singapore has to develop innovative solutions to collect, treat, and reuse sewage and rainwater from all across the nation, including Singapore's island resort, Sentosa.

Managed by Sentosa Development Corporation (SDC), Sentosa is home to an exciting array of themed attractions, lush rainforests, golden sandy beaches, luxury residences, and world-renowned golf courses. Collectively, this patch of paradise welcomed an impressive total of 19.1 million guests in 2017 and 2018³.

Running a myriad of developments on a 500-hectare island presents many challenges, such as ensuring a steady supply of water and electricity, as well as an efficient wastewater management system. With a high volume of visitors, the island resort depends on a complex system of pumping stations to help remove sewage on demand.

Building Resilience: Upgrading an Aging Pump System

Designed in the 90s, Sentosa's complex pumping system and its programmable logic controller (PLC) algorithm was no longer fully suited for its current application. SDC decided to conduct an in-depth study of all existing pumps and found that several pumps had to be overhauled. An upgrade to the entire system was necessary, so the SDC team set out to search for a more robust solution, including pumps that have had a proven track record.



END USER: Sentosa Development Corporation

XYLEM SCOPE:

Xylem installed and commissioned three water and wastewater solutions: Flygt MultiSmart® monitoring and control system, Flygt N-pumps and MJK Shuttle® Ultrasonic Level transmitters.

When combined, the three solutions helped to reduce floating scum, minimize odor and prevent clogging across 11 pumping stations on the island.



¹ Department of Statistics Singapore, [Population and Population Structure](#)

² Public Utilities Board, [Singapore Water Story](#)

³ Sentosa Development Corporation, [Annual Report 2017/18](#)

Steven Kong, Senior Project Engineer, SDC, shared, "Other than confirming that our old pumps could no longer fulfil our sewage disposal needs, the study also helped us realize that a monitoring system capable of generating incident reports would allow us to identify specific reasons for the pump breakdowns."

The absence of a monitoring controller in the pumping system proved to be crippling to the pumping stations, as damaged pumps would go undiscovered. When they were finally identified, it was often too late. The broken pumps were mostly beyond repair and needed to be replaced completely.

New Pumps, Transmitters and Monitoring Systems for Sentosa

"With the logged events data, we had the information we needed to rectify the problem in a timely manner."

Following some thorough review and considerations, SDC decided to install three of Xylem's solutions - Flygt N-pumps, MJK Shuttle® Ultrasonic Level transmitters, and Flygt MultiSmart® monitoring and control system. By pairing Flygt N-pumps with a fuss-free level transmitter and an intelligent pump station manager, Xylem had recommended a complete system that addressed the island resort's needs and eliminated previously faced challenges.

Suitable for a broad range of wastewater applications, the N-pumps replaced the older pumps in 11 pumping stations across the southern region of Sentosa, with two units for dry well installation and nine units for wet well installation. Built with the patented N-technology comprising an innovative self-cleaning impeller, Flygt N-pumps helped lower SDC's energy bills and reduce unplanned maintenance costs.

When asked about the new pumps, Kong commented, "The 11 pumping stations serve major tourist attractions, golf clubs and hotels. The new pumps are still running with no clogging issues! We used to call-out vacuum trucks for scum removal once a month, but we haven't needed that service since the installation of the Flygt N-pumps."



Flygt N-pumps:

- Patented N-technology with self-cleaning impellers
- Multi-vane designs for the highest wastewater efficiency
- Self-cleaning pumps with sustained high efficiency
- Fewer unplanned service calls



MJK Shuttle® Ultrasonic Level transmitters:

- Sensors with 3°, 6° and 7° ultrasonic sound beam angle
- Simple, logical operation to 25 m measuring range
- Automatic start-up and learning function

However, SDC still required a monitoring controller to pull the system together. With Xylem's recommendation, the SDC team decided to install a scalable system with advanced remote monitoring capabilities for regular checks on the health of the system, providing adequate reaction time before any detrimental issues might surface.

Kong explained, "We used to struggle with the old pumping stations' PLC program, whereas the MultiSmart® handles all basic and advanced functionalities on its own. Furthermore, the controller's history log was crucial in helping us identify the root cause of a flash flood that happened in one of the pumping stations a while back. With the logged in-depth events data, we had the information we needed to rectify the problem in a timely manner."

The controller also boasts auto-reset capabilities for non-critical alarms, enhanced motor protection, and SMS messaging alerts. Kong added, "The SMS messaging alert system is, by far, our team's favorite feature. Problems with pumping stations can occur at any time of the day, and we don't have personnel stationed near each station all the time. With the SMS messaging alerts, if a problem occurs, we'll immediately receive a specific alarm notification, and can then address that problem promptly."

Koh Chong Hin, Managing Director, Xylem Southeast Asia commented, "Selecting the perfect technology for each application is crucial for achieving better water management. We're glad that our solutions met Sentosa's needs, and they haven't experienced any major breakdowns since then. Most importantly, our solutions ensure Sentosa a smooth, reliable and low maintenance operation for many years to come."



Flygt MultiSmart Pump Station Controller®:

- Simplified waste and sewage water management that helps achieve energy savings
- Patented set-point profiles for optimizing your pump station
- Fully-open communications
- Offers support for DNP3, Modbus or Aquacom protocols
- Has its own local SCADA platform, which can log up to 50,000 events, and is able to interface with any SCADA system
- Boasts built-in features such as pump reversal, automatic resetting of tripped pumps, alarm signals to prompt timely maintenance, real power consumption logging and insulation resistance testing
- Predictive maintenance – reduced call-outs and site visits

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