

ABB drives boost efficiency of sewage pumping station



Upgrade eliminates odor problems

EMAYA SA, the water supply and waste utility for the Spanish city of Palma de Mallorca, recently launched a project to upgrade its wastewater pumping stations. The city, which is located on the holiday island of Mallorca, has 380 000 inhabitants.

Palma's sewage system consists of a chain of tanks, with wastewater being rapidly transferred from one tank to the next and finally to a treatment plant. At the first pumping station to be upgraded, the wastewater was previously stored in a tower. This has now been replaced with a 15 000 liter underground holding tank. Four 60 kW submersible pumps have been installed at the station. Each pump is operated by an ABB industrial drive running intelligent pump control (IPC) software.

"This pumping station was old, and there were also odor problems. Simply put, the local environment needed improving," says Lorenzo Mestre, industrial engineer at EMAYA.

The four drives and pumps provide an unprecedented level of fail-safety. Even at peak

times only two pumps are required to empty the tank, and one pump can cope during lighter loads. Two pumps are always ready to start up if necessary. Thus, if a pump should fail, another one immediately takes over. The pumping station is also equipped with a diesel generator to ensure a continuous supply of energy in case of a power outage.

Intelligent pump control saves energy

IPC software can significantly improve the energy efficiency of a pumping system. Compared to conventional methods of controlling sewage pumps, IPC can deliver significant energy savings.

IPC also includes a number of other features especially designed for pumping systems. The pump priority control function balances the operating time of all the pumps over the long term. As all four pumps are run, two at a time, maintenance can be scheduled so that all the pumps can be serviced at the same time.

The software's anti-jam function enables the drive to perform preventive maintenance on

the pump. When the function is triggered, the pump is run at a high speed and either reversed or stopped in a number of user-defined cleaning cycles. This helps to prevent congestion through the build-up of particles, and therefore helps to further reduce pump maintenance needs. IPC also enables the drive to monitor the motor temperature more closely than standard systems, further enhancing the overall system reliability.

The optical communication link between the drives is implemented in a star connection by means of an optical distributor, which provides additional redundancy over a ring configuration. The ability of the system to withstand disturbances was demonstrated in an unexpected way during commissioning. The power supply to the optical distributor was temporarily switched off by accident, but the pumps themselves were unaffected and continued operating as stand-alone units.

Straightforward system

One of the advantages of using ABB industrial drives in a pumping system of this kind is that the overall system is very straightforward. The system consists only of the drives and pumps, with no need for a dedicated control unit with the extra wiring and complexity that involves.

“We worked together with Cobelsa SA, a panel builder, to deliver an easy-to-use solution to EMAYA. Cobelsa designed the system layout and took care of the installation, and it offers engineering support to the customer. ABB provided assistance during the implementation stage,” says Ramon Granados, ABB Product Manager.

The city authorities are planning to upgrade other pumping stations in adjacent areas in order to further enhance the reliability of the system.



Solved problem

- Above-ground wastewater storage and old pumping station required modernization.
- Need to eliminate odors.

Solution

- Underground storage tank with four submersible pumps.
- Pumps operated by ABB industrial drives with intelligent pump control (IPC).

Benefits

- Four pumps provide unprecedented level of fail-safety, as two can handle maximum load.
- Anti-jam feature performs preventive maintenance on pumps. No restriction to flow in the pipeline, so less risk of clogging and blockages.
- IPC boosts energy efficiency.
- Need for PLC, contactors and other external equipment eliminated, making system more straightforward.
- Industrial drives are designed for reliable operation even in harsh conditions.

