

Industry: **Water**

Products: **Modular PLC, e-F@ctory Solution, Inverter**

# Preventative condition monitoring in the sewage treatment plant

Stadtwerke Rotenburg a. d. Fulda's sewage treatment plant is designed for a load of 34,000 population equivalent (size class 4) and caters for around 20,000 people.

## The challenge: Improve efficiency of preventative maintenance

In one part of the waste water plant, three Archimedes pumps are connected to the secondary settlement basin at the sludge recirculation pumping station. They continuously take the biological sludge back into the aeration basins, where the micro-organisms break down dissolved and fine particulate organic pollutants.

In the space of about a year each of the three spiral pumps failed due to the design. At the time only mechanical damage could be found: because of bearing damage, the gear block was literally torn apart and had to be completely replaced – a costly and time consuming affair.

## The solution: A condition monitoring system

For solving the problem in the sludge recirculation pumping station, system integrator Willich Elektrotechnik GmbH and Mitsubishi Electric proposed a reference application to the Stadtwerke. A condition monitoring system consisting of a controller of the type MELSEC System Q and three FAG SmartChecks monitors the condition of the gears by vibration measurement. The system supplies early information on deviations from the normal value which could lead to possible damage to the machine.

An intelligent FAG SmartCheck vibration sensor was attached to each of the three drives, allowing their condition to be precisely monitored. If, for example, a gearwheel is defective, vibrations are caused which at first are not perceptible to humans. Over time, other gearwheels become wedged into one another. It is only some months later that noises occur, and the motor temperature rises within a few weeks. Total failure follows within a few days. Vibration changes are therefore the first sign that something is amiss.

## The result: Increased overall efficiency of the plant

The reference project in Rotenburg shows a case in which a gearbox failed completely within four months from the initial advance warning. The result proves how early the first warning points to something going wrong.



**“ The FAG SmartChecks measure the vibration of the gears and the MELSEC System Q compares the measured data with the normal value. If a deviation is detected, a specific error message is created – and promptly, so that the problem can quickly be targeted and corrected. This means that a time and cost intensive total breakdown can be avoided, with a positive effect on operational safety and overall operating costs. ”**

Antonio Genovese,  
waste water treatment plant manager,  
Stadtwerke Rotenburg a. d. Fulda waste water  
treatment plant

Preventative maintenance measures instituted at once counter a potential total breakdown later on.

Targeted correction of the faults can be carried out based on specific error messages, without the whole gear block having to be taken apart into its smallest components looking for the cause. The microprocessor integrated in the FAG SmartCheck stores all the values long term. They can be viewed retrospectively and evaluated via the installed web server. The controller can pass the data on to higher level systems directly or via remote control technology. Condition monitoring contributes to preventing unplanned downtimes and expensive consequential damage – and thus increases the overall efficiency of the plant.

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