

## Schaeffler Global Technology Solutions

### Wastewater engineering

Stadtwerke Rotenburg, Germany

### Preventative Condition Monitoring in a Wastewater Treatment Plant

The sewage treatment plant in Rotenburg an der Fulda has treatment capacity for 34 000 residents (size class 4) and supplies approximately 20 000 people. At the secondary sedimentation tank, three Archimedes pumps are connected to the return activated sludge pumping station. These pumps ensure that the biological sludge is consistently fed back into the aeration tanks where micro-organisms break down loose and finely dissipated organic pollutants.

#### Challenge for Schaeffler

Within the space of one year, one of the three screw pumps failed due to a fault in its design. At that point in time, only one mechanical defect could be identified. Due to bearing damage, the gear block was literally torn apart and had to be entirely replaced – a costly and time-consuming process.

#### Schaeffler Solution

A condition monitoring system comprising a MELSEC System Q control unit from Mitsubishi Electric and three FAG SmartCheck was used to help solve the problem in the return activated sludge pumping station. An FAG SmartCheck was attached to each of the three drives for this purpose. Thanks to this system, the condition of the drive has been subject to constant monitoring ever since. In the event of a change in vibrations, the system provides data about the deviations at an early stage. Such deviations can be the initial signs of potential damage.



#### Technical Information about the Plant

Sewage treatment plant

Treatment capacity:

Max. 34 000 residents

Sewage pipe network:

160 km

Inflow:

- Average 70 – 80 l/s
- Maximum 280 l/s





Return activated sludge pumping station



FAG SmartCheck measures gear vibrations



Switch cabinet : MELSEC System Q and eWon Router

## Customer Benefit

The project in Rotenburg is a case in which a gearbox failed completely, four months after the first prealarm. The result proves just how early the first alarm calls attention to a deviation. If maintenance measures are introduced immediately, potential subsequent total failures can be avoided. With the help of specific fault messages, errors can be rectified in a targeted manner without having to dismantle the entire gear block into individual parts to search for the cause. The scalable real-time condition monitoring system thus provides high system availability and contributes towards ensuring trouble-free, continuous operation. The overall equipment efficiency and energy efficiency are very closely linked here, as forward-looking maintenance not only reduces lifecycle costs but also plays a role in reducing energy consumption thanks to its ability to detect early signs of wear.

## What's special

The microprocessor integrated into the FAG SmartCheck ensures that all data are stored long-term. The data can be retrospectively examined and evaluated using the integrated web server. The control system can pass the data on to higher-level systems either directly or using telecontrol technology.

The solution can be implemented in all applications in which wear occurs due to mechanical, rotating components, or where changes occur as a result of external influences. In addition to wastewater, thick matter, fluid, vacuum, or heat pumps, other tools can also prove useful, such as fans, ventilation units, compressors, CNC machines, and centrifuges.

### Technical Information about the Solution

#### Monitoring system:

1 FAG SmartCheck per pump gear

#### Monitored components:

- Gear teeth
- Various rolling bearings
- Shaft

#### Signal transmission and control system:

- Mitsubishi Electric MELSEC System Q
- eWon router type 4005CD

#### Status display:

- Via WLAN
- Access point on mobile terminal devices can reach the control station, 300 m

#### Monitored operating parameters:

- Temperature
- Speed

#### Further options:

- Several years of history data can be stored
- Information passed on via control system at control station
- Remote monitoring