



APPLICATION NOTE

Water & Wastewater

Measuring the sludge blanket level in a wastewater treatment plant

- Pumping sludge from primary sedimentation tanks
- Direct, optical monitoring of sludge blanket level in 8 primary sedimentation tanks
- Minimisation of pumping of water to digesters

1. Background

A major Australian wastewater treatment plant treats sewage using the following main processes: Grit removal, fine screening, primary sedimentation and finally sludge digestion. The plant is situated almost 40 m / 131 ft underground in large caverns excavated out of solid rock. Effluent is pumped 2.2 km / 1.38 mi out to sea. The raw sludge and scum from the sedimentation process are pumped up to four large steel tanks where they undergo anaerobic digestion. The digested sludge is then converted to sludge cake in centrifuges for biosolid production.

2. Measurement requirements

Monitoring of the sludge content is key to optimising the digestion process. The customer was searching for an alternative control process to the time based method or ultrasonic technology.

3. KROHNE solution

An OPTISYS SLM 2100 sludge level measuring system was mounted on each of the hoppers of 8 primary sedimentation tanks. The sludge level monitor makes it possible to directly measure the concentration of the suspended solids content.

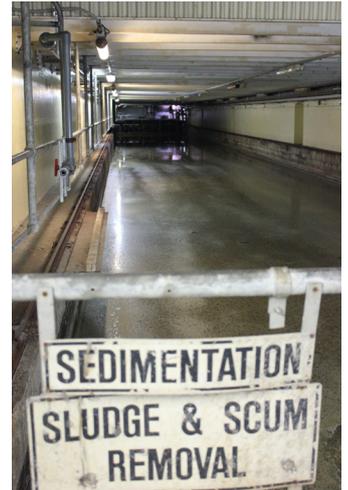
In the process there is scum that is present on the surface. This scum can cause false positive as the sensor moves through this top layer. For this reason the OPTISYS SLM 2100 features a blind zone where by the optical sensor does not begin measuring until it has moved through this pre-determined scum layer.

Based on the light absorption method, the system can accurately measure the suspended solids content in the sedimentation tank regardless of the colour of the sludge. Measurements are transferred to the control room in the treatment plant via 4...20 mA signal. The solid and height measurements (in %) are used to calculate the volume of sludge. Along with the volume a maximum pumping time will be calculated.

The system incorporates a water flush cleaning system which is triggered after each sensor retraction. The cleaning system allows the system to monitor over lengthy periods without maintenance.



OPTISYS SLM 2100 mounted on a hopper of a primary sedimentation tank



Primary sedimentation tank

4. Customer benefits

The OPTISYS SLM 2100 permanently monitors the sludge level allowing the operator to maximise digester solids. The pumps, one of the greatest cost factors for the operator, are now only activated when they are really needed, constantly saving the customer on energy costs.

Manual monitoring of sludge level is eliminated for the customer. The KROHNE system is significantly more reliable and accurate than the previously carried out manual and ultrasonic measurements. Compared to ultrasonic technology, the analytical measurement technology of the OPTISYS SLM 2100 is considerably less susceptible to faulty measurements. The typical weaknesses of ultrasonic technology are not an issue with the OPTISYS SLM 2100.

5. Product used

OPTISYS SLM 2100

- Optical measuring system for the measurement of sedimentation profiles, sludge blankets and fluff level
- Continuous level measurement of sludge blanket (zone tracking)
- Accurate and colour-independent measurement at a depth of up to 10 m / 33 ft
- Built-in cleaning unit for wastewater
- Built-in heater and ventilation for temperature regulation



Contact

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