24/7 event detection and fully automated process optimization

Municipal Wastewater Treatment

A municipal wastewater treatment plant in Portugal is using s::can equipment to install a 24/7 online monitoring system. Automatic event detection based on pattern and spectral alarms at the influent and effluent protects the plant from illegal chemical discharges. At the same time, the measurement data is used to monitor, control, and optimize the treatment process and energy consumption using CTGA's innovative platform called SYNAPPS.

Centro Tecnológico de Gestão Ambiental, Lda.

Parameter:

- **Pattern Alarm**
- **Spectral Alarm**
- **COD / BOD**
- **TSS / Turbidity**
- **Conductivity**
- **NH_4-N**
- **NO_3-N**
- **K**
- **ORP**
- **pH**

Facts & Figures

Customer:
Centro Tecnológico de Gestão Ambiental, Lda.

Location:
Portugal

Application:
Wastewater

Key Products:
spectro::lyser, ammo::lyser, con::cube, moni::tool, vali::tool and ana::tool

Background

With growing environmental awareness, compliance requirements for treated wastewater discharges have become progressively more demanding. Thus, there is a need for automated control of all these processes and for them to be developed in the most efficient way possible by analyzing the different externalities that influence the operational, environmental, and energy performance of a wastewater treatment plant (WWTP).

Challenge

For a municipal WWTP in Portugal, CTGA was commissioned to establish a 24/7 online monitoring system to protect the plant from illegal chemical discharges, while also using the measurement data to fully automate and optimize the complete treatment process and save engergy.

Solution

s::can sensors were installed at multiple locations of the WWTP by CTGA. This made it possible to monitor the complete treatment process from influent to effluent. Three con::cube terminals collect the data from the over 20 probes for more than 70 parameters. The con::cubes are managing the raw wastewater influent, primary settlement, biological treatment, secondary settlement and treated effluent.

All con::cubes automatically trigger the collection of water samples in case a contamination or an event is detected. An electro valve is wired to the con::cube. When a contamination event is detected, the con::cube sends a signal to the valve to take a sample. Moreover, the collection of samples can be triggered remotely.

The measured data for all parameters is accessible remotely via VPN and displayed locally on the con::cubes.

Benefits

The automatic event detection based on pattern and spectral alarms protects the WWTP from illegal discharges. Pattern alarms are based on the combined signals of several sensors. If the measured pattern changes to a state outside the acceptable range an alarm will be triggered. Pattern and spectral alarms take advantage of the huge range of information in spectral data.

By using the auto-sampler function of the con::cube there is no need for a separate auto-sampler device. The conditions for taking samples can be freely configured. In the case of an alarm, one or multiple valves open and take a sample. It is also possible to set up composite samples with interval control.

With the implementation of multi-parametric measurement chains and the application of computational intelligence techniques, CTGA's SYNAPPS platform is able to provide integrated management of the various wastewater treatment processes, ensuring high environmental, energy, and operational performance.

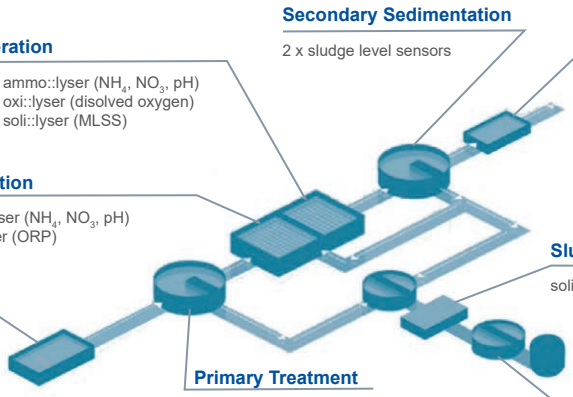
"We found the s::can instruments easy to work with. s::can's knowledge and experience in the area helped us to find the most cost-effective monitoring solution for our needs and the pre- and after-sales support has been great."

Dr. Hugo China, CEO
Centro Tecnológico de Gestão Ambiental, Lda.

Eng.ª Joana Dias, Wastewater Operations Manager
Centro Tecnológico de Gestão Ambiental, Lda.

s::can
A Badger Meter® Brand

Process Schematics



Aeration
2 x ammo::lyser (NH_4, NO_3, pH)
2 x oxi::lyser (disolved oxygen)
2 x soli::lyser (MLSS)

Secondary Sedimentation
2 x sludge level sensors

Final effluent
spectro::lyser (TSS, Turbidity, COD, BOD)
ammo::lyser (NH_4, NO_3)
pH::lyser (pH)

Denitrification
2 x ammo::lyser (NH_4, NO_3, pH)
2 x redo::lyser (ORP)

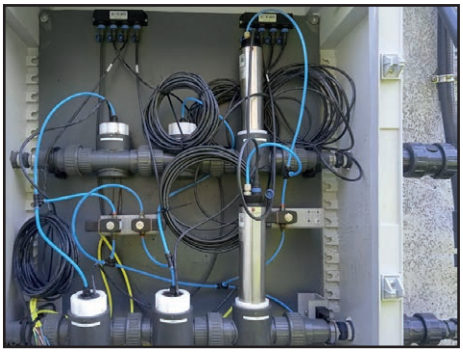
Sludge Treatment
soli::lyser (TSS)

Influent
spectro::lyser (TSS, Turbidity, COD, BOD)
ammo::lyser (NH_4, NO_3, pH)
redo::lyser (ORP)
condu::lyser (Conductivity)

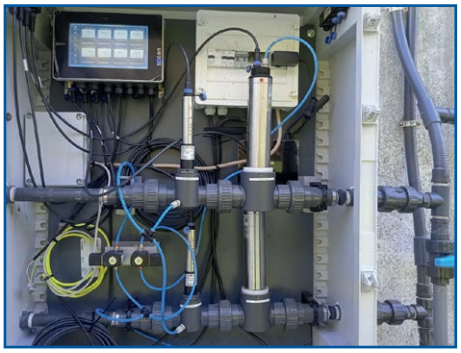
Primary Treatment
spectro::lyser (TSS, Turbidity, COD, BOD)
2 x sludge level sensors
soli::lyser (TSS)

Anaerobic digestion
pH::lyser (pH)

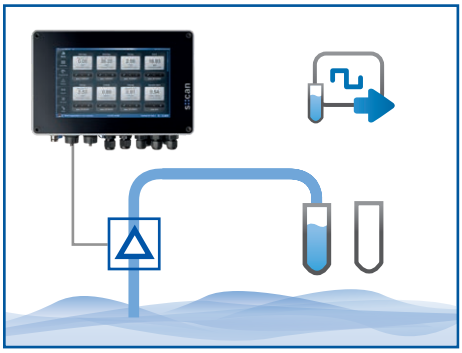
s::can's event detection system continuously analyzes the measured parameters and spectral fingerprint to detect changes in the water composition. Pattern and Spectral alarms can be used to detect deviations from the typical wastewater composition. ana::tool incorporates a simple to use learning system for its alarms that includes user feedback and gradual composition changes (e.g. seasonal variations).



The ammo::lyser is a multi-parameter probe for the online measurement of NH_4, NO_3 and pH. It is an absolutely reliable device outclassing conventional analysers in terms of measurement stability and lifetime. Precision is guaranteed by real-time compensation of the ammonium value with temperature, pH and potassium and a high-performance reference electrode.



All sensors were installed with automatic cleaning via compressed air. The cleaning is orchestrated by the con::cube terminals. Individual cleaning intervals can be set, depending on the application.



With the con::cube auto-sampler function you can create your own auto-sampler. The conditions for taking samples can be freely configured. It is also possible to combine different conditions and program delays. The sample capacity is controlled either by a fill-level detector or by a timer.

s::can GmbH
Brigittagasse 22-24
1200 Vienna, Austria

Phone: +43 / 1 / 219 73 93
Fax: +43 / 1 / 219 73 93-12

E-Mail: sales@s-can.at
Web: www.s-can.at