

# The right solution for optimising a purification plant's sludge line dewatering phase: The RTC-SD system

## Problem

Polyelectrolyte dosing in the sludge dewatering process is often performed manually or at a fixed rate, which can cause the sludge generated to be unstable. All of this leads to high management costs in terms of consumption of the polymers used and high disposal costs.

## Solution

The RTC-SD system developed by Hach® allows you to optimise the sludge dewatering process. You can control the process in real time and continuously adapt the polymer dosage according to the variable suspended solid content coming into the centrifuge.

## Benefits

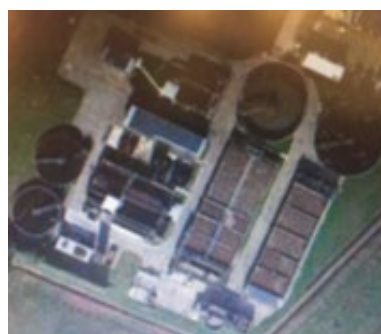
The system has made it possible to generate dewatered sludge with consistent and improved characteristics compared to when using manual dosages, and above all has drastically reduced the consumption of the polymers used.

## The Quarto d'Altino purification plant

PIAVE SERVIZI, trustee of the integrated urban water management of the Veneto Orientale (north-east area of Venice) A.T.O. (Ambito Territoriale Ottimale – the local water board), is a company that is wholly owned by 39 local authorities between the provinces of Venice and Treviso and is one of the most important managers of north-east Italy, with a catchment area of 320,000 population equivalent (PE) for a total of 43 wastewater treatment plants and 356 lifting systems. For several years, it has been committed to implementing technological innovations aimed at reducing management costs. The Quarto d'Altino purification plant is the second largest plant in terms of population equivalents managed as water lines (capacity equal to 50,000 PE) and is the highest performing of the whole company as a sludge line (30,000 PE).

### Sludge line: The initial situation

The plant's sludge line treats both sludge incoming from the water line (characterised by a high load in terms of biochemical oxygen demand [BOD] and made up of 76 % volatile compounds) and the septic sludge that passes directly into the sludge line when loaded into a biological reactor in order to not overload the water line. The sludge line is comprised of a dynamic thickener, a digester, a post-thickening phase and a dewatering section. The original belt press (3000 tonnes of sludge treated with 17 % dewatered sludge generated) was replaced in 2007 with a centrifuge (a Peralisi Jumbo 3 model). This model offers a much higher performance and works for six days a week, ten hours a day, and generates sludge with better characteristics (dryness percentage of dewatered sludge: minimum 24 %). The sludge produced is disposed of through the process of composting with a disposal cost of € 90/tonne. The sludge disposal cost makes up about 35 % of the total costs of plant



Quarto d'Altino purification plant

management. Before the RTC optimisation system was installed, the polyelectrolyte dosage in the centrifuge was carried out manually at a fixed value (1.5 m<sup>3</sup>/hr as an emulsion mixture) and with a fixed sludge flow to the centrifuge (10 m<sup>3</sup>/hr).

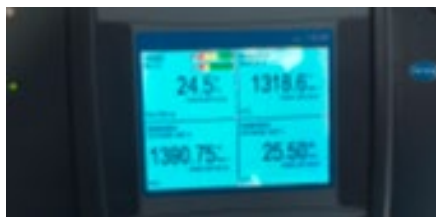
## The solution and its benefits for the customer.

### The RTC-SD optimisation system

The RTC-SD automatic adjustment system makes it possible to optimise the dewatering phase depending on the concentration of suspended solids. This type of adjustment is far more preferable to manual operation because it allows the polyelectrolyte dosage to be streamlined, the treatment capacity of the machine to be increased and the treatment process to be more effective overall. Adjustment is based on real-time measurements of the concentration of suspended solids flowing to the centrifuge by using the Solitax inline sc probe, which is fitted for insertion on the pipe. Alongside measuring the sludge flow rate to the centrifuge, this determines the optimal polyelectrolyte dosing set point.

## Application report: Quarto d'Altino wastewater treatment plant

All of the measurement and control parameters can be set on the display of the SC1000 multi-channel controller and transferred to the PLC/SCADA of the centrifugal machine with different methods of communication. The signal management unit features an internal diagnostics system that allows constant validation of the measurement signal and automatic transition to alternative control strategies in the event of a fault.



*System installation*

### Results achieved

The installation of the Solitax inline sc probe on the supply line of the centrifuge, and particularly the implementation of the RTC-SD system to improve machine adjustments, has created many advantages for the plant manager.

Real experience has made it possible to:

- Increase the machine's treatment capacity.
- Make the treatment process more efficient (more concentrated sludge).
- Increase operational stability by basing operations on real load rather than volume.
- Decrease the amount of sludge produced that must be disposed of (17 %).
- Make the process more stable.
- Save on flocculant dosage (polyelectrolyte consumption reduced by 32 %).
- Reduced disposal costs.

PERIOD BEFORE AND AFTER INSTALLATION OF THE RTC SYSTEM	SEPTIC SLUDGE TREATED (TONNE/MONTH)	SLUDGE DISPOSED OF (TONNE/MONTH)	POLYELECTROLYTE CONSUMP. (KG/MONTH)	DEWATERED SLUDGE (DRY MATTER %)
January - August 2015	388	255	2756	24
September 2015 - August 2016	350	218	2083	24.5
Delta Δ	-10.8 %	-17 %	-32.3 %	+2 %

SAVINGS	Monthly	€1330	€330
	Annual	€15,960	€3600
	TOTAL	€19,560	
INVESTMENT RECOVERY	Years	0.6 - 0.8	

*Comparison of management costs before and after installing RTC-SD*

### Conclusions

The installation of the Solitax process probe for measuring TSS (a sturdy, reliable and virtually maintenance-free probe) and the RTC-SD adjustment system has allowed the manager to significantly reduce running costs in terms of the savings made on flocculant (consumption reduced by 32 %) and disposal costs (dryness percentage of dewatered sludge improved by 2 %), which has led to overall cost savings of € 19,560, ensuring the investment could be recovered within approximately eight months.