Improving Sludge Dewatering Process Control with RTC-SD

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Problem

A WWTP sought solutions to improve process control, as high centrate solids caused plant inefficiencies such as high wasting rates, inefficient capacity and loading, and stress on centrifuges.

Solution

The RTC-SD solution controls polymer dosing in real time, allowing the WWTP to improve solids capture and increase throughput.

Benefits

RTC-SD improved solids capture by 38% and throughput by 27%, greatly increasing the WWTP's process control.

Background

At a 112.5 MGD wastewater treatment plant (WWTP) operating under a consent decree, one problem was spotted quickly: High-centrate solids were cycling through the plant. These solids caused an endless loop of stolen capacity from the biological system, causing higher wasting rates than necessary, and overloading the 25-year-old centrifuges. After the plant exhausted its polymer budget ahead of schedule and had to request an additional $250,000 for its budget, the plant supervisor searched for new methods and solutions to improve operations.

Before installing the Hach® Real-Time Control system for Sludge Dewatering (RTC-SD), the WWTP supervisor and his staff established a new standard operating procedure. Leaving three of four centrifuges online, each operating at 150% of capacity, the WWTP would leave the fourth centrifuge offline for maintenance. Further, the WWTP would reduce specific polymer dose from an overdose of 55 pounds per ton to a more reasonable 25 pounds per ton—a 60% reduction (see Figure 1). The centrifuges would operate in torque control mode with a setpoint of 18%. Soon after the new operating procedure was in place, the centrate began to clear up. But, the plant wasn't satisfied and sought more solutions to improve efficiency to further ensure compliance and operate more smoothly.

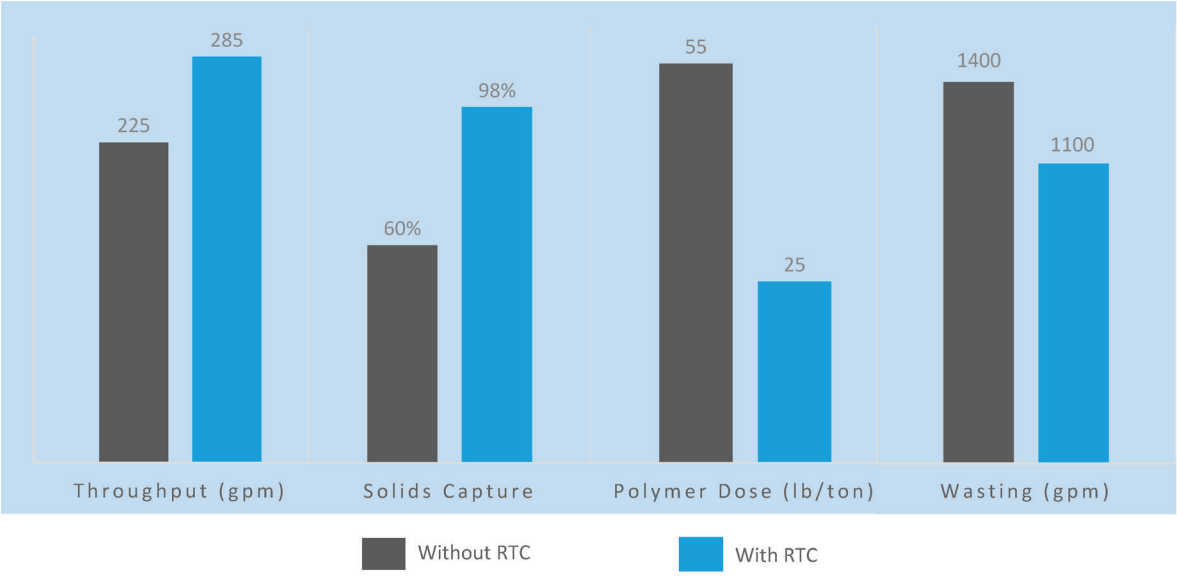

Figure 1: Sludge dewatering improvements

Solution and Improvements

The RTC-SD solution adjusts the polymer flow rate in real time in order to maintain a specific polymer dose. This is achieved by measuring feed sludge concentration with the Solitax™ suspended solid sensor and feed sludge flow rate with the existing flowmeter. The RTC-SD was installed on Centrifuge 3. Centrifuge 2 and Centrifuge 4 were operated with a static polymer flow rate, and the solids capture of each was measured for comparison.

As soon as the RTC-SD was running, the plant supervisor could see the centrate from Centrifuge 3 improve. As shown in Figure 1, by the end of the evaluation Centrifuge 3 had an average solids capture of 98%, whereas the other two centrifuges varied between 60-65%. As a result of the improved centrate quality and reduced recycle loading, the WWTP reduced secondary wasting rates from 1400 gpm to 1100 gpm (21% decrease), further decreasing the stress on the aging centrifuges.

Thanks to RTC-SD, the WWTP realized Centrifuge 3 could handle higher loading. Figure 1 highlights how the WWTP increased throughput from 225 to 285 gpm (90% over capacity) while maintaining 98% solids capture and 18% cake. This allows for two centrifuges to be taken offline for repairs—a luxury they were not able to perform before installing the RTC-SD system.

"My concerns are meeting permit; having a well-run plant, and giving my guys the right tools so they can do their job with minimal management," said the WWTP supervisor. "The Hach Real-Time Control system helps us maintain consistency and improve process control."

Solitax suspended solids sensor used to measure feed sludge to a centrifuge

Conclusion

The WWTP found Hach RTC-SD system so helpful that the plant immediately decided to add an RTC-SD to another centrifuge. Currently, there is a project in design to replace the centrifuges in four years, and the plant already decided that the new units will have real-time, solids-loading-based polymer control.

Increasing solids capture, increasing centrifuge throughput and decreasing waste while creating a consistent cake and maintaining compliance are major components of an efficient WWTP. This WWTP's process control improvements prove that with the right instrumentation, WWTPs can greatly improve operations and increase efficiency.

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