

HACH ONLINE SUSPENDED SOLIDS MEASUREMENT OPTIMIZES DAFT POLYMER DOSING

The King County South Treatment Plant in Renton, Washington, has found monitoring the solids loading to the dissolved air flotation thickener (DAFT) tanks yields the timely signal needed for effective control of polymer dosing during sludge thickening (THS). The trick, according to Curtis Steinke, Process Analyst at the Renton plant, was to find a suspended solids sensor that stands up to the task in such a harsh environment. He found his answer at work in another process at the same plant.

Sensor Meets the Challenge

Since the late 1980's, operators at the King County South Treatment Plant have been utilizing DAFT tank effluent turbidity measurements to control polymer dosing via an automated single-loop-cascade control system. While automated, this reactive strategy suffered a four-to-six hour delay between a dosing adjustment and follow-on underflow turbidity.

“The effect was delayed adjustment for a condition that existed hours earlier,” said Steinke. He explained how this reactive dosing strategy – based on whether the underflow turbidity was above or below the set-point – at times underdosed or over-dosed polymer with respectively increasing or decreasing solids loading.

In June, 2004, the staff decided to evaluate a more proactive approach to DAFT polymer dosing. Steinke learned that an associate had been using a SOLITAX™ sc Turbidity and Suspended Solids Sensor with sc100 Controller (Hach Company) to monitor mixed liquor suspended solids (MLSS) measurements at the plant's aeration basin, for purposes of automating sludge volume index (SVI) monitoring. The sensor had proven during its year-long deployment in the mixed liquor channel that its dual-beam infrared/scattered light photometric detection technology is immune to color interference and that its readings correlate well to laboratory analysis. A self-cleaning sensor wiper also proved valuable in reducing erroneous values and maintenance due to biological growth.



Curtis Steinke, Process Analyst, exhibits the Hach SOLITAX sc Turbidity and Suspended Solids Sensor he uses to monitor mixed sludge solids for purposes of automated thickening polymer dosing control

Steinke installed a unit of the SOLITAX sc Sensor and its sc100 Controller to monitor the mixed sludge (primary and activated sludge solids) in DAFT feed for about two months. He compared readings, ranging from 3,000 to 12,000 mg/L, to grab sample measurements and observed the sensor's resistance to fouling. This trial-by-fire convinced him this sensor was the answer for online, real-time monitoring of sludge mass loading to the DAFTs.

Controller Output Automates Control

He then linked the signal from the suspended solids sensor to the plant SCADA system using a full-scale 4-20 mA output from the sensor's sc100 Controller. With real-time mixed sludge flow rate, the SOLITAX sc Sensor value, and polymer flow and concentration, the SCADA system calculated and adjusted polymer flow rate to consistently meet the set-point of lbs. of active polymer to dry ton mixed sludge (lbs/DT).

Steinke noted that the sc100 Controller allows for adjusting the sensor measurement with an operator-entered factor that correlates sensor measurement to traditional gravimetric suspended solids determination. Operators have revised this factor, due to changes in overall water quality conditions, three times over the six months the sensor has been monitoring DAFT solids loading.

After just three weeks of successful automated dosing control, the King County South Treatment Plant converted additional DAFT tanks to the same dosing-control approach. "It's what we needed to eliminate the overand under-dosing conditions," acknowledged Steinke.

The Bottom Line

The bottom line reflects the value of reliable monitoring instrumentation: the South Treatment Plant now sees doses of 2.3 to 2.7 lbs/DT, compared to the turbidity-guided approach that yielded doses ranging from 3.0 to 4.0 lbs/DT. In just a few months, the new DAFT polymer dosing control strategy realized a 20% to 30% reduction in polymer consumption – the equivalent of an estimated \$30,000 to \$40,000 savings in chemical costs over a year.



The built-in wiper of the suspended solids sensor prevents measurement error due to fouling



The SOLITAX sc Turbidity and Suspended Solids Sensor attached with fixed-point mount is lowered into the mixed primary sludge feed box feeding the DAFT tanks. Online measurement of solids loading, coupled with flow rate, controls dosing of polymer to the DAFT process.

“We’re saving operating costs while we’re maintaining the thickened sludge concentration of 6.0% to 6.5% that keeps the overall solids treatment optimized – the thickening, digestion and dewatering processes,” Steinke concluded.

To find out more about this or any Hach product including current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area. In the United States, contact: HACH COMPANY World Headquarters; Telephone: 800-227-4224 (970-669-3050 outside the USA); E-mail: orders@hach.com (intl@hach.com outside the USA) On the web: www.hach.com

FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:

Tel: 800-227-4224 | E-Mail: techhelp@hach.com

To locate the HACH office or distributor serving you, visit: www.hach.com

LIT2145

© Hach Company, 2014. All rights reserved.

In the interest of improving and updating its equipment, Hach Company reserves the right to alter specifications to equipment at any time.

