

Sustainable SBR treatment: treatment efficiency, energy, carbon footprint

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Abstract: To meet the growing demand of improved sewage treatment efficiency, reduced operational cost and carbon footprint, an advanced process control algorithm was developed and implemented in a continuous feed SBR in both pilot- and full scale. Utilizing online sensors, the control method automatically adjusted the treatment conditions of the SBR to the varying load conditions. The advanced process controller improved nutrient removal compared to standard time-based cycle control, reaching effluent TP below 1 mg/L and TN down to 3 mg/l. With enhanced biological phosphorus removal, the chemical usage for phosphorus removal could be reduced more than 50% at the full scale site and completely removed in the pilot tests. In addition, by avoiding excessive aeration the control method reduced blower starts by up to 50% and reduced energy consumption between 15-21%, which all resulted in improving sustainability of existing SBRs.

Keywords: Advanced process control; Energy savings; Treatment capacity; SBR; Biological phosphorus removal; Nutrient removal