Stepwise Calibration of the Activated Sludge Model No. 1 at a Partially Denitrifying Large Wastewater Treatment Plant

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Abstract:

Activated sludge modeling technology is maturing; however, currently, there exists a great need to increase its use in daily engineering practice worldwide. A good way for building the capacities of the practitioners is to promote good modeling practices and standardize the protocols. In this study, a systematic procedure was proposed to calibrate the Activated Sludge Model No. 1 (ASM1) at a large wastewater treatment plant, by which the model adequately predicted the quality of the effluent and the sludge quantities. A hydraulics model was set up and validated through a tracer test. The Vesilind settling constants were measured and combined with the default value of the flocculent zone settling parameter, to calibrate the clarifiers. A virtual anoxic tank was installed in the return activated sludge to mimic the denitrification occurring in the settlers. In ASM1, the calibrated parameters were only two influent chemical oxygen demand fractions and one kinetic constant (oxygen half-saturation coefficient).

Keywords: ASM1; activated sludge model; calibration; denitrification; fractionation; nitrification; protocol; reactive clarifier

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