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USE OF ARTIFICIAL NEURAL NETWORK FOR PREDICTION OF COAGULATION/FLOCCULATION PROCESS BY PAC IN WATER TREATMENT PLANT

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Abstract

The paper presents the results of a study carried out using the Artificial Neural Network (ANN) for prediction the coagulation/flocculation process of suspended solids in water treatment plant (WTP). In this research 5 kinds of Poly Aluminum Chloride (PAC) as coagulant were used to examine the impact of coagulant kinds, PAC dosage and influent turbidity for removal of suspended solids. Determination of optimal coagulant doses is vital, as insufficient dosing will result in undesirable treated water quality. Traditionally, jar tests and operators' own experience are used to determine the optimum coagulant dosage. But this method is expensive and time-consuming and does not enable responses to changes in raw water quality in real time. Recently the ANN modeling has been increasingly applied in the area of environmental and water resources engineering. In this research, ANN was used to model coagulation/flocculation process by PAC in water treatment plant (WTP) number 3&4 in Tehran. The model was built based on 316 sets of process-controlled data. The performance of the models is found to be very good, with correlation (R^2) values ranging from 0.90 to 0.98 for the process models predicting treated water turbidity and effluent pH. Therefore the ANN simulation model was developed that enabled operators to obtain real-time PAC dosage more easily.

Key words: artificial neural networks, coagulation/flocculation, modeling, poly aluminum chloride

Received: September, 2010; Revised final: May, 2011; Accepted: June, 2011

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