Application of neuro-fuzzy PID controller for effective post-chlorination in water treatment plant

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ABSTRACT

The presented chlorine controller system has neglected the travel time for monitoring the amount of chlorine in water treatment plant (WTP). In the present study, an adaptive neuro-fuzzy inference system was used to predict the travel time and chlorine changes that take place at a clear well in a typical WTP. The artificial Neuro-Fuzzy Inference System combined with Proportional Integral Derivative (PID) controller system was applied to optimize the chlorine dosing rate and to minimize the chance of errors. The travel time and the dosing rate were automatically calculated and injected using the proposed model and the controller. The standard deviation of an output chlorine rate was 3.6 and 7 times less than those of an old controller system in real application and in simulation, respectively. It was found that the neuro-fuzzy PID controller made a significant contribution to supply hygienically safe drinking water by considering various conditions including the travel time than the existing methods.

Keywords: Neuro-fuzzy PID; Post-chlorination; Chlorine dosing rate; Water treatment plant

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