



## Artificial neural network modeling for predict performance of pressure filters in a water treatment plant

Hamid Reza Tashaouie<sup>a</sup>, Gagik Badalians Gholikandi<sup>b,\*</sup>, Hossein Hazrati<sup>c</sup>

<sup>a</sup>National Water and Wastewater Company (NWWC), Tehran, Iran

<sup>b</sup>Power and Water University of Technology (PWUT), Water Research Institute (WRI), Tehran, Iran

Tel. +9821-77000919; Fax: +9821-77000306; email: g.badalians@yahoo.com

<sup>c</sup>Sharif University, Tehran, Iran

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### ABSTRACT

Pressure filters are popular in small municipal water treatment plants. One of the principles for designing and using the various units of water treatment plants is the ability of assigning and predicting the performance of those units under different and various conditions that could be verified by making pilot scale tests and could be modeled by means of available programs and software such as artificial neural network. The goals of this study that was conducted to predict pressure filter efficiency are: (1) evaluations of pressure filter efficiency for turbidity removal under different conditions such as turbidity of raw water, filtration rate and filter pressure changes; (2) statistical analysis of results and determination of the minimum and maximum and maximum effluent turbidity from filter; (3) application of Artificial Neural Network as a suitable model of filter efficiency for turbidity removal; and (4) determination of considered model index for the prediction of similar filters efficiencies. For approaching those goals, pilot designation, sampling and analysis were done for 1,300 samples, and the maximum and the minimum effluent turbidity from filter were determined based on statistical analyses. Different structure of Artificial Neural Network were evaluated based on results, and the best structure was selected and its indexes was proposed for future studies; for example the best value for different network schemes like momentum coefficient and training rate were 0.5 and 0.2, respectively.

*Keywords:* Water treatment; Pressure filter; Performance prediction; Modeling; Artificial neural network (ANN); Turbidity removal

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\*Corresponding author.