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Verification of filter efficiency of horizontal roughing filter by Weglin's design criteria and Artificial Neural Network

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Abstract. The general objective of this study is to estimate the performance of the Horizontal Roughing Filter (HRF) by using Weglin's design criteria based on 1/3–2/3 filter theory. The main objective of the present study is to validate HRF developed in the laboratory with Slow Sand Filter (SSF) as a pretreatment unit with the help of Weglin's design criteria for HRF with respect to raw water condition and neuro-genetic model developed based on the filter dataset. The results achieved from the three different models were compared to find whether the performance of the experimental HRF with SSF output conforms to the other two models which will verify the validity of the former. According to the results, the experimental setup was coherent with the neural model but incoherent with the results from Weglin's formula as lowest mean square error was observed in case of the neuro-genetic model while comparing with the values found from the experimental SSF-HRF unit. As neural models are known to learn a problem with utmost efficiency, the model verification result was taken as positive.

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