UNIVERSITI TEKNOLOGI MARA

EFFECT OF VIBRATION ON HYDRAULIC CONDUCTIVITY OF RIVERBANK FILTRATION SITE

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ABSTRACT

Riverbank filtration (RBF) is a process where the river water is induced to flow through the riverbed soil to pumping wells located at the banks. This system has shown in recent years to be very effective at controlling plenty of contaminants, microorganisms, and also reducing concentrations of total and dissolved organic carbon. However, due to long and continuous pumping, the efficiency might decrease because of soil clogging. This decreased can be quantified and reflected as the change of hydraulic conductivity (*K*) values at the pumping site. This study aims to assess the variability of soil hydraulic conductivity at groundwater pumping site and also to study the effectiveness of vibration method to improve the hydraulic conductivity. The study was carried out by measuring the *K* values using slug test method at three pumping wells, namely MW01, MW02 and MW03 with several durations of vibration ranging from 30 minutes to 240 minutes. The result shows that average values of hydraulic conductivity of the soil were found to have increased for all wells. The trend of *K* changes increased with longer duration of vibration indicated improvement of the hydraulic conductivity. The shortest duration of vibration which is 30 minutes was able to improve *K* values within the range of 7.2% to 9.0%. The longest duration of vibration which is 240 minutes was able to get *K* improvement from 27.2% to 37.7%. The prediction models of hydraulic conductivity (*K)* improvement were developed using three training algorithms which were Scaled Conjugate Gradient (SCG), Bayesian regularization (BR) and Levenberg-Marquardt (LM). The results have shown that the model developed with Scaled Conjugate Gradient (SCG) algorithm provided the best prediction with values for mean squared error (MSE) of 58.59 and R of 0.86. Thus, it has been proven that the vibration can be an effective method and this model can be used for future study on improvement of hydraulic conductivity of the soil.

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