



Evaluation of the ground thermal conductivity and the borehole thermal resistance from thermal response tests in Korea

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Thermal response test (TRT) generally has been applied to obtain the ground thermal conductivity and the borehole thermal resistance for a ground source heat pump (GSHP) system design in many countries. The aim of this study is surveying the ranges of the thermal parameters from the interpretation of a number of TRT data sets as well as to consider the appropriateness of test criteria developed in Korea. There are many unstructured processes on the test and still some factors are under discussion. 208 TRT data sets were interpreted by line source method and correlations between environmental factors and the thermal parameters were statistically analyzed. According to adapting different initial ignorance time step, convergence time of the varying ground thermal conductivity over test period changed, and statistical results from all data sets represented the general trend of the parameters over the time steps. The calculated mean ground thermal conductivities are 2.55 and 2.80 W/m-k hiring 12.0 and 22.0 hours initial ignorance time respectively. From the ground thermal conductivity with initial ignorance time 12.0 hours the mean borehole thermal resistance is 0.14 m-k/W and the minimum and the maximum values are 0.06 and 0.21 m-k/W. This evaluation study will be helpful to increase the accuracy of the estimation and to complement current TRT standard procedure.