NUMERICAL ANALYSIS OF BOREHOLE HEAT EXCHANGER

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Abstract

In this paper, 2D and 3D numerical simulation of bore-hole heat exchanger is done using multi-physics CFD solvers. The thermal performance of GSHP (Ground source heat pump) system depends heavily on the heat transfer between a bore-hole heat exchanger (BHE) and its surrounding soil. To ensure high efficiency of GSHP systems,thermal efficiency of the BHE is of essential importance [1,2]. Thermal efficiency of BHE is calculated numerically at selected location. Thermal analysis of porous media is done using PORFLOW® CFD solver and analysis of fluid flow and heat transfer inside the is done using ANSWER® CFD multi-physics solver. Estimation of COP of heat pipe and effectiveness of heat exchanger will be calculated based on the various designs of heat exchanger and parametric study of soil properties during this analysis which will lead to the heat and cooling load calculation of the indoor environment. The details of the problem and numerical results will be given in the full paper.

Keywords: CFD,PORFLOW®, ANSWER®, GSHP, BHE , COP, Effectiveness

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