An Empirical application of high-performance cement grout for ground heat exchanger

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Ground heat exchanger is the most important part which than 14% of the cost of construction and the performance of Ground heat exchanger is depended on it. Grout is inserted into the hole to the ground fixed and serves to enhance the thermal conductivity. So the research and development is needed. We were using cement grout. The result of the test thermal conductivity is 3.14 W/mK. It is much better than the existing grout is the thermal conductivity. The developed materials was examined by applying the grout in the field.

Key words : Ground heat exchanger, Cement, Thermal Conductivity

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Development of Water-Source Heat Pump System Using Riverbank Filtration

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A water-source heat pump system has been developed for cooling and heating of a green house on the waterfront in Jinju. In order to supply a heat source/sink of water in alluvium aquifer to the heat pump system, the riverbank filtration facility (two pumping wells and one recharge well) for water intake and injection has been constructed. To pump and recharge water sufficiently, the geometric design such as depth and diameter for the wells have been completed, and details of the well such as slot size and length of the screen and filter pack size have been designed based on the practical and theoretical design method including D30 technique. For the investigation of the hydrogeological characteristics, step-drawdown test, long-term pumping test, and recovery test have been carried out for two developed pumping wells. Step-drawdown test has been performed on 4 step flowrates of 150, 300, 450, 600 m³/day for 1 hour, and long-term pumping test on flowrate of 500 m³/day for 24 hours, and recovery test for 6 hours. Since the underground water filtrated by riverbank is flowing smoothly into the well, the water level goes down slightly for the long-term test. Consequently, the stable pumping flowrate for two pumping well has been predicted at least over 1,647 m³/day which is larger than the flowrate of 1,000 m³/day for a 60 RT heat pump system.

Key words : Riverbank Filtration, Alluvium Aquifer, Temperature Difference Energy, Water Source Heat Pump, Ground Water Heat Pump

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