

Accepted Manuscript

Title: Effects of Groundwater Flow on the Heat Transfer Performance of Energy Piles: Experimental and Numerical Analysis

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PII: S0378-7788(17)31276-8
DOI: <http://dx.doi.org/10.1016/j.enbuild.2017.09.023>
Reference: ENB 7942

To appear in: *ENB*

Received date: 10-4-2017
Revised date: 24-8-2017
Accepted date: 10-9-2017

Please cite this article as: Shuang You, Xiaohui Cheng, Chunli Yu, Zheng Dang, Effects of Groundwater Flow on the Heat Transfer Performance of Energy Piles: Experimental and Numerical Analysis, Energy and Buildings <http://dx.doi.org/10.1016/j.enbuild.2017.09.023>

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Effects of Groundwater Flow on the Heat Transfer Performance of Energy Piles: Experimental and Numerical Analysis

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Highlight

- In-situ full-scale experiment is used to study the heat exchange capacity of a bored pile in a groundwater-rich area, Tianjin, China.
- The water content of soil has positive effect on thermal conductivity coefficient.
- The 3D finite element program RSAS is used to simulate the heating process at various groundwater flow velocities.
- Even slight groundwater flow could have a significant effect on heat transfer of a pile.
- Groundwater flow has a positive impact on soil temperature during the heat transfer process of an energy pile.

Abstract: The underground heat exchangers of ground source heat pumps pass through different strata. The physical properties of these strata, particularly groundwater flow, affect heat exchange efficiency. In this study, energy piles located in an ecological tourism resort near Binhai Lake,

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