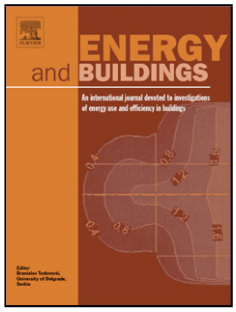

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PII: S0378-7788(17)31556-6
DOI: http://dx.doi.org/doi:10.1016/j.enbuild.2017.07.041
Reference: ENB 7781

To appear in: *ENB*

Received date: 30-4-2017
Revised date: 24-6-2017
Accepted date: 14-7-2017

Please cite this article as: Wenke Zhang, Ping Cui, Junhong Liu, Xueting Liu, Study on Heat Transfer Experiments and Mathematical Models of the Energy Pile of Building, Energy and Buildingshttp://dx.doi.org/10.1016/j.enbuild.2017.07.041

Study on Heat Transfer Experiments and Mathematical Models of the Energy Pile of Building

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Highlights

- 1. Describe the significance of studying energy pile.
- 2. The on-site heat transfer experiments of energy pile are conducted.
- 3. The heat transfer models of energy pile are explained.
- 4. The heat transfer ability of energy pile is analyzed.
- 5. Validate the heat transfer model by means of experimental findings.

Abstract Energy pile is a novel ground heat exchanger (GHE) of ground source heat pump (GSHP) system, and the spiral coils are set into pile to form this type of GHE. However, the on-site heat transfer experiments combined with engineering projects are not much, and the corresponding validation of model is a little. This paper describes both heat transfer experiments and models of energy pile. During the experiments, some parameters of circulating fluid of spiral coils are recorded, and meanwhile the thermal resistors are installed at the pile's surface to observe the temperature response induced by spiral coils. The heat transfer models of energy pile are explained and the corresponding characteristics are investigated. Afterwards, the comparisons between experimental data and model's results are made to explore the differences, the difference is small and therefore the heat transfer models can be validated. Thus, the validation is a significant contribution and the model can provide guideline for project design; the research of the paper is helpful to promote further development of GSHP system.

Keywords : Energy pile; Heat transfer experiments; Ground heat exchangers;

Temperature response; Heat transfer models; Validation.