Energy storage charging pile group heat conduction case

Can ultra-thin heat pipes reduce the operation temperature of a charging pile?
In order to reduce the operation temperature of the charging pile, this paper proposed a fin and ultra-thin heat pipes (UTHPs) hybrid heat dissipation system for the direct-current (DC) charging pile. The L-shaped ultra-thin flattened heat pipe with ultra-high thermal conductivity was adopted to reduce the spreading thermal resistance.

What is an energy pile with a deeply penetrating U-shaped heat exchanger?
An energy pile with a deeply penetrating U-shaped heat exchanger is a pile foundationin which the heat exchange tube is embedded and attached to a reinforcement cage,with the tube being arranged in a U shape and its bottom penetrating through the bottom of the pile and sticking deeply into the soil below the pile.

What parameters affect the heat transfer performance of a pile group?
A parametric analysis is performed to investigate the effects of several important parameters (i.e.,pile spacing,pile diameter,soil type,and thermal parameters) on the heat transfer performance of an energy pile group with the proposed deeply penetrating U-shaped configuration.

Can uthps be used to heat dissipate DC EV charging piles?
The UTHP was especially suitable for the heat dissipation of electronic equipment in narrow space. Thus it could be directly attached to the surface of the electronic components to cool the heat source. However,few researches reportedon the application of UTHPs to the heat dissipation of the DC EV charging piles. Fig. 1.

How efficient is heat transfer in an energy pile?
The efficiency of heat transfer in an energy pile depends on the design parametersconcerning the characteristics of the pile,pipe,concrete,fluid,and ground. The configuration of heat exchanger pipes is found to be the most influential parameter.

Does the number of energy piles affect the thermo-mechanical behavior?
The results showed that the increase in the number of energy piles decreases the pile stresses but increases the displacements of the foundation to critical values. Wu et al. introduced the effect of the pile cap on the thermo-mechanical behavior of energy piles.

In the present study, a two-dimensional CFD approach has been chosen to investigate heat transfer in a packed bed filled with phase change materials (PCM) capsules. In this research, four different geometries, circular, hexagonal, elliptical, and square, are considered PCM packages made of KNO3 covered with a copper layer and NaK as heat transfer fluid ...

In this paper, the battery energy storage technology is applied to the traditional EV (electric vehicle) charging

piles to build a new EV charging pile with integrated charging,... A coupled ...

Numerical simulations are performed to analyze the thermal characteristics of a latent heat thermal energy storage system with phase change material embedded in highly conductive porous media. A network of finned heat pipes is also employed to enhance the heat transfer within the system. ANSYS-FLUENT 19.0 is used to create a transient multiphase ...

Charging pile energy storage system can improve the relationship between power supply and demand. Applying the characteristics of energy storage technology to the charging piles of electric vehicles and optimizing them in conjunction with the power grid can achieve the effect of peak-shaving and valley-filling, which can effectively cut costs.

Through in situ experiments and a simulation algorithm, the research investigated the heat transmission characteristics of the deeply buried pipe energy pile group and ...

Numerical Evaluation of the Transient Performance of Rock-Pile Seasonal Thermal Energy Storage Systems Coupled with Exhaust Heat Recovery November 2020 Applied Sciences 10(21):7771

Abstract: In order to improve the heat dissipation performance and study the factors affecting the heat dissipation effect of a two-dimensional ordered porous structure, a thermal analysis of the radiator in the power module of a DC charging pile was carried out.

natural melt is about 20-25 % of the 30,000 m3 snow pile. Cold can be extracted either by putting pipes under the snow pile and circulating a heat carrier, or by circulating the melted water itself. In Sundsvall, the melt water circulation solution is used. 128 6 ...

Energy pile groups provide superior thermal energy storage performance over boreholes. Both energy pile geometry and number of internal heat exchangers are important. ...

10.2.1 Sensible-Thermal Storage. Sensible storage of thermal energy requires a perceptible change in temperature. A storage medium is heated or cooled. The quantity of energy stored is determined by the specific thermal capacity ((c_{p})-value) of the material.Since, with sensible-energy storage systems, the temperature differences between the storage medium ...

It is concluded that a multi-objective optimization is highly recommended to enhance the dual performance of an energy pile system coupled with a heat pump using the 4E evaluation criteria (energy, exergy, economy, and environment) while ensuring the safety of the foundation under thermal cyclic loads.

Screw piles with different fillings act as energy piles and thermal storage piles. Phase Change Material is added inside the piles" hollow case, requiring minimal work. Piles filled with Phase Change Materials store up

to 189.8 MJ/m 3 heat energy during operation. Heat Pump"s performance increases by up to 3.4 % when Thermal Storage Piles are used.

Through in situ experiments and a simulation algorithm, the research investigated the heat transmission characteristics of the deeply buried pipe energy pile group and optimized different intermittent operation schemes. The findings suggest that prolonged operation of the pile cluster intensifies heat buildup within the pile foundation, thereby ...

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This study presents a novel heat exchanger configuration, called a deeply penetrating U-shaped configuration, for energy piles. The outlet water temperature, temperature variation along the tube, and heat transfer ...

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