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خلاصه مقاله:

Geothermal energy is one of the most environmental-friendly and cost effective energy sources with potential to replace fossil fuels and help mitigate global warming. Recent technological progress, energy price variability, difficulty of oil and gas supply from foreign countries and the need to reduce fossil fuel deployment have made the exploitation of geothermal energy, especially for heating and cooling purposes, an attractive and viable energy alternative. Energy pile provides a mean to reduce energy consumption for space heating and cooling, while functioning as a support for superstructure. Despite of the environmental benefits of energy pile, some countries are still reluctant in implementing energy pile. This is because of knowledge gap on the influence of temperature cycles on energy pile ultimate and serviceability limit states. This paper reviews the geo exchanger and energy pile systems and highlights their applicability and efficiency as well as advantages and limits. To investigate the effects of soils on energy pile, in present study a two dimensional (۲D), axisymmetric numerical model for the energy piles has been created using finite element method based on the field test. The main purpose of this study is investigating energy pile response in various soils. This was performed by considering some different hypothetical layers with underlain bedrock and their results which included displacement, strain and stresses induced by thermal load compared with four layered soil experimental data. The results showed that soil properties have important effect on the response of energy pile. Also temperature affects pile reactions.

کلمات کلیدی:

Geothermal Energy, heat exchanger, fossil fuels, Finite element, COMSOL