

Impact of temperature cycles at soil – concrete interface for energy piles

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Abstract

Energy piles are double purpose foundation elements used both for transferring loads to the soil and temperature regulation in buildings. The response of the pile-soil interface is influenced by daily and seasonal temperature variations. In order to assess the impact of the thermal cycles on the mobilization of shear strength, in-situ and laboratory experiments were performed. Three energy piles were instrumented with vibrating cord sensors in the foundation of a waste water treatment plant in the North East (NE) part of Paris (at Sept Sorts, Seine et Marne), France. The deformation of these sensors has been recorded for more than one year and the impact of temperature cycles was assessed. In addition the impact of cyclic thermal load-ing on soil deformation at the soil-pile interface was also studied in the labora-tory using an interface direct shear device equipped with a temperature con-trol system. The preliminary results show that the undisturbed soil tempera-ture below 5m deep remains constant, around 13°C and that the response of sand-concrete interface at different temperatures and temperature cycles con-sists in the overall low contraction of the sand.