

Dissertation abstract

Analysis of the cooperation of a piled raft foundation with a subsoil taking into account the resistance of skin and pile base caused by settlement

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Piled raft foundations are used to account for cooperation of raft with a group of piles in transferring the load to the ground. In many ground conditions, such a foundation fills the gap among conventional solutions as optimal in both utility and economic terms i.e. spread foundations and pure pile foundations.

Based on the review of literature, it can be concluded that, despite developed numerous calculation methods for the analysis of piled raft foundations, they lack the mathematical description, that would include the active zones of the raft and piles, corresponding to the thickness of the subsoil undergoing deformation under load. In addition, there is a lack of research related to the possibility of using a load-settlement curve from a static pile test in the full range, to analyze the load-settlement curve of a pile working in a group under the raft. In this dissertation, the above research postulates were answered, formulating a mathematical model in which a particular emphasis was placed on the actual load-settlement relation of the raft with a given stiffness and the actual work of a single pile in the ground, taking into account the interaction between the raft, piles and subsoil. The mathematical model developed was verified on the basis of the results of field research taken from the literature. For this purpose, the results of settlement of supports of road flyover and two tanks were used.

The formulated mathematical description of the piled raft foundation cooperation with the subsoil and its verification allowed to confirm the thesis of the dissertation that it is possible to use the load-settlement curve from the static pile test in the full range with sufficient precision for practical purposes to analyze the load-settlement curve of a pile occurring in a pile group under the raft.

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