

Calculation theory of pile-soil interaction under horizontal load

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Abstract: Strength and deformation are key problems in soil mechanics. Generally, there is an order of magnitude difference in the support stiffness of pile and soil. Therefore, under the same load level, the deformation of pile and soil is not coordinated. The research shows that when the horizontal displacement of pile foundation is small, the vertical load has little effect on the horizontal bearing capacity of pile foundation. Therefore, the study of pile-soil interaction under horizontal load has become the focus of single pile foundation. In practical engineering, the horizontal bearing pile uses the resistance of the soil around the pile to bear the horizontal load. Among them, soil is a common elastic-plastic material. When bearing the horizontal load from the pile, it is mainly divided into elastic deformation stage, elastic-plastic deformation stage and failure stage. In the elastic stage, the soil resistance has a linear relationship with the pile displacement. In the elastic-plastic stage, the soil reflects partial elasticity and partial plasticity, In the failure stage, the pile deformation reaches the limit, resulting in soil instability and failure. The numerical calculation method is of great significance in the study of pile-soil interaction.

Keywords: Pile soil interaction; Horizontal bearing capacity; Composite foundation reaction method; Abaqus