

饱和土中管桩的纵向振动特性

Vertical vibration characteristics of pipe pile in saturated soil

中文关键词: [多孔介质](#) [饱和土](#) [纵向振动](#) [复刚度](#)

英文关键词: [porous medium](#) [saturated soil](#) [vertical vibration](#) [complex stiffness](#)

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中文摘要:

受饱和土中孔隙水的流动特性和桩基与土体渗透率不同的影响, 饱和土中土与管桩的相互作用与单相土-桩相互作用的动力学行为差异较大。本文将土体视为液固饱和两相介质, 利用多孔介质理论描述饱和土的宏观力学行为, 假定饱和土符合Novak平面假定, 将Novak的平面应变模型推广应用到饱和土中管桩的振动问题中, 求解了饱和土层的纵向振动, 并通过数值算例分析讨论了桩周土和桩芯土力学参数对饱和土中管桩纵向振动的影响。研究表明: 管桩桩顶复刚度和导纳随频率的变化规律与实心桩不同, 桩周土较桩芯土提供的摩擦力要大, 且桩周土对管桩纵向振动的影响较桩芯土大。

英文摘要:

There are important differences in the mechanical properties, especially dynamic behaviors of a pile in saturated soil and single-phase soil, because of the flow quality of pore water in saturated soil and the different permeability of the soil and the pile. The soil around the pile is regarded as saturated porous medium, and the macro-mechanical properties of saturated soil is described by the theory of porous medium. Applying the Novak plane assumption to saturated soil, the Novak plane strain model was spread to pipe pile in saturated soil, and the vertical vibration of soil layer was solved; the vertical vibration of pipe pile in saturated soil was analyzed, and the influences of mechanical parameters of soil around the pile and inner soil on the vibration were investigated. The results indicate that the changes of complex stiffness and admittance of pipe pile with frequency are different with solid pile; the soil around the pile has a greater influence than the inner soil, and the frictional resistance of outer soil is larger than that of the inner soil.

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