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多层地基中桩的荷载传递分析

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摘要: 利用剪切位移法和传递矩阵法, 根据分层分析原理, 推导出了多层地基中桩的荷载传递矩阵, 并在桩端应用双曲线荷载传递模型, 模拟土的非线性变形特性, 从而建立了可考虑土非线性影响的多层地基中桩荷载传递分析理论. 该理论可用于计算多层地基中桩的沉降和极限承载力, 也可用于分析多层地基中桩的荷载传递规律. 通过与现场实测结果对比可知, 计算结果与实测所得到的 p - s 结果非常吻合, 计算所得到的桩身轴力和桩侧摩阻力沿深度的分布与土层分布的实际情况相符, 也与用其他分析方法得到的结果一致. 荷载传递分析理论比有限元方法简单, 并具有较强的实用性. 它不但可用于分析多层地基中桩的荷载传递规律, 也可用于分析嵌岩桩和扩底桩的荷载传递规律.

关键字: 多层地基; 荷载传递; 剪切位移法

Analysis of pile's load transfer in layered soils

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Abstract: Using the theory of shear-displacement and transfer matrix, this paper derivated the transfer matrix of piles in layered soils according to the principle of layer by layer analysis. Then the hyperbola load transfer model is used in the pile end to imitate the nonlinear deformation properties of soils, so the analytical theory of pile's load transfer in layered soils is established, which can take into account the nonlinear influence of soils. It can be used to calculate the settlement and bearing capacity of piles in layered soils, and it can also be used to analyze the law of load transfer of piles in the same soils. It is known by comparing with the tested datum and calculated results, the calculated p - s curve is very close to the tested, and the distribution of calculated axle force and side friction of piles along the depth are very coincident with the soil layer. So, it is also consistent with the results obtained by other analysis method. Thus the accuracy and the reliability of the proposed method are verified, and it has a higher calculation precision. The proposed method is simple than the finite element method. It can notably be used to analyze the pile foundation in layered soils, but can also be used to analyze the piles socketed into rock or piles with expanded base.

Key words: layered soils; load transfer; shear-displacement method

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