

隧道施工对临近桩基影响的三维数值分析

杨超¹, 黄茂松¹, 刘明蕴²

1. 同济大学 地下建筑与工程系, 上海 200092; 2. 上海应翔建筑设计有限公司, 上海 200233)

收稿日期 2006-6-23 修回日期 2006-11-30 网络版发布日期 2008-1-16 接受日期 2007-7-15

摘要 通过与两阶段分析方法的对比, 表明所采用的三维整体数值分析方法能够有效地模拟隧道施工对临近桩基的影响。在此基础上建立三维弹塑性模型, 模拟实际的施工过程, 从整体上研究黏性土地基中桩-土-隧道三者间的作用特征。计算结果表明: 隧道施工对临近桩基影响显著, 桩体的变形和受力状态不仅与隧道施工工况有关, 而且也与桩基的位置、长度和数目紧密相关; 桩基的存在改善局部区域内土体的受力状态, 但也加剧此处土体的变形; 桩体沿隧道轴线方向的弯矩数值较大且分布曲折, 长桩尤为明显; 群桩可以显著提高隧道施工过程中桩体的受力性能。

关键词 [隧道工程](#); [桩基础](#); [黏性土](#); [数值分析](#)

分类号

THREE-DIMENSIONAL NUMERICAL ANALYSIS OF EFFECT OF TUNNEL CONSTRUCTION ON ADJACENT PILE FOUNDATION

YANG Chao¹, HUANG Maosong¹, LIU Mingyun²

(1. Department of Geotechnical Engineering, Tongji University, Shanghai 200092, China;
2. Shanghai Yingxiang Architectural Design Co., Ltd., Shanghai 200233, China)

Abstract

Three-dimensional numerical analysis is used to simulate the influence of tunnel construction on adjacent pile foundation; and its comparison with two-stage method is carried out. Results show that this numerical program is able to simulate effectively the interaction effects between tunnel and piles. Based on these, a 3D elastoplastic model is established to study the whole interaction among pile, soil and tunnel in the cohesive foundation with actual tunnel construction steps. The outcome of numerical simulations shows that tunnel construction imposes a significant effect on adjacent pile foundation. The deformation and stress states of piles are closely dependent on not only the tunneling step, but also the position, length and quantity of piles. The presence of piles not only improves the stress state of the neighboring soil greatly but also aggravates the soil deformation. The pile bending moment along the tunnel axis is fairly large in value and complicated in distribution, especially for the long pile. The pile group is able to increase the stress performance of piles due to tunnel construction obviously.

Key words [tunnelling engineering](#); [pile foundation](#); [cohesive soil](#); [numerical analysis](#)

DOI:

通讯作者

扩展功能	
本文信息	
▶ Supporting info	
▶ PDF(323KB)	
▶ [HTML全文](0KB)	
▶ 参考文献	
服务与反馈	
▶ 把本文推荐给朋友	
▶ 加入我的书架	
▶ 加入引用管理器	
▶ 复制索引	
▶ Email Alert	
▶ 文章反馈	
▶ 浏览反馈信息	
相关信息	
▶ 本刊中 包含 “隧道工程; 桩基础; 黏性土; 数值分析” 的相关文章	
▶ 本文作者相关文章	
· 杨超	
· 黄茂松	
· 刘明蕴	