

# 越江隧道泥水盾构施工引起地层移动的有限元分析(PDF)

《西安交通大学学报》自然版[ISSN:0253-987X/CN:61-1069/T] 期数: 2007年第09期 页码: 1119-1123 栏目: 出版日期: 2007-09-10

**Title:** Finite Element Analysis of Soil Movements Due to Slurry Shield Tunnelling for River Crossing Soft Clay Highway

**文章编号:** 0253-987X (2007) 09-1119-05

**作者:** [马可栓](#) 1; 2; 3; [丁烈云](#) 1; 2; [彭畅](#) 1; 2  
1. 华中科技大学土木工程与力学学院, 430074, 武汉; 2. 华中科技大学控制结构湖北省重点实验室, 430074, 武汉; 3. 南阳理工学院土木工程系, 473004, 南阳

**Author(s):** [Ma Keshuan](#) 1; 2; 3; [Ding Lieyun](#) 1; 2; [Peng Chang](#) 1; 2  
1. School of Civil Engineering and Mechanics, Huazhong University of Science and Technology, Wuhan??? 430074, China; 2. Hubei Key Laboratory of Control Structure, Huazhong University of Science and Technology, Wuhan???? 430074, China; ?3. Department of Civil Engineering, Nanyang Institute of Technology, Nanyang???? 473004, China

**关键词:** [有限元分析](#); [沉降槽](#); [水平移动槽](#); [泥水盾构隧道](#)

**Keywords:** [finite element analysis](#); [settlement trough](#); [horizontal movement trough](#); [slurry shield tunnel](#)

**分类号:** TU471

**DOI:** 0253-987X (2007) 09-1119-05

**文献标识码:** A

**摘要:** 以武汉越江公路隧道为工程背景, 建立了考虑衬砌结构与土体变形耦合作用的分析模型, 并对单洞、双洞开挖进行了有限元分析. 模拟结果表明: 与有限元分析最大沉降相比较, Peck公式的预测值一般偏大; 在相同埋深的情况下, 单洞和双洞开挖引起的地面水平槽的峰值先后出现在3个区域, 而这3个区域对于建筑物来说是最危险的区域; 随着隧道埋深的增加, 地面移动槽的宽度增大但峰值减小, 沉降槽峰值位置不变, 而水平槽最终峰值位置远离两隧道中心, 即对于地面建筑物最危险的区域随着隧道埋深而变化. 此结论可为设计、施工提供参考.

**Abstract:** Aiming at the river crossing highway tunnels in Wuhan and taking the lining construction and soil deformation coupling effects into account, two finite element models are established for single tunnel and twin tunnel excavation. A comparison between the finite element analysis and the Peck's empirical formula indicates that the predicted maximum settlement value from Peck's formula generally tends to larger. It is concluded that under the same depth, the peak values of the ground horizontal movement trough caused by single tunnel and twin tunnel digging appear sequentially in three regions which are the most dangerous for ground structures; while the tunnel depth gets deeper, the width of ground movement trough increases but the peak values decreases, the position of the settlement trough remains constant, and the final peak value of the horizontal movement trough gets apart from the centre of two tunnels, which implies that the most dangerous region varies with tunnel

## ◆ 导航/NAVIGATE

[本期目录/Table of Contents](#)

[下一篇/Next Article](#)

[上一篇/Previous Article](#)

## ◆ 工具/TOOLS

[引用本文的文章/References](#)

[下载 PDF/Download PDF\(855KB\)](#)

[立即打印本文/Print Now](#)

[推荐给朋友/Recommend](#)

[查看/发表评论/Comments](#)

## ◆ 统计/STATISTICS

摘要浏览/Viewed 523

全文下载/Downloads 300

评论/Comments



## 参考文献/REFERENCES

- [1] Addenbrooke T I, Potts D M. Twin tunnel interaction: surface and subsurface effect [J]. The International Journal of Geomechanics, 2001, 1(2): 249 271.
- [2] Peck R B. Deep excavation and tunneling in soft ground [C] || Proceedings of the 7th International Conference on Soil Mechanics and Foundation Engineering. Mexico City: Mexico Press, 1969: 225 290.
- [3] 易宏伟, 孙钧. 盾构施工对软粘土的扰动机理分析 [J]. 同济大学学报, 1999, 28(3): 277 281.  
Yi Hongwei, Sun Jun. Mechanism analysis of disturbance caused by shield tunneling on soft clay [J]. J of Tongji University, 1999, 28(3): 277 281.
- [4] 骆建军, 王梦恕. 地铁施工对管线的影响 [J]. 中国铁道科学, 2006, 27(6): 125 128.  
Luo Jianjun, Wang Mengshu. Influence of metro construction on under ground pipeline [J]. China Railway Science, 2006, 27(6): 125 128.
- [5] 刘元雪, 施建勇, 许江, 等. 盾构法隧道施工数值模拟 [J]. 岩土工程学报, 2004, 26(2): 239 243.  
Liu Yuanxue, Shi Jianyong, Xu Jiang, et al. Numerical simulation of excavation of shield tunnel [J]. Chinese Journal of Geotechnical Engineering, 2004, 26(2): 239 243.
- [6] 姜忻良, 赵志民, 李园. 隧道开挖引起土层沉降槽曲线形态的分析与计算 [J]. 岩土力学, 2004, 25(10): 1542 1544.  
Jiang Xiliang, Zhao Zhimin, Li Yuan. Analysis calculation of surface and subsurface settlement trough profiles due to tunneling [J]. Rock and Soil Mechanics, 2004, 25(10): 1542 1544.
- [7] 谢康和, 周健. 岩土工程有限元分析理论与应用 [M]. 北京: 科学出版社, 2002.
- [8] Thomas K, Gunther M. A numerical study of the effect of soil and grout material properties and cover depth in shield tunnelling [J]. Computers and Geotechnics, 2006, 33(4 / 5): 234 247.
- [9] 杨秋玲, 马可栓. 大体积混凝土水化热温度场三维有限元分析 [J]. 哈尔滨工业大学学报, 2004, 36(2): 261 263.  
Yang Qiuling, Ma Keshuan. Analysis of massive concrete 3 dimensional finite element hydrated heat temperature field [J]. Journal of Harbin Institute of Technology, 2004, 36(2): 261 263.
- [10] Rowe R K, Lee K M. An evaluation of simplified techniques for estimating three dimensional undrained ground movements due to tunneling in soft soils [J]. Canada Geotech J, 1992, 29(3): 39 52.

---

备注/Memo: -

---

更新日期/Last Update: