

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(236KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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 “爆破工程; 浅埋隧道; 地表震动; 空洞效应” 的相关文章](#)
- ▶ [本文作者相关文章](#)

- [张继春](#)
- [曹孝君](#)
- [郑爽英](#)
- [郭学彬](#)

浅埋隧道掘进爆破的地表震动效应试验研究

张继春1, 曹孝君1, 郑爽英2, 郭学彬3

(1. 西南交通大学 土木工程学院, 四川 成都 610031; 2. 西南交通大学 环境科学与工程学院, 四川 成都 610031; 3. 西南科技大学 环境与资源学院, 四川 绵阳 621002)

收稿日期 2004-5-13 修回日期 2004-8-16 网络版发布日期 2007-4-2 接受日期 2004-5-13

摘要 以渝怀铁路人和场浅埋隧道工程为背景, 进行掘进爆破的地表震动效应试验。通过测量掘进爆破引起的不同位置处的地表振动速度波形, 研究地表震动特性及其变化规律。试验与分析结果表明: (1) 掏槽孔爆破产生的地震效应最强烈, 其震动强度是其他各类炮孔爆破的2倍以上; (2) 辅助孔、崩落孔和周边孔爆破引起的地表振动速度并不总是随着其单段装药量的增加而增大; (3) 浅埋隧道开挖区将造成掘进爆破产生的地表震动出现“空洞效应”; (4) 掘进前方的爆破地震效应可用萨道夫斯基公式进行预测, 掘进后方的爆破地震波则不符合这一衰减规律。人和场隧道掘进前方的地震波衰减参数为 $K = 232.8$, $a = 1.90$ 。

关键词 [爆破工程](#); [浅埋隧道](#); [地表震动](#); [空洞效应](#)

分类号

EXPERIMENTAL STUDY ON VIBRATION EFFECTS OF GROUND DUE TO SHALLOW TUNNEL BLASTING

ZHANG Ji-chun1, CAO Xiao-jun1, ZHENG Shuang-ying2, GUO Xue-bin3

(1. School of Civil Engineering, Southwest Jiaotong University, Chengdu 610031, China;
2. School of Environmental Science and Engineering, Southwest Jiaotong University, Chengdu 610031, China;
3. School of Environment and Resource, Southwest University of Science and Technology, Mianyang 621002, China)

Abstract

Taking the project of Renhechang shallow tunnel for Chongqing—Huaihua railway as the background, the field experiments of vibration effects of the ground in tunneling blasting have been done. Based on the measurement of the waveforms of the vibration velocity in different distances away from the tunneling blasting sources on the ground, the vibration characteristic of the ground and its varying laws are studied. Four blasting experiments for the shallow tunnel were carried out and twenty-seven waveforms of measured point vibration were obtained. The results of the tests and analysis show that: (1) the seismic effect of cutting hole blasting is the most intensive and its vibration intensity is over two times greater than that of the other blast-holes blasting; (2) the vibration velocities of the ground resulting from relief, breast and trim holes blasting do not always become greater with the increase of their single period charges; (3) the excavation region of the shallow tunnel may cause the hollow effect of ground vibration in tunneling blasting; and (4) the blasting vibration effect along the tunneling direction can be forecasted by Sadov’s formula, but the formula is not suited to the forecast of the opposite direction. Moreover, for Renhechang shallow tunnel, the attenuation parameters of seismic waves along the tunneling direction are $K = 232.8$ and $a = 1.90$.

Key words [blasting engineering](#); [shallow tunnel](#); [ground vibration](#); [hollow effect](#)

通讯作者