

沿桩顶径向的动测三维效应分析

王雪峰¹, 陈培¹, 黄贻海², 甘轶¹

(1. 华中科技大学 土木工程与力学学院, 湖北 武汉 430074; 2. 荆门职业技术学院, 湖北 荆门 448000)

收稿日期 2006-6-19 修回日期 2006-9-4 网络版发布日期 2008-1-22 接受日期 2007-7-15

摘要 桩基动测问题的理论基础一维应力波理论只有在锤径桩径比、波长桩径比、桩长桩径比足够大时才能近似成立, 否则该问题实际上为应力波在柱体中传播的三维问题。基于应力波理论, 考虑计算精度和效能, 借助新型有限元分析系统COMSOL Multiphysics对桩基动测过程进行一维和三维动态仿真, 对比分析两种模型计算结果异同, 沿桩顶径向三维效应主要表现为不同部位速度响应不同且信号发生振荡, 入射波存在延时, 反射波到也存在差别。结合野外实验较系统地研究这些三维效应随锤桩比、波长桩径比、长径比的变化规律, 给出三维效应的动测规避方式。

关键词 [桩基工程](#); [桩基动测](#); [速度曲线](#); [振荡](#); [三维效应](#)

分类号

ANALYSIS OF 3D EFFECT OF DYNAMIC TEST ALONG PILE TIP

WANG Xuefeng¹, CHEN Pei¹, HUANG Yihai², GAN Yi¹

(1. School of Civil Engineering and Mechanics, Huazhong University of Science and Technology, Wuhan, Hubei 430074, China; 2. Jingmen Technical College, Jingmen, Hubei 448000, China)

Abstract

Testing results of piles under low strain integrity are normally interpreted using one-dimensional stress wave theory. While one-dimensional stress wave theory is acceptable for pile-driving analysis, the responses of piles integrity tests can not be adequately simulated when the hammer and the incident wave length are small in relation to the diameter of the pile. Extensive parametric studies are performed using one-dimensional and three-dimensional(axisymmetrical) wave equation models respectively. Considering the calculation precision and efficiency, the axisymmetrical system of COMSOL Multiphysics is used to simulate the process of pile's dynamic test. The main three-dimensional effect lies in the oscillating degrees of velocity curves and the time of reflected wave. Under the conditions of different hammers, wave lengths and pile diameters, the three-dimensional dynamic effect is analyzed. Moreover, some suggestions about how to avoid three-dimensional dynamic effect are put forward.

Key words [pile foundations](#); [pile dynamic test](#); [velocity curve](#); [oscillation](#); [3D effect](#)

DOI:

通讯作者

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(320KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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](#)
“[桩基工程](#); [桩基动测](#); [速度曲线](#); [振荡](#); [三维效应](#)”
的 [相关文章](#)
- ▶ [本文作者相关文章](#)

- [王雪峰](#)
- [陈培](#)
- [黄贻海](#)
- [甘轶](#)