

学术论文

钢纤维混凝土二桩厚承台的试验研究

孙成访;谷倩;彭少民;

东莞理工学院城市学院;武汉理工大学土木工程与建筑学院;

摘要: 为了研究钢纤维增强混凝土(SFRC)二桩厚承台的传力机理和破坏模型,以及钢纤维在混凝土二桩厚承台中的作用,对30个混凝土和钢纤维混凝土二桩承台进行了静力加载试验和非线性有限元分析,探讨了钢纤维混凝土二桩厚承台的开裂荷载、极限荷载、裂缝开展、承台内部应变分布、钢筋应力分布等力学性能。结果表明:钢纤维的掺入能有效提高混凝土承台的开裂荷载和极限荷载,阻碍裂缝的发展,降低承台的厚度;钢纤维混凝土二桩厚承台破坏形态为冲切破坏,其传力模型符合拉杆拱模型或桁架模型。提出了基于桁架模型的钢纤维混凝土二桩厚承台承载力设计计算公式,其计算值与试验值吻合较好。该研究成果可为有关规程的编制及实际工程的应用提供参考。

关键词: 钢纤维混凝土 二桩厚承台 破坏模型 静载试验 非线性分析 承载力

Experimental research on steel fiber reinforced concrete two-pile thick caps

SUN Chengfang¹,GU Qian²,PENG Shaomin²(1.City College,Dongguan University of Technology,Dongguan 523106,China;2.School of Civil Engineering & Architecture,Wuhan University of Technology,Wuhan 430070,China)

Abstract: In order to study load-transfer mechanism and the failure mode of the steel fiber reinforced concrete(SFRC) two-pile thick caps,and the effect of the steel fiber on reinforced concrete two-pile thick caps,thirty model specimens were tested under static loading and analyzed by nonlinear finite element method.This paper discusses the mechanical behavior such as cracking load,limit load,distribution of strain inside caps and stress of the bars on the bottom of SFRC two-pile caps.The results indicate that steel fiber can increase the cracking load and limit load of the reinforced concrete pile caps,hinder the further growth of cracks,thus the thickness of the reinforced concrete pile caps may be reduced.The failure mode of SFRC two-pile thick caps is punching damage,and the load-transfer mechanism can be explained well by arch-and-tie or truss models.An equation for predicting the bearing capacity of SFRC two-pile thick cap based on truss model is proposed and the calculation results agree well with the experimental results.The research results provide references for compiling the guidelines or codes to guide engineering design practice.

Keywords: two-pile thick cap failure model static test nonlinear analysis bearing capacity

收稿日期 2010-04-05 修回日期 2010-04-05 网络版发布日期 2010-04-05

DOI:

基金项目:

国家规程《钢纤维混凝土结构设计与施工规程》修订项目;; 武汉青年科技晨光计划项目(20035002016-30)

通讯作者:

作者简介:

作者Email:

参考文献:

本刊中的类似文章

1. 李继祥;张元元;刘肖凡;.钢纤维混凝土六桩双柱厚承台试验研究及理论分析[J]. 建筑结构学报, 2009,30(02): 149-157
2. 侯杰;程赫明;王时越;杨积武;.预应力钢纤维混凝土板弯曲疲劳挠度试验研究[J]. 建筑结构学报, 2007,28(S1): 219-223

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(OKB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 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
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 钢纤维混凝土
- ▶ 二桩厚承台
- ▶ 破坏模型
- ▶ 静载试验
- ▶ 非线性分析
- ▶ 承载力

本文作者相关文章

- ▶ 孙成访
- ▶ 谷倩
- ▶ 彭少民

PubMed

- ▶ Article by
- ▶ Article by
- ▶ Article by

3. 高丹盈,赵军,朱海堂. 钢筋钢纤维混凝土牛腿受剪承载力试验研究[J]. 建筑结构学报, 2006,27(02): 100-106
 4. 胡金生,杨秀敏,周早生,唐德高. 钢纤维混凝土与聚丙烯纤维混凝土材料冲击荷载下纤维增韧特性试验研究[J]. 建筑结构学报, 2005,26(02): 101-105
 5. 赵斌,吕西林,刘海峰. 预制高强混凝土结构后浇整体式梁柱组合件抗震性能试验研究[J]. 建筑结构学报, 2004,25(06): 22-28
 6. 孙成访,王敏根,谷倩,彭少民. 钢纤维混凝土二桩厚承台冲切、剪切承载力试验研究[J]. 建筑结构学报, 2004,25(01): 107-113+128
 7. 黄承逵,赵国藩,吕克顺,邢顺铨,王五俊,王晓明. 钢筋钢纤维混凝土轴拉构件裂缝宽度计算方法[J]. 建筑结构学报, 1997,18(03): 2-10+21
-