

学术论文

组合T形截面钢管混凝土柱偏心受压试验研究

杜国锋¹, 徐礼华^{1,2}, 徐浩然¹, 温芳¹

1. 武汉大学 土木建筑工程学院, 湖北武汉 430072; 2. 湖北省岩土与结构工程安全重点实验室, 湖北武汉 430072

摘要:

在分析各种异形钢管混凝土柱工程应用的基础上, 提出组合T形截面钢管混凝土柱。考虑长细比、偏心距等参数的影响, 设计制作18个组合T形钢管混凝土柱试件。通过偏心受压试验, 对长细比 $16.0 < \lambda \leq 28.8$ 的组合T形钢管混凝土柱压弯性能进行研究, 考察试件的破坏形态, 实测试件的荷载-应变曲线和荷载-柱中挠度曲线, 分析各参数对试件偏心受压力学性能的影响。通过试验数据回归分析, 参考国内外相关规范, 提出组合T形截面钢管混凝土柱偏心受压承载力计算公式。试验结果表明: 偏心受压柱均为弯曲失稳破坏, 长细比越大, 弯曲破坏特征越明显; 偏心距越大, 试件极限承载力越低。研究表明, 组合T形钢管混凝土柱的两个组成部分能很好地协同工作, 力学性能较好; 所提出的承载力计算公式可供工程设计参考。图10表3参8

关键词: 钢管混凝土 组合T形截面柱 偏心受压试验 强度

Study on composite T-shaped concrete filled steel tubular columns under eccentric compression

DU Guofeng¹, XU Lihua^{1,2}, XU Haoran¹, WEN Fang¹

1. School of Civil Engineering, Wuhan University, Wuhan 430072, China; 2. Hubei Province Key Laboratory of Geotechnical and Structural Engineering Safety, Wuhan 430072, China

Abstract:

Based on the summary of various types of special shaped concrete-filled steel tubular columns in practical application, composite T-shaped concrete-filled steel tubular column was presented in this paper. Eighteen composite T-shaped concrete-filled steel tubular columns were designed and manufactured with considering several experimental parameters such as the slenderness ratio and the eccentricity. Eccentric compression tests were carried out, and the mechanical behavior of composite T-shaped concrete-filled steel tubular columns with the slenderness ratio of $16 < \lambda \leq 28.8$ were investigated, focusing on the load-strain relationships, load-column deflection relationships, failure modes of the specimens, and the effects of different influencing parameters on the eccentric compression properties of the specimens. Based on the existing methods in both domestic and foreign codes, the practical design formula for the eccentric compression bearing capacity of composite T-shaped concrete-filled steel tubular columns was derived through the regression analysis of experimental data. The results show that the eccentric compression columns are dominated by flexural buckling, and the greater the slenderness ratio is, the more obvious the characteristic of flexural failure is. The studies show that the two parts of composite T-shaped concrete-filled steel tube column can work together very well with good mechanical properties. The formula could be valuable for engineering design.

Keywords: concrete-filled steel tube composite T-shaped column eccentric compression test strength

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

湖北省教育厅科技计划项目 (Q20091210)

通讯作者: 杜国锋 (1975—), 男, 吉林伊通人, 工学博士, 副教授

作者简介:

作者Email: gfd_1125@126.com

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

- ▶ 钢管混凝土
- ▶ 组合T形截面柱
- ▶ 偏心受压试验
- ▶ 强度

本文作者相关文章

PubMed

本刊中的类似文章

1. 方小丹;韩小雷;韦宏;季静;黄超;唐嘉敏;.广州西塔巨型斜交网格平面相贯节点试验研究[J]. 建筑结构学报, 2010,31(01): 56-62
2. 韩小雷;黄超;方小丹;韦宏;季静;唐嘉敏;.广州西塔巨型斜交网格空间相贯节点试验研究[J]. 建筑结构学报, 2010,31(01): 63-69
3. 汪大绥;陆道渊;黄良;王建;徐麟;朱俊;.天津津塔结构设计[J]. 建筑结构学报, 2009,30(S1): 1-7
4. 徐斌;阚敦莉;王雪生;罗超英;郑宣鹏;.雪莲大厦高层混合结构设计[J]. 建筑结构学报, 2009,30(S1): 59-63
5. 何文辉;范云蕾;肖岩;郭玉荣;.高强螺栓端板连接钢梁-方钢管混凝土框架结构抗震性能研究[J]. 建筑结构学报, 2009,30(04): 18-29
6. 陈宝春;宋福春;.钢管混凝土平缀管格构柱极限承载力试验研究[J]. 建筑结构学报, 2009,30(03): 36-44
7. 陈曦;周德源;.矩形钢管混凝土轴压短柱中采用不同混凝土材料模型的性能比较分析[J]. 建筑结构学报, 2009,30(03): 120-125
8. 陈宝春;高婧;.波形钢板钢管混凝土柱试验研究[J]. 建筑结构学报, 2009,30(02): 55-63
9. 王玉银;张素梅;.圆钢管高强混凝土轴压短柱受剪承载力分析[J]. 建筑结构学报, 2009,30(02): 114-124
10. 蔡健;龙跃凌;.带约束拉杆方形、矩形钢管混凝土短柱的轴压承载力[J]. 建筑结构学报, 2009,30(01): 7-14
11. 黄文金;陈宝春;.腹杆形式对钢管混凝土桁梁受力性能影响的研究[J]. 建筑结构学报, 2009,30(01): 55-61
12. 刘永健;周绪红;刘君平;.主管内填混凝土的矩形钢管X型节点受拉和受弯性能试验研究[J]. 建筑结构学报, 2009,30(01): 82-86+94
13. 李正良;刘红军;赵仕兴;.方钢管混凝土分叉柱与钢梁连接节点的抗震性能研究[J]. 建筑结构学报, 2009,30(01): 87-94
14. 孙修礼;.RC梁-钢管混凝土柱单跨框架抗震性能试验研究[J]. 建筑结构学报, 2009,30(01): 142-146+156
15. 刘士润;司炳君;.钢管混凝土柱-钢筋混凝土梁节点及受力特点[J]. 建筑结构学报, 2008,29(S1): 294-297