

学术论文

方钢管约束型钢混凝土短柱抗震性能试验研究

周绪红¹, 刘界鹏^{1,2}, 张素梅³

1.兰州大学 土木工程与力学学院, 甘肃兰州 730000; 2.哈尔滨工业大学 建筑设计研究院, 黑龙江哈尔滨 150090; 3.哈尔滨工业大学 土木工程学院, 黑龙江哈尔滨 150090

摘要:

进行了3个剪跨比为1.5的方钢管约束型钢混凝土短柱和1个相同用钢量的型钢混凝土对比试件的拟静力试验研究, 试件的主要变化参数为轴压比(0.3, 0.4和0.5)。试验结果表明: 轴压比为0.3的方钢管约束型钢混凝土柱的破坏模式为弯曲破坏, 而轴压比为0.4和0.5的方钢管约束型钢混凝土柱的破坏模式为剪切破坏和粘结破坏相结合。相同用钢量条件下, 方钢管约束型钢混凝土短柱的受剪承载力、延性、层间变形能力和耗能性能明显优于型钢混凝土柱。随轴压比的增加, 方钢管约束型钢混凝土短柱的受剪承载力提高, 但延性和极限变形能力降低。对钢管的弹塑性应力分析结果表明: 水平荷载施加过程中, 发生弯曲破坏试件的钢管不屈服, 而发生剪切破坏试件的钢管在下降段屈服。 图8表2参13

关键词: 方钢管约束型钢混凝土 短柱 轴压比 拟静力试验 抗震性能

Seismic behavior of square tubed steel reinforced concrete short columns

ZHOU Xuhong¹, LIU Jiepeng^{1,2}, ZHANG Sumei³

1.School of Civil Engineering and Mechanics, Lanzhou University, Lanzhou 730000, China;
2.Architectural Design and Research Institute, Harbin Institute of Technology, Harbin 150090, China;
3.School of Civil Engineering, Harbin Institute of Technology, Harbin 150090, China

Abstract:

The seismic behavior of square tubed steel reinforced concrete (STSRC) short columns was studied by testing three STSRC columns and one common SRC column under combined axial constant compression and lateral cyclic load. The main test parameter was the axial load ratio (0.3,0.4 and 0.5). The test results indicate that the failure mode of the column with the axial load ratio 0.3 is flexure failure, while the failure mode of the two columns with the axial load ratio 0.4 and 0.5 respectively is combined shear failure and bond failure. The shear strength, ductility, deformation ability and energy dissipation ability of a STSRC short column are remarkably higher than that of a common SRC column on condition that the steel ratio of the column is the same. The shear strength of the STSRC short columns increase as the axial load ratio increase, while the ductility and ultimate deformation ability decrease as the axial load ratio increase. The results form elasto-plastic analysis on the steel tube indicated that, during the lateral load being applied procedure, the steel tube do not yield for the STSRC columns with flexural failure and the steel tube yield after the peak load point for the STSRC columns with shear failure.

Keywords: square tubed steel reinforced concrete short column axial load ratio quasi-static test seismic behavior

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

国家自然科学基金项目(50708027)

通讯作者: 周绪红(1956—), 男, 湖南南县人, 工学博士, 教授

作者简介:

作者Email: zXH@lzu.edu.cn

参考文献:

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

- ▶ 方钢管约束型钢混凝土
- ▶ 短柱
- ▶ 轴压比
- ▶ 拟静力试验
- ▶ 抗震性能

本文作者相关文章

PubMed

