

学术论文

钢结构柱脚抗剪键抗剪承载力计算

肖南, 李莎, 赵文争

浙江大学 建筑工程学院, 浙江杭州 310058

摘要:

为了确定钢结构柱脚抗剪键的抗剪承载力, 分别以混凝土应变达到应力峰值应变和极限应变为抗剪屈服承载力和极限承载力的两种极限状态, 选取混凝土应力-应变关系接近实际受力情况的非线性弹塑性模型, 建立了考虑抗剪键剪切变形的Timoshenko梁平衡微分方程, 采用Galerkin法求得抗剪键的变形曲线, 进而推导了两种抗剪承载力的理论计算公式, 提出了确定抗剪键埋深和截面规格的方法。研究表明: 抗剪键的抗剪承载力和理论埋深取决于其材料截面特性及基础混凝土强度。研究同时表明, 抗剪键埋深范围内混凝土压力方向不改变, 对柱脚底板产生附加弯矩。采用有限元方法对比分析, 算例结果验证了理论计算公式的正确性。 图7表1参13

关键词: 钢柱脚 抗剪键 Timoshenko梁 Galerkin法 抗剪承载力

Calculation of shear capacity of shear connector in steel column base

XIAO Nan, LI Sha, ZHAO Wenzheng

College of Civil Engineering and Architecture, Zhejiang University, Hangzhou 310058, China

Abstract:

In order to determine the shear capacity of the shear connector in steel column base, two ultimate states of concrete compressive strain achieving the strain of peak stress and the ultimate strain in concrete constitutive relationship were taken into account for calculating yielding and ultimate shear capacity of the shear connector respectively. The simplified nonlinear elasto-plastic concrete stress-strain relationship was adopted. Based on the Timoshenko-beam theory considering the shear deformation, the differential equations about the deformation curve of the shear connector were established, and solved by Galerkin method. The theoretical formulae of the shear capacity were deduced and the design method for the effective embedment depth and section of the shear connector were proposed. The research shows that, the shear capacity and the embedment depth are determined by the section characteristics of shear connector and the foundation concrete. It also indicates that an additional flexural moment is generated by the reaction of the concrete. Case study shows that the shear capacities obtained by FEM and the proposed method in this paper are accordant with each other and proves the validity of the proposed method.

Keywords: steel column base shear connector Timoshenko beam Galerkin method shear capacity

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(50638050, 50978228)

通讯作者: 肖南(1965—), 男, 江西南康人, 副教授

作者简介:

作者Email: sholran@zju.edu.cn

参考文献:

本刊中的类似文章

1. 曹万林; 薛素铎; 张毅刚; 范重; 王春光; 张晓新; 谢龙宝. 国家体育场桁架柱柱脚锚固性能试验研究[J]. 建筑结构

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

- ▶ 钢柱脚
- ▶ 抗剪键
- ▶ Timoshenko梁
- ▶ Galerkin法
- ▶ 抗剪承载力

本文作者相关文章

PubMed

