



## 论文摘要

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### 型钢-钢管混凝土轴压柱核心混凝土应力-应变关系

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**摘要:** 对型钢-钢管混凝土轴压柱核心混凝土的受力特征进行分析; 借鉴典型的约束混凝土本构关系, 提出核心混凝土等效单轴受压应力-应变关系模型, 该模型考虑了型钢翼缘对核心混凝土约束效应的贡献。利用所建立的核心混凝土应力-应变关系模型, 采用数值方法对型钢-钢管混凝土轴压组合柱的荷载-变形关系进行分析。研究表明: 核心混凝土内部存在双重约束区域, 其力学性能与钢管混凝土柱中的核心混凝土存在差异; 数值计算结果与试验结果较吻合, 表明所提出的核心混凝土应力-应变关系模型能较准确地描述型钢-钢管混凝土轴压柱的受力过程、变形特征和承载能力等基本力学性能。

**关键字:** 组合柱; 核心混凝土; 应力; 应变; 受力特征; 数值分析

### Stress-strain relation of core concrete of axially-loaded steel tubular columns filled with steel-reinforced concrete

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**Abstract:** The working mechanism and stress characters of core concrete of axially-loaded steel tubular columns filled with steel-reinforced concrete were investigated. Based on the typical constitutive models of confined concrete, stress-strain relationship describing the equivalent single-axis compressive stress of the core concrete was put forward by considering the confining contribution of steel flanges. Moreover, full-range load-deformation relationship for the composite columns under axial load was calculated by using the proposed constitutive relationship. The results show that the mechanics performance of the core concrete is different from that of concrete-filled steel tubular column, due to the inner double confined area of core concrete of the composite columns. The calculated results and the experimental ones are in agreement well, which shows the proposed stress-strain relationship of core concrete is feasible in the evaluation of ultimate strength and deformation of axially-loaded steel tubular columns filled with steel-reinforced concrete.

**Key words:** composite column; core concrete; stress; strain; mechanics characteristic; numerical analysis

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