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屈曲约束支撑核心单元的多波屈曲过程研究

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RESARCH ON THE MULTI-WAVE BUCKLING PROCESS OF THE CORE COMPONENT OF THE BUCKLING-RESTRAINED BRACE

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摘要

屈曲约束支撑核心单元的受力形态是影响其低周疲劳特性和滞回特性的重要因素。基于屈曲约束支撑核心单元的受力特点,建立了基本假定,并依据承受轴向荷载和侧向荷载杆件的平衡方程,推导了核心单元与约束单元点接触和线接触状态下的挠曲线方程,揭示了其在持续增大的轴向力作用下点接触、线接触和新波生成交替出现的多波屈曲过程。算例分析表明:该文提出的计算公式与数值分析计算结果相一致,可用以描述核心单元在约束单元内的受力特性。

关键词: 屈曲约束支撑 限制失稳 接触 多波屈曲 挠曲线

Abstract:

The structural behavior of the core component is one of the key factors that influence the low-cycle fatigue and hysteretic character of buckling-restrained brace (BRB). Based on the structural features of the BRB, some basic assumptions are introduced to establish the equilibrium equation of a member subjected to axial and lateral force. Equations are then derived to describe the deflection curve of the core component under the situation of point contact and line contact. The multi-wave buckling process of the core under increasing axial load in turn of point contact, line contact and generation of new wave is revealed. A calculation example illustrates that the derived equations agree well with the numerical results, and the equations can be used to describe the structural behavior of the BRB core.

Key words: buckling-restrained brace confined buckling contact multi-wave buckling deflection curve

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