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梁翼缘削弱型节点钢框架柱弹性稳定分析

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ELASTIC STABILITY ANALYSIS OF COLUMN IN STEEL FRAMES WITH REDUCED BEAM SECTION CONNECTIONS

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摘要

采用变截面梁的转角位移方程,通过分析柱子的近端影响,推导出翼缘削弱型节点(RBS)无侧移和有侧移框架柱分别对应的计算长度系数?值的计算公式。通过引入梁柱修正线刚度比,RBS节点框架柱计算长度系数的计算公式可写成现行《钢结构设计规范》附录D的公式形式。研究结果表明:RBS节点无侧移框架柱的计算长度系数基本等同于普通刚接钢框架柱的计算长度系数,建议在简化计算中可直接按普通无侧移钢框架来计算;但对RBS节点有侧移钢框架,由于梁翼缘削弱,柱计算长度系数比普通刚接有侧移钢框架柱的计算长度系数有较大增加,已超过工程设计的允许误差,设计中应考虑其不利影响。

关键词: 翼缘削弱型节点 钢框架 计算长度系数 修正线刚度比 转角位移方程

Abstract:

By using rotational displacement equation of beams with varied cross-section and analyzing the effect of the column proximal end, the paper derives the equations for determining the effective length factor of columns in non-sway and sway steel frames with RBS (reduced beam section) connections. To do that, modified linear stiffness ratio is introduced, which can be written as a formula similar to that in appendix D in ‘Code for Design of Steel Structure’. The results show that effective length factor of non-sway RBS steel frames is very close to that of non-sway conventional steel frames, so the paper suggests that the effective length factor of columns in non-sway RBS frames can be replaced by that of columns in non-sway conventional steel frames; but the effective length factor of sway RBS steel frames is greatly large compared with that of sway conventional steel frames, which should be considered in engineering design.

Key words: reduced beam section connection steel frame effective length factor modified linear stiffness ratio rotational displacement equation

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