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联肢剪力墙的刚度、稳定性以及二阶效应

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RIGIDITY & BUCKLING OF COUPLED SHEAR WALLS AND SECOND ORDER EFFECT

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摘要

该文采用连续化模型, 对双肢剪力墙结构平面内稳定性进行了研究, 求得了顶部作用集中压力时临界荷载的精确显式表达式和显式屈曲波形。这个临界荷载公式表明, 联肢剪力墙是一种双重抗侧力结构, 并且可以采用串并联电路模型来表示两者之间的相互作用。串并联模型推广到线性分析的情况, 得到顶部抗侧刚度的显式表达式, 与精确解进行了比较。推导了顶部作用竖向集中荷载时, 在不同水平荷载作用下结构的侧移、墙肢弯矩、墙肢轴力和连梁弯矩放大系数, 并提供了近似计算公式。

关键词: 双肢剪力墙 屈曲 抗侧刚度 放大系数 连续介质方法

Abstract:

Using the continuum model, this paper made a study on buckling of coupled shear walls. A closed form solution and an explicit formula for the buckling load were obtained. The form of the formula implies that the coupled shear wall is a kind of dual structural system, and the interaction between two structural components may be elucidated by a series-parallel circuit. Based on this circuit, an explicit expression for the lateral stiffness of coupled shear wall was found and compared with the exact solution. Amplification factors of drift, bending moments and axial forces in walls and bending moments in the link beams due to the second order effect were studied and a simple formula for the amplification factor was also provided.

Key words: coupled shear wall buckling stiffness amplification factor continuous medium method

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