



轻钢龙骨框格密肋复合墙体抗震性能试验研究

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EXPERIMENTAL INVESTIGATION ON SEISMIC BEHAVIOR OF MULTI-GRID COMPOSITE WALL REINFORCED BY LIGHT STEEL

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摘要 轻钢龙骨框格密肋复合墙是在普通RC密肋复合墙的基础上,以轻钢龙骨代替肋梁柱中钢筋龙骨而形成的一种改进型密肋复合墙,为使密肋结构在大开间、中高层建筑结构中的应用成为可能,对轻钢龙骨框格密肋复合墙体抗震性能开展试验与理论研究十分必要。设计进行了1/2比例轻钢龙骨密肋复合墙体与标准RC复合墙体的低周反复荷载试验,对比研究改进前后密肋复合墙在破坏形态、承载力、刚度、延性等主要抗震性能方面的差异。试验结果表明,轻钢龙骨复合墙与普通RC复合墙均呈整体剪切型破坏,遵循砌块-框格-外框的破坏顺序;在用钢量增加17%的条件下,前者屈服荷载较后者提高了54.3%,极限荷载提高了53.1%,刚度及耗能性能亦明显优于后者;延性方面两者表现基本一致。该文研究工作为轻钢龙骨框格密肋复合墙在密肋结构中的应用提供了试验数据与基础。

关键词: 密肋复合墙 轻钢龙骨框格 低周反复荷载 抗震性能 试验研究

Abstract: Similar to the multi-grid composite wall reinforced by steel bars, an improved multi-grid composite wall reinforced by light steels is proposed, where the steel bars in grid beams and columns are replaced by light steels. To apply the improved composite in large-bay high-rise buildings, its seismic performance should be examined. 1/2 scale multi-grid composite walls reinforced by light steels, as well as by steel bars, were tested under reversed cyclic loading. Damage procedures, load-bearing capacity and ductility were compared. It is found that both kinds of walls fail in shear, and the damage propagates from the filling blocks to grids made up of grid beams and columns, and finally to the edged frame. Compared with using steel bars, using light steels to reinforce composite walls, with a 17% increase of steel, generated a yielding capacity of 54.3% larger and an ultimate capacity of 53.1% larger. The stiffness behavior and energy dissipation capacity of the improved composite wall were better too, while the ductility capacity of the two composite walls was almost the same.

Key words: multi-grid composite wall grids reinforced by light steel reversed cyclic loading seismic performance experimental investigation

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