

学术论文

端部加强型组合热轧角钢防屈曲支撑静载试验研究

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摘要: 提出用端部加强方法制作组合热轧角钢防屈曲支撑的钢芯。设计、制作并测试了7个试件,其中热轧角钢防屈曲支撑试件4个、对比热轧钢板试件3个。端部加强型角钢钢芯采用了两种截面(错十字形和T形)、两种组合方式(工作段焊接与非焊接),用端部焊接加强板的方法形成弱化工作段,主要优点是加工方便、降低造价。热轧钢板试件采用钢板焊接并切削成型。试验中设计改进了加载装置,采用静力反复加载方法加载。研究了包括轴向荷载-轴向变形滞回曲线、累计塑性变形、极限变形能力、刚度退化以及等效阻尼比等抗震性能。研究表明,用这种成型方法制作的组合热轧角钢防屈曲支撑构造简单,耗能能力、延性等抗震性能可满足建筑结构消能减震设计的需求。

关键词: 防屈曲支撑 热轧钢材 抗震设计 减震

Static tests on buckling restrained brace made of hot-rolled steel angle with strengthened ends

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Abstract: A new type of BRB(buckling-restrained braces) is designed and tested.With both ends strengthened,the braces are made of hot-rolled steel angle core.It has an advantage of simple and effective for manufacturing with low price.Seven specimens were tested,including four BRAB(buckling-restrained angle brace) with two cross section types(quasi-cross and T section) at combination methods (welded or without welding),three BRB made of hot-rolled steel plate for comparison.Cyclically static loading tests were conducted.Seismic behaviors,such as force-deformation hysteresis loops,accumulated plastic deformation,and tangent stiffness and its deterioration,as well as equivalent damping ratio are studied.It is validated that the new BRB using angle core has a reliable performance with high energy dissipation property and can be used to satisfy design requirements for buildings in seismic region.

Keywords: hot-rolled steel seismic design seismic dissipation

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