

世博会工程专辑

虹桥综合交通枢纽结构连续倒塌分析研究

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摘要:

为减少局部构件破坏引起结构连续倒塌的可能性,对虹桥综合交通枢纽东交通广场B3结构单元进行了3个单柱失效和1个双柱失效情况下的结构连续倒塌分析。采用有限元程序LS-DYNA对结构进行非线性动力分析,构件破坏判断标准参考美国国防部规范UFC4-023-03的要求。研究表明:在不同位置单柱失效情况下,该框架结构发生了局部破坏,但破坏限制在去除构件周围的一定范围内;支撑的存在可改变破坏路径;在双柱失效情况下,结构破坏范围明显加大,但最终破坏仍限制在局部范围,不会造成整体结构的连续坍塌。

关键词: 混合框架结构 构件拆除法 非线性动力分析 连续倒塌

Progressive collapse analysis of a building inHongqiao Communication Junction.To reduce the potential

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Abstract:

To reduce the potential of structural progressive collapse due to local member failure, progressive collapse analysis was carried out for the B3 structure in the East Communication Plaza of Hongqiao Junction. Three cases of single-column failure and one case of double-columns failure were analyzed employing alternative path method according to the requirements of UFC-023-03. From nonlinear dynamic analysis results, this frame structure is locally damaged for single-column failure cases but the damage is confined within the limited area around the removed member. For the double-columns failure case, the damaged area is obviously increased but is still confined in a limited area and won't induce the whole structure's progressive collapse.

Keywords: hybrid frame structure alternative path method non-linear dynamic analysis progressive collapse

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