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新型自复位桥梁墩柱节点的局部稳定性研究

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LOCAL STABILITY STUDY OF NEW BRIDGE PIERS WITH SELF-CENTERING JOINTS

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摘要 为了更好地控制结构震后残余变形,增强桥梁结构自复位性能,最大限度地强化震后继续服役的能力和增加再修复的可能,该文基于性能设计的理念,给出一种新型自复位桥梁墩柱节点体系的基本概念,并选取该体系的典型模型进行截面弹性承载力、滞回特性、设计控制参数等力学性能进行初步的推导和分析。研究结果初步表明,该自复位桥梁墩柱节点结构受力明确,构造合理巧妙,由于嵌合式接头限制了体系最小势能位置,能够帮助结构复位,震后残余变形小,震后弹性承载力不下降,能够满足对结构性能的更高要求。

关键词: 自复位 基于性能 嵌合式接头 残余变形 自复位性能

Abstract: In order to minimize post-earthquake residual structural deformation, to enhance seismic self-centering ability of bridge structures and to promote the continuous service condition with limited repair or even without retrofit, a series of new concepts of self-centering bridge pier joints has been presented. Based on a typical self-centering bridge pier joint structure, some mechanical factors including the flexural strength, hysteretic characteristics, working characters and control parameters have been derived and analyzed. The proposed joint that constrains the minimum potential position of the system, can help the structure reset. The paper shows that the unambiguous mechanical system of self-centering bridge pier joint has little post-earthquake residual deformation, prevents the elastic strength from weakening and holds the flexibility for construction, which can better satisfy more rigorous seismic requirements for next generation bridge system.

Key words: self-centering performance based tongue-groove joint residual deformation self-centering ability

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