

عنوان مقاله:

NEAR SURFACE-MOUNTED SHAPE MEMORY ALLOY TECHNIQUE FOR MITIGATING THE DUCTILITY DEMAND OF THE IRREGULAR BRIDGES

محل انتشار:

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خلاصه مقاله:

A common form of bridge irregularity is defined when a bridge has different height (length) piers. Bridges that have different length piers could have undesirable seismic behaviour during earthquake events. This stiffness irregularity produces a large concentration of seismic forces in the shorter piers which are usually the stiffer parts of the lateral resisting system. The shape memory alloy bars have the ability to reduce permanent deformations of concrete structures. This paper presents a new retrofitting approach to improve the seismic behavior and to mitigate the ductility demand of the short pier in the irregular bridges. In this concept, the short pier was divided into three zones. The first zone in the critical region of the pier where the plastic hinge is possible to occur was retrofitted with near-surface mounted shape memory alloy technique and wrapped with FRP sheets. The second zone, being above the plastic hinge, was confined with Fiber-Reinforced Polymer (FRP) jacket only, and the rest of the column left without any retrofitting. The retrofitted bridge was numerically investigated under 2D fiber element modeling in OpenSees software. The results of the nonlinear time history analysis indicated that the proposed retrofitting technique was able to reduce the ductility demand of the short pier by about 34%.

کلمات کلیدی:

irregular bridges, shape memory alloy, near surface mounted, ductility demand

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