

Seismic Response of Braced Steel Frames with Shape Memory Alloy and Mega Bracing Systems

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Abstract : Steel bracing members are widely used in steel structures to reduce lateral displacement and dissipate energy during earthquake motions. Concentric steel bracing provide an excellent approach for strengthening and stiffening steel buildings. Using these braces the designer can hardly adjust the stiffness together with ductility as needed because of buckling of braces in compression. In this study the use of SMA bracing and steel bracing (Mega) utilized in steel frames are investigated. The effectiveness of these two systems in rehabilitating a mid-rise eight-storey steel frames were examined using time-history nonlinear analysis utilizing Seismo-Struct software. Results show that both systems improve the strength and stiffness of the original structure but due to excellent behavior of SMA in nonlinear phase and under compressive forces this system shows much better performance than the rehabilitation system of Mega bracing.

Keywords : finite element analysis, seismic response, shapes memory alloy, steel frame, mega bracing

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