

PERFORMANCE-BASED PLASTIC DESIGN OF SELF-CENTERING STEEL BRACED FRAME

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This study proposes a performance-based seismic design (PBSD) method for steel braced frames with novel self-centering (SC) braces that utilizes shape memory alloys (SMA) as a kernel component. The presented PBSD method is essentially a modified version of the performance-based plastic design. A few concentrically braced frames with SC braces are designed as examples to illustrate the efficacy of the proposed design method. The seismic performance of the designed frames is examined at various seismic intensity levels. Results of nonlinear time-history analyses indicate that the designed SC braced frames can successfully achieve the prescribed performance objectives at three seismic hazard levels.

Keywords:

performance-based seismic design; performance-based plastic design; self-centering; steel braced frame; shape memory alloy (SMA).