

# APPLICATION OF SUPERELASTIC SHAPE MEMORY ALLOY (SMA) IN CIVIL INFRASTRUCTURE FOR SEISMIC HAZARD MITIGATION

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Shape memory alloy (SMA) is a smart material that has a great potential for various civil engineering applications. The novelty of this material lies in its ability to undergo large deformation and return to its undeformed shape through stress removal (superelasticity) or heating (shape-memory effect). In particular, SMAs have distinct thermomechanical properties, including superelasticity, shape-memory effect and hysteretic damping. These properties could be effectively utilized to substantially enhance the safety of various structures. This presentation will cover the fundamental characteristics of SMAs, the constitutive material models of SMAs and the factors influencing the engineering properties of SMAs. The outcomes of several SMA-based research projects will be discussed including the reinforcement and repair of structural elements, bracing technology and the development of kernel components for seismic devices such as dampers and isolators and their performance-based seismic design. This presentation will synthesize existing information on various SMA types and their applications which is intended to motivate researchers and practicing engineers and extend the use of SMAs in novel and emerging applications.

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