Shahria Alam et al., J Material Sci Eng 2015, 4:3
http://dx.doi.org/10.4172/2169-0022.S1.019

OMICS International
conferenceseries.com

International Conference on
Smart Materials & Structures

June 15 -17, 2015 Las Vegas, USA

Seismic applications of shape memory alloys in steel buildings: A Review

Shahria Alam and **Saber Moradi**
The University of British Columbia, Canada

Shape Memory Alloys (SMAs) are a class of metallic alloys with unique properties suitable for various civil engineering applications. SMAs are known for their capabilities to undergo large deformations while returning to their original undeformed shape through stress removal (superelasticity) or heating (shape memory effect).These desirable characteristics have attracted the interests of civil and structural engineers.Over the past three decades, several applications have been proposed and investigated for seismic response mitigation of steel buildings using SMAs in the forms of bars, wires, shells, and plates.In addition to providing supplemental damping, SMAs are used in civil infrastructures to mainly provide self-centering (i.e, return the structure back to its original position). As a result of this self-centering performance, residual deformations are eliminated in the building, even after severe earthquake events. Consequently, repair costs are significantly reduced following earthquakes. Here, a state-of-the-art review of the research on SMA-based damping and recenteringdevices, isolation devices, bracing systems, and structural retrofit and rehabilitations in steel braced frames and moment frames is presented.First, a general brief introduction of shape memory alloys is provided. Afterwards, the literature review is presented in three main sections, including numerical works, experimental works, and numerical studies along with experimental works. The challenges that exist for the practical applications of smart materials in buildings arealso discussed. Based on the literature review, recommendations are provided for future research in this field.

Biography

Shahria Alam is an Associate Professor in the School of Engineering at The University of British Columbia's Okanagan campus. He received his PhD in Structural Engineering from the University of Western Ontario in 2008. His research interests include sustainable construction and smart materials for structural applications and seismic rehabilitation. He published more than 100 peer reviewed papers and is the recipient of many national and international awards.He also delivered several keynote speeches in international conferences on smart materials. Currently he is serving as a Chair of the Concrete Structures sub-Committee of the Canadian Society for Civil Engineering (CSCE), and also a member of several international code committees.

shahria.alam@ubc.ca

Notes: