

The Johns Hopkins University Department of Civil Engineering
2011 Richard J. Carroll Memorial Lectureship

APPLICATION OF SMART MATERIALS IN NATURAL HAZARD MITIGATION



Reginald DesRoches, PhD
Georgia Institute of Technology

Wed., April 13
1:30-2:30 p.m.

The Johns Hopkins University
Homewood Campus
Hodson Hall, 3rd Floor Boardroom
Open to the public

Followed by ASCE Event
And after-dinner lecture
6:00 p.m. Cocktails, 7:00 p.m. Dinner*
8:00 p.m. Seminar

The 2010 Haiti Earthquake: Lessons Learned and Opportunities for Rebuilding for Resilience and Sustainability in Haiti

The Engineers Club
11 W. Mount Vernon Place, Baltimore, MD
*Reservations are required: asce@esb.org

Civil
Engineering
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ABSTRACT: The recent earthquakes in New Zealand and Chile underscore the importance of developing new approaches and technologies to increase the performance of structures during earthquakes. The presentation will highlight the application of a new class of materials, namely shape memory alloys (SMAs), in mitigating the effects of earthquakes in buildings and bridges. Shape memory alloys are a unique metallic alloy which can undergo large deformations while reverting back to their original, undeformed shape. This unique property has led to the development of applications in the biomedical field (arterial stents), aerospace field (adaptive wings), and commercial industry (eyeglass frames). A multi-scale and multi-disciplinary approach is taken to explore the use of SMAs for applications in earthquake engineering. Several large scale applications are tested including a “smart” steel beam-column connection that uses shape memory alloys, innovative bracing systems, and recentering restraining devices for bridges. The large scale experimental tests and complementary analysis show great potential for the use of shape memory alloys in seismic applications.

BIO: Reginald DesRoches is a Professor and Associate Chair of Civil and Environmental Engineering at the Georgia Institute of Technology. His primary research interests are design of buildings and critical infrastructure under earthquake engineering, seismic risk assessment of lifeline systems, and application of innovative materials in rehabilitation of structures. He has published over 180 articles in the general area of structural and earthquake engineering. Dr. DesRoches has served as Chair of the ASCE Seismic Effects Committee (2006-2010), and Chair of the executive committee of the Technical Council on Lifeline Earthquake Engineering (2010). He is currently a member of the executive committee of the National Academy of Sciences Disasters Roundtable, and is on the Board for the Earthquake Engineering Research Institute (EERI). Dr. DesRoches has been a key technical leader in the U.S. response to the 2010 Haiti Earthquake.

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