



U. of Illinois

Earthquake Engineering Research Institute and Mid America Earthquake Center Seminar

Wednesday - April 25, 2012

Pizza and drinks 12:00 – 1:00 pm
Room 1233 NCEL



MAE Center
U. of Illinois

Asynchronous excitation of long bridges in high seismicity areas: evidence, ongoing research and design implications



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Although bridge structures might seem at a first sight as rather linear and simple structural systems, their actual performance under earthquake loading is more complicated than that of ordinary buildings, because bridges have typically an order of magnitude larger overall and cross-sectional dimensions, different energy absorption mechanisms, more significant contribution of higher modes, while they are most commonly crossing non-uniform soil profiles. Notwithstanding the significant research progress made to date which has already shed some light on many bridge engineering problems, the development of a “realistic” earthquake motion scenario is still associated with the highest relative uncertainty compared to maybe all other design and construction aspects. This is even more pronounced in the case of long bridges, where the variation of ground motion among its supports in terms of arrival time, frequency content and amplitude, can strongly affect both the pseudo-static and the dynamic components of the system. The objective of the presentation is to discuss the recent findings on the impact of asynchronous (i.e., spatially variable) seismic excitation on the response of long bridges. The study focuses on the recently constructed 780km Egnatia highway in northern Greece, and the 400m cable-stayed Evripos bridge that connects the Evia island to the Greek mainland. Despite the long distance from the earthquake source, the simultaneous free-field and on-structure recordings reveal interesting patterns of higher mode excitation and subsequent dynamic behavior. Based on the above comparative studies, an effort is made to focus on the dynamic response of the entire, interacting soil-structure system under asynchronous excitation and to propose means for assessing in advance the degree of its potential detrimental influence.



Dr. Anastasios Sextos is an Assistant Professor of Information Technologies in Earthquake Engineering at Aristotle University of Thessaloniki in Greece. His main research interests are related to the application of information technologies for the analysis and design of RC structures and bridges, software development, numerical analysis of complex structures, spatial variability of earthquake ground motion, soil-structure interaction and rehabilitation of historical structures.

Anastasios Sextos received a 5yr Diploma in Civil Engineering in 1997 at Aristotle University, a Masters Degree on Earthquake Engineering and Structural Dynamics at Imperial College London, U.K. in 1998 and a Ph.D. in Bridge Engineering from Aristotle University in 2001. He was appointed as a lecturer at Aristotle University in 2003 and as an Assistant Professor in 2008. He is the author or co-author of approximately 100 scientific publications, from 2003 to present, including 14 peer-reviewed journal papers, 2 books, numerous book chapters and papers in conference proceedings. He is a reviewer for 21 international scientific journals. He has received scholarships & fellowships from the Deutscher Akademischer Austausch Dienst (DAAD, Germany), the Engineering and Physical Science Research Council (EPSRC, U.K.), the Bodossaki Foundation (Greece) and the Institution of Public Scholarships of Greece.

Anastasios Sextos is currently a Fulbright visiting scholar at the University of Illinois at Urbana-Champaign. For additional information please refer to: www.asextos.net