

Bridge Engineering Distinguished Speaker Series

PRESENTED BY THE DEPARTMENT OF CIVIL, STRUCTURAL AND ENVIRONMENTAL ENGINEERING AND MCEER

Health Monitoring of Prestressing Tendons in Post-tensioned Concrete Bridges



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Dr. Salvatore Salamone earned a Laurea (MS) in Civil Engineering from University of Palermo in 2002, and a PhD in Structural Engineering from Palermo in 2007. He did his post-doctoral studies at the University of California San Diego. His primary research interests are in structural health monitoring, non-destructive evaluation, ultrasonic sensing methods for smart structures, digital signal processing and pattern recognition. He has published 20+ papers in international peer-reviewed journals and conferences.

Biographical Sketch:

Prestressing (PS) tendons are the main load-carrying components of post-tensioned box-girders bridges. Structural damage (e.g., corrosion and broken wires) as well as loss of prestress in the tendons are critical for the performance of the structure and may lead to failure. This talk presents a structural health monitoring system for post-tensioned bridges. Such a system uses ultrasonic guided waves and embedded sensors to provide simultaneously and in real time, (a) measurements of the level of applied prestress, and (b) defect detection at early grow stages. The proposed technique exploits the sensitivity of ultrasonic waves to the inter-wire contact developing in a multi-wire strand as a function of prestress level. The wave behavior is examined in both the linear regime and the nonlinear regime. Experimental results of load monitoring will be shown for both free and embedded strands. A statistical approach based on Multivariate Outlier Analysis will be also discussed to enhance the sensitivity of the PS level measurement technique. The talk will also present real-time damage detection and location in post-tensioned bridge joints using Acoustic Emissions collected during large-scale laboratory testing. Issues and potential for the use of such techniques to monitor post-tensioned bridges in the field will be discussed.

Date / Time: Monday, **October 25, 2010**, 6:30 – 7:45 pm Eastern Time

Location: Baldy Hall, 2nd Floor, Room 200G

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