

Research Frontiers and Challenges for Earthquake Engineering and Beyond

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Abstract

This presentation will comment on several research frontiers in earthquake engineering with respect to the advancement of smart structures technologies for earthquake protection of buildings and infrastructure systems. Personal views of long term and short term research subjects are discussed in three categories: (1) Earthquake hazard mitigation research, (2) Community preparedness research, (3) Disaster management research. In most cases, multiple extreme hazard engineering will be emphasized including earthquake engineering. The latter may be regarded as one of the most advanced discipline among all extreme hazard engineering activities. It is suggested that many existing earthquake engineering technologies may be expanded or modified for multiple hazard mitigation, while new earthquake engineering technologies to be developed should consider their ability and versatility for multiple hazard protection of infrastructure systems.

Bibliography

Dr. George C. Lee is a SUNY Distinguished Professor in the Department of Civil, Structural and Environmental Engineering. Previously, he had served as Chair of the Department of Civil Engineering (1974-77) and Dean of the School of Engineering and Applied Sciences (1978-95) at UB. Since 1995, Dr. Lee is Samuel P. Capen Professor of Engineering. Between 1992 and 2003 he served as Director of the Multidisciplinary Center for Earthquake Engineering Research (MCEER). Between 2003 and 2008 he has served as Special Task Director of MCEER. He earned both his Ph.D. and M.S. degrees at Lehigh University, and his undergraduate degree from the National Taiwan University. During his 46 years of educational services at SUNY at Buffalo, Dr. Lee has mentored 20 post doctoral fellows, supported over 30 international visiting scholars to Buffalo, and guided 45 Ph.D. students and 75 MS students. He has co-authored four books and published more than 250 papers on structural engineering and mechanics, steel structures and earthquake engineering. In his earlier career, he also made contributions in cold regions structural engineering and in biomechanics and living systems. His currently funded research projects (NSF and FHWA) include the development of:

1. Seismic Design of Structures with Added Response Modification and Isolation Systems

2. Decision-Support Systems for Managing Utility Systems for Critical Facilities
3. Seismic Design of Segmental Piers for Accelerated Bridge Construction
4. Multi-hazard Design Principles for Highway Bridges
5. Bridge Damage Monitoring System

Dr. Lee has held leadership positions in numerous professional organizations in which he is a member, including: American Society of Civil Engineers, Welding Research Council, Structural Stability Research Council, U.S. National Committee on Biomechanics, and Committee on Hazard Mitigation Engineering of the National Research Council. He has served as the editor or as a member of editorial boards of several ASCE and international journals. At present, he is the editor-in-chief (US) of Journal of Earthquake Engineering and Earthquake Vibration. He is the recipient of numerous awards and citations including the Newmark Medal of the American Society of Civil Engineers for his research contributions in structural engineering and engineering mechanics and his leadership role to successfully pioneer the center approach in earthquake engineering research engaging multi-institution, multi-disciplinary team efforts. Most recently, Dr. Lee received a 2006 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM).