

Seismic Performance Assessment of Structures through Numerical and Hybrid Simulations

(July 2 – 12, 2018)

Overview

The structural engineering field is moving towards the performance based seismic design (PBSD). One of the main challenges in PBSD is the accurate assessment of performance of structures. Because most structures in civil engineering are designed to perform in the inelastic range when subjected to design level earthquakes, it is important to properly model the inelastic cyclic behavior of structural elements, such that their influence on the global structural response can be accurately captured. Yet, numerical modelling of structural elements that may experience cycles of inelastic deformation is still a challenging task. In most cases, engineers and researchers should clearly understand the underlying assumptions and limitations of numerical modelling approach that they adopt. This course will provide a detailed coverage on several topics that engineers and researchers need to learn for seismic performance assessment of structures. The course will start with review of structural dynamics, which is essential to understand various analysis methods. Then, numerical modelling approaches for various structural elements will be discussed, which will be followed by hybrid simulation approach where physical specimens can be directly integrated with numerical models for more realistic seismic performance assessment of a structural system. Several analysis methods, such as pushover analysis, incremental dynamic analysis, capacity spectrum methods, etc., will be discussed.

Contents	<ul style="list-style-type: none"> ▪ Introduction to Performance based Design. ▪ Review of Structural Dynamics. ▪ Numerical Modelling of Non-linear Structures. ▪ Seismic Analysis of Non-linear Structural systems. ▪ Introduction to Non-linear Finite Element Analysis. ▪ Hybrid (experimental-analytical) Simulation method. ▪ Seismic Retrofit Strategies. ▪ Seismic Analysis and Retrofit of Historical Structures.
You Should Attend If...	<ul style="list-style-type: none"> ▪ Executives, engineers and researchers from construction industry such as design offices, contractors, engineers from various state and central government laboratories. ▪ Graduate students at all levels (ME/MTech/PhD), research scholars, faculty from reputed academic institutions and technical institutions.
Fees	<p>The participation fees for taking the course is as follows: Participants from abroad: US \$500; Industry/ Research Organizations: Rs. 20000; Faculty from Academic Institutions: Rs. 10000; Graduate Students: Rs. 2000</p> <p>The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, and free internet facility. The participants will be provided food and accommodation on additional payment basis.</p>

The Faculty



Dr. Oh-Sung Kwon is in the faculty of Civil Engineering at the University of Toronto. He is currently the editorial manager of journal of earthquake engineering. Dr. Kwon earned his BSc and MS degrees from Hanyang University, Korea. Thereafter, he received his MS and PhD degrees from University of Illinois at Urbana Champaign (UIUC) in the filed on earthquake engineering. His research interest is focused on development and application of advanced simulation methods for the seismic performance assessment of structural systems. He is very well known for his contributions in the field of hybrid simulation technique by integrating various experimental elements that are geographically distributed around the world and numerical elements that are modelled with specialized analysis tools.



Dr. Arun Menon earned his M-Tech from IIT Madras and MSc, PhD degrees in earthquake engineering from University of Pavia, Italy. He has more than 15 years of exposure to the field of seismic engineering and his research interests include seismic behaviour of masonry structures, restoration of heritage structures and seismic risk assessment. He is currently coordinating the efforts of National Centre for Safety of Heritage Structures (NCSHS), IIT Madras. He is member of Bureau of Indian Standards Panel for Masonry, CED 46: P7 and Convener, Working Group for Draft Code: "Seismic Retrofit of Structures: Masonry Buildings" in CED 39: Earthquake Engineering Sectional Committee



Dr. Suriya Prakash received his MS from IIT Madras and PhD from University of Missouri Rolla. His research expertise is on seismic behaviour, design and retrofit of concrete structures. He worked with Structural Group Inc., a renowned firm in seismic strengthening design and construction using advanced construction materials. He has authored more than thirty journal papers on the behaviour of reinforced concrete/ prestressed concrete structural elements under static and cyclic loading. He has also extensively worked on assessment of structural components under seismic loading through large scale testing. He is a member of ASCE and ACI, USA.



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