Risk Based Damage Tolerant Seismic Design of Structure-A New Paradigm

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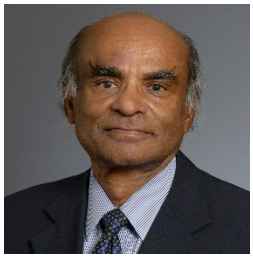
Overview

In spite of the best efforts of the engineering community all over the world, structures fail after most major seismic events causing significant property damages and loss of human live. The world communities spent an enormous amount of resources over past several decades, conducting theoretical, analytical, and experimental studies, to study the structural response behavior caused by the seismic excitation. However, the success of such work has been very limited at best so far. Designing seismic damage-tolerant structures has been one of the major challenges facing the civil engineering profession over a long period of time.

The current seismic analysis and design procedures are not adequate and a major shift in the design paradigm is necessary. There is no doubt that the engineering profession has developed full understanding of structural behavior excited by a known earthquake time history. Unfortunately, the profession does not know how to predict a future design earthquake time history at a site at present. This presenter was awarded a major research grant funded by the U.S. National Science Foundation to develop the required paradigm shift in a comprehensive way to replace the current seismic design practices. The ultimate objective is to design more seismic damage-tolerant structures. The underlying seismic risk of a structure cannot completely be eliminated, it needs to be managed. Instead of conducting millions of simulations, can be impractical in most cases, the information on risk can be extracted by conducting only dozens of deterministic analyses at very few intelligently selected points. Multiple deterministic analyses will provide the new seismic design paradigm. This new design paradigm will be introduced in this short course, specifically addressing steel structures. Course participants will learn these topics through lectures, tutorials and case-studies.

Modules	**18th December-27th December, 2017** **A.** Sources of uncertainty in seismic analysis, Risk based structural analysis and design **B.** Reliability-based design code, Concepts of Load and resistance factor design (LRFD), Partial safety factors. **C.** Reliability analysis for explicit and implicit limit state functions, Stochastic finite element method and applications **D.** Response surface concept to generate implicit limit state functions, Reliability evaluation using the response surface method, Advanced factorial design, and Kriging **E.** Risk based analysis and design of steel structures-New design paradigm, Case study **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ you are an civil engineer or research scientist interested in analysis and design of risk based damage tolerant design of structure. ▪ you are practicing structural engineering, involved with planning and design of urban infrastructure or involved with policy formation and governance of infrastructure in your profession. ▪ you are a student or faculty from academic institution interested in applying concepts of uncertainty and reliability analysis for performing load and resistance factor design for seismic resistance structures.
Fees	The participation fees for taking the course is as follows: **Research scholar/Students: Rs. 1,000** (Refundable subject to joining the course) **Faculty from academic institutions: Rs 4,000** **Industry/ Research Organizations: Rs 10,000** **Participants from abroad : US $500** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty



Prof. Achintya Haldar is a Professor of Department of Civil Engineering and Engineering Mechanics at The University of Arizona, Tucson. His research interests are application of probabilistic methods in earthquake engineering, reliability based engineering analysis and performance based design and structural health monitoring and system identification.

Amit Shelke is an Assistant Professor at Department of Civil Engineering at IIT Guwahati. His research interest are structural health monitoring and nondestructive testing using guided waves.

Course Co-ordinator

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