Two-day Seminar on:

Performance-Based Design of

Tall Buildings

April 5 and April 6, 2025

Invited Speakers

Mr. Thaung Htut Aung
A.I.T. Solutions, Thailand

Dr. Pennung Warnitchai
A.I.T., Thailand

Dr. T Ornthammarath
Mahidol University, Thailand

Dr. Naveed Anwar
C.S.I., Bangkok

Dr. Yogendra Singh
I.I.T. Roorkee

Mr. S. M. Zia Uddin
A.I.T., Solutions, Thailand

For Registration:

SCAN ME

Department of Civil Engineering
Indian Institute of Technology Roorkee

Schedule

Day 1: 05/04/2025: Saturday

9:00 am	Lighting of Lamp
9:30 -11 AM	Mr. Thaung Htut Aung Performance-based Seismic Design of Tall Buildings
11:00 -11:30 AM	Tea/Coffee
11:30 - 1 PM	Dr. Yogendra Singh Nonlinear Modelling of RC Buildings for Performnance-based Seismic Design
1:00 - 2:00 PM	Lunch
2:00 - 3:30 PM	Dr. Pennung Warnitchai Wind Effects on Buildings and Structures and Wind Tunnel Model Tests
3:30 - 4:00 PM	Tea/Coffee
4:00 - 5:30 PM	Dr. Naveed Anwar AI in Structural Design Workflow: Opportunities and Challenges

Day 2: 06/04/2025: Sunday

9:30: 11.00 AM	Dr. Teraphan Ornthammarath Seismic Hazard & Deaggregation Analysis for Selected Major Cities in Continental South East Asia
11:00 -11:30 AM	Tea/Coffee
11:30 - 1 PM	Mr. S.M. Ziauddin Post-earthquake Structural Health Monitoring: An Overview
1:00 - 2:00 PM	Lunch
2:00 - 3:30 PM	Structural Engineering Laboratory Visit
	Closure

Seminar Venue: Room No. 103, A.P.J. Abdul Kalam Block, I.I.T. Roorkee

Who can attend?

Educators, Researchers, Students, Structural Designers.

Important dates

Last Date of Registration : 25th March 2025

Accomodation

Limited accomodation will be provided in the guest house of IITR on first come-first serve basis. For accomodation related queries please contact: Mr. Abhishek Srivastava (Mob.+91-9454344923) and Mr. Swapnil Balasaheb Ghodke (Mob. +91-9730010717).

How to reach I.I.T. Roorkee

By Road:

Roorkee is located approximately 180 km north to Delhi. There is an excellent bus service available from Delhi to Roorkee. All buses going to Dehradun from Delhi will pass through the Roorkee.

By Rail:

Roorkee is well connected by rail to Delhi and other major cities of north India. The high speed trains Shatabdi, Jan Shatabti and Vande Bharat offers a convenient option of travelling from Delhi to Roorkee. By train, it takes less than 3 hours and 30 minutes to reach Roorkee from Delhi.

By Air:

The closest airport Jolly Grantt Dehradun is locatd at about 70 km from Roorkee. Dehradun is served by air from Delhi to many other cities across India. But most preferable airport nearest from Roorkee is the New Delhi International Airport which is about 180 kilometers away.

For any seminar-related queries, please contact

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Synopsis

Performance-based Seismic Design of Tall Buildings

Mr. Thaung Htut Aung
Executive Director, AIT Solutions, Asian Institute of Technology, Thailand

Performance-based seismic design (PBSD) is an innovative approach that allows for the design of tall buildings to meet specific performance objectives during seismic events. Unlike traditional prescriptive methods, PBSD focuses on achieving desired performance levels through detailed analysis and modeling of building behavior under seismic loads. This presentation will explore the key components of PBSD, including the seismic design philosophy, nonlinear modeling and analysis, and the performance evaluation procedure. Additionally, the presentation will discuss future directions in the field, emphasizing the importance of continuous research and collaboration among academicians and practicing engineers.

Nonlinear Modelling of RC Buildings for Performnance-based Seismic Design

Dr. Yogendra Singh
Professor, Department of Earthquake Engineering, Indian Institute of Technology Roorkee

Structures inevitably undergo nonlinear inelastic response under large earthquakes. Estimation of nonlinear response is a crucial step in performance-based seismic design. This can be done either using a static (Push-over) analysis or a dynamic (Time History) analysis. The push-over analysis is based on monotonic lateral loading and takes in to account the cyclic nature of seismic response, indirectly, using 'back-bone' curves for the plastic hinges, which are derived from envelopes of experimental cyclic (hysteresis) test results of structural components. On the other hand, the time history method requires the complete hysteresis models of structural components, to simulate the response under ground motion excitation. In this talk, different models of back-bone and hysteretic load-displacement curves for RC building components shall be discussed. Nonlinear modelling of beams, columns, shear walls, infill walls and slab-column frame structures shall be discussed.

Synopsis

Wind Effects on Buildings and Structures and Wind Tunnel Model Tests

Dr. Pennung Warnitchai
Professor, Department of Civil & Infrastructure Engineering,
Asian Institute of Technology, Pathum Thani, Thailand

Strong winds can exert significant dynamic pressures on structures, leading to potential structural failure, discomfort for occupants, or damage to cladding systems. Understanding these effects is essential for ensuring structural integrity and minimizing economic losses. Wind tunnel model tests have emerged as a vital tool for understanding and mitigating these effects. By simulating real-world wind conditions on scaled-down models, these tests provide valuable insights into wind pressure distribution, vortex shedding, aeroelastic effects, and overall structural behavior. This presentation shows the fundamental principles of wind structure interaction, the role of wind tunnel testing in predicting wind loads, the methodologies employed in wind tunnel testing, and the application of test results.

AI in Structural Design Workflow: Opportunities and Challenges

Dr. Naveed Anwar
CEO, CSI Bangkok, Thailand

The primary objective of structural design is to create resilient and sustainable structures. Achieving this often requires structural engineers to navigate several iterative and often repetitive processes. This talk explores the opportunities and challenges of integrating AI-enabled tools and processes into the structural design workflow to enhance efficiency and improve design outcomes. Key concepts such as predictive design, generative design, image-based modeling, AI-assisted sanity checks, AI-driven conversational programs, leveraging existing design data, and using engineering analysis and design software to generate large, valid datasets for training reliable AI models will be discussed.

Synopsis

Seismic Hazard & Deaggregation Analysis for Selected Major Cities in Continental South East Asia

Dr. Teraphan Ornthammarath
Associate Professor, Department of Civil and Environmental Engineering, Faculty of Engineering, Mahidol University, Thailand

We present an evaluation of the 2018 Northern Southeast Asia Seismic Hazard Model (NSAHM18) based on a combination of smoothed seismicity, subduction zone, and fault models. The smoothed seismicity is used to model observed distributed seismicity from largely unknown sources in the current study area. In addition, due to a short instrumental earthquake catalog, slip rate and characteristic earthquake magnitudes are incorporated through the fault model. However, only seismic hazard results generally lacking communication capabilities for general public and earthquake engineering to understand hazard results, deaggregation analysis is then generally been introduced to display the relative contributions of hazard results at a specific return period from different earthquake scenarios. In this study, deaggregation and sensitivity analysis for cities in this study area have been performed. Seismic deaggregation hazard maps for peak ground acceleration (PGA), 0.2s and 1.0s spectral acceleration (SA) at 10% and 2% of probability in 50 years have been derived. Key cities, including Bangkok, Hanoi, Yangon, and Ho Chi Minh City, are examined to assess region-specific seismic risks. By analyzing probabilistic seismic hazard data and considering uncertainties arising from seismic source models, ground motion prediction equations (GMPEs), and other parameters, we provide insights into the dominant seismic sources and their contributions to hazard levels.

Post-earthquake Structural Health Monitoring: An Overview

Mr. S.M. Ziauddin
Coordinator, Wind Engineering & Structural Health Monitoring, AIT Solutions, Asian Institute of Technology, Thailand

Earthquake-induced shaking can cause anxiety among residents, which may lead to prolonged evacuation of structurally sound buildings and substantial financial losses due to business and occupancy disruptions. Conversely, failure to promptly evacuate individuals from severely damaged structures following the mainshock poses a considerable risk of casualties, as these buildings may collapse during aftershocks. To mitigate this issue, buildings can be instrumented with accelerometers, and acceleration records can be used for post earthquake structural health monitoring. This presentation shows three methods that employed floor acceleration records to identify structural damage after an earthquake. Outcomes indicate that an appropriate data-driven analysis scheme can accurately estimate inelastic seismic responses of every floor of a building.