About BMTPC

The Building Materials & Technology Promotion Council (BMTPC) is an autonomous organization under the aegis of the Ministry of Housing & Urban Poverty Alleviation, Govt. of India. BMTPC has been playing a proactive role in the area of disaster mitigation and management. Noteworthy contributions made by BMTPC are the publication of the Vulnerability Atlas of India and the Landslide Hazard Zonation Atlas of India as well as the conduct of retrofitting of various life-line structures such as schools, hospitals etc. BMTPC has always been in the forefront in educating and creating mass awareness amongst common men and publishing guidelines, brochures, pamphlets etc. for improving Earthquake and Cyclone/Wind Resistant Housing. These documents have served as important tools for safety against natural hazards for all stake holders involved in disaster mitigation & management. The Council is also involved in the construction of cost-effective disaster resistant model houses and retrofitting of existing buildings besides helping State/UT Govts. in modifications of their Building Byelaws.

About DEPARTMENT OF EARTHQUAKE ENGINEERING at IIT ROORKEE

The Department of Earthquake Engineering at IIT Roorkee was established in 1960 as School of Research and Training in Earthquake Engineering. The Department has provided yeomen service in teaching, research, training and rendered advice in the field of Earthquake Engineering for the last 50 years. The Department has four main sections: (i) Seismic Instrumentation, (ii) Engineering Seismology and Seismotectonics, (iii) Soil Dynamics, and (iv) Structural Dynamics. It offers three M.Tech. programs in Earthquake Engineering with specialization in Structural Dynamics, Soil Dynamics, and Seismic Vulnerability and Risk. The Department has played crucial role in development of seismic design codes in India, and has intensive interaction with the industry.

About NORSAR

NORSAR is an independent research foundation specialized in seismological research and engineering services relevant for the society. During the last decade NORSAR has become increasingly engaged in seismic risk and vulnerability research and development aimed at societal units like cities and municipalities. By combining civil engineering and earth scientist competence, NORSAR has developed a unique environment for such earthquake hazard, vulnerability and risk evaluations. These efforts have over the past years included seismic hazard and risk projects in many earthquake exposed countries, including Guatemala, Nicaragua, El Salvador, Pakistan, India, or entire Central Asia. NORSAR has together with the University of Alicante developed the SELENA-RISe Open Risk software (www.norsar.no) that computes expected damage, economic losses and casualties from earthquakes, either as scenarios or in real-time mode.

For further information, please contact:

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Indo-Norwegian Training Programme

Seismic Design of Multi-storey Buildings: IS 1893 vs. Eurocode 8

October 12 - 14, 2017
(Non-Residential)

at
Gulmohar Hall
India Habitat Centre
New Delhi

for
Structural and Geotechnical Engineers, Research Students, Architects, Practitioners, Designers

Organised by:

Building Materials & Technology Promotion Council
Ministry of Housing & Urban Poverty Alleviation
Government of India

Department of Earthquake Engineering
Indian Institute of Technology Roorkee

Department of Earthquake Hazard and Risk
NORSAR, Norway

Background

Currently, India is undergoing a rapid phase of urban development and a large number of multi-storey projects are coming up, not only in the big cities but also in moderate towns.

The Indian seismic design codes are also undergoing revision. IS:1893 and IS:13920 have been revised and a new code on tall buildings is under development. In the era of globalization, many multinational companies are also entering in Indian construction industry.

Therefore, Indian structural designers also need to be skilled in earthquake resistant design methodologies and international standards. Eurocode 8 is one of the more recent and one of the most applied international seismic design codes.

The focus of the proposed training programme is on a comparative study and understanding of the underlying principles of IS 1893 and IS 13920 and Eurocode 8 with respect to the design of multi-storey buildings in seismic areas. The training programme will also include a comprehensive coverage of the various changes in the revised IS codes, and the main features of the upcoming Tall Buildings Code.

WHO SHOULD ATTEND?

The course is specifically targeted to practicing structural designers in public and private sectors. The emphasis will be on real life problems and hands-on training and the participants are encouraged to bring their real life problems for discussion. In addition to practicing engineers, a few seats will be available to post-graduate and research students, who want to have an exposure to real life problems and issues in design of multi-storey buildings. The participants are recommended to bring their lap-top computers with structural design software being used by them, for hands-on training sessions.

COURSE FEE

The registration fee for the course is Rs.8,000.00 per participant including training material, lunch/ refreshment, etc. The participants have to make their own arrangements for stay in Delhi. The fee may be paid either by DD drawn in favour of BMTPC, New Delhi or through RTGS/NEFT. (RTGS/NEFT details: A/c No.– 62054931366, A/c Name–Building Materials & Technology Promotion Council, Bank–State Bank of India, Branch Code–20511, IFSC Code–SBIN0020511).

COURSE FACULTY

The lectures will be delivered by the experienced faculty from NORSAR, Norway, and Department of Earthquake Engineering IIT Roorkee. Faculty from some other institutes, having experience in modelling and analysis of multi-storey buildings will be involved in hands-on training sessions. The course will be conducted in interactive mode and the participants will be encouraged to discuss their problems/queries encountered during practice.

The Course

COURSE CONTENT

1. **Principles of Earthquake Resistant Design:**
   - Earthquakes - origin, terminology and comparison with other loads
   - Concepts of strength, over-strength and ductility
   - Inelastic energy dissipation and 'Response Reduction Factor'
   - Ductile detailing of RC structures
2. **Seismic hazard assessment:**
   - Seismological parameters, terminology
   - Seismic zonation
   - DSHA, PSHA and risk-targeted hazard assessment
   - Local site effects
   - Representation and application in design of multi-storey buildings, issues related with long-period structures
   - Comparison of IS 1893 and EC8
3. **Structural modelling and analysis for seismic actions:**
   - Structural systems for lateral loads
   - Modelling of beams, columns, and joints; Common pitfall and checks
   - Modelling of shear wall and shear wall core buildings
   - Concept of response spectrum and mode superposition
   - Time history analysis; selection of ground motions for time-history analysis
   - Considerations and checks for irregularities
4. **Earthquake Resistant Design of multi-storey RC buildings:**
   - Seismic design of frame, shear wall, frame-shear wall and shear wall core buildings
   - Ductile detailing – confinement and anchorage
   - Ductile detailing – capacity design
   - Recent revisions in IS 1893 and IS 13920
   - IS 13920 vs. EC8 provisions, load and resistance factors and response reduction (behaviour) factors
5. **Other structural systems:**
   - Flat slab/flat plate buildings
   - Steel buildings – MRF, CBF, and EBF
   - Effect of masonry infills on seismic performance and design
   - Seismic design of services and equipment
6. **Geotechnical seismic design:**
   - Site classification and liquefaction potential
   - Modelling analysis and design of shallow foundations – isolated and raft foundations
   - Modelling analysis and design of deep foundations – piles and raft on piles
   - Foundations in liquefiable soils
7. **Performance Based Design of multi-storey buildings:**
   - Nonlinear modelling and analysis; Nonlinear static (Pushover) analysis; Nonlinear dynamic analysis, selection and scaling of ground motions
   - Effective stiffness and damping
   - Performance levels and performance objectives
   - Codes and documents for Performance-Based Design
8. **Hands-on training:**
   - Site classification and design response spectra using IS 1893 and EC8
   - Modelling of foundations and soil-foundation flexibility
   - Modelling and analysis using response spectrum and time history
   - Pushover analysis (for advanced learners)

COURSE COORDINATORS AND PRINCIPAL INSTRUCTORS:

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