QUAKE ZONE

Newsletter of EERI IIT Bombay

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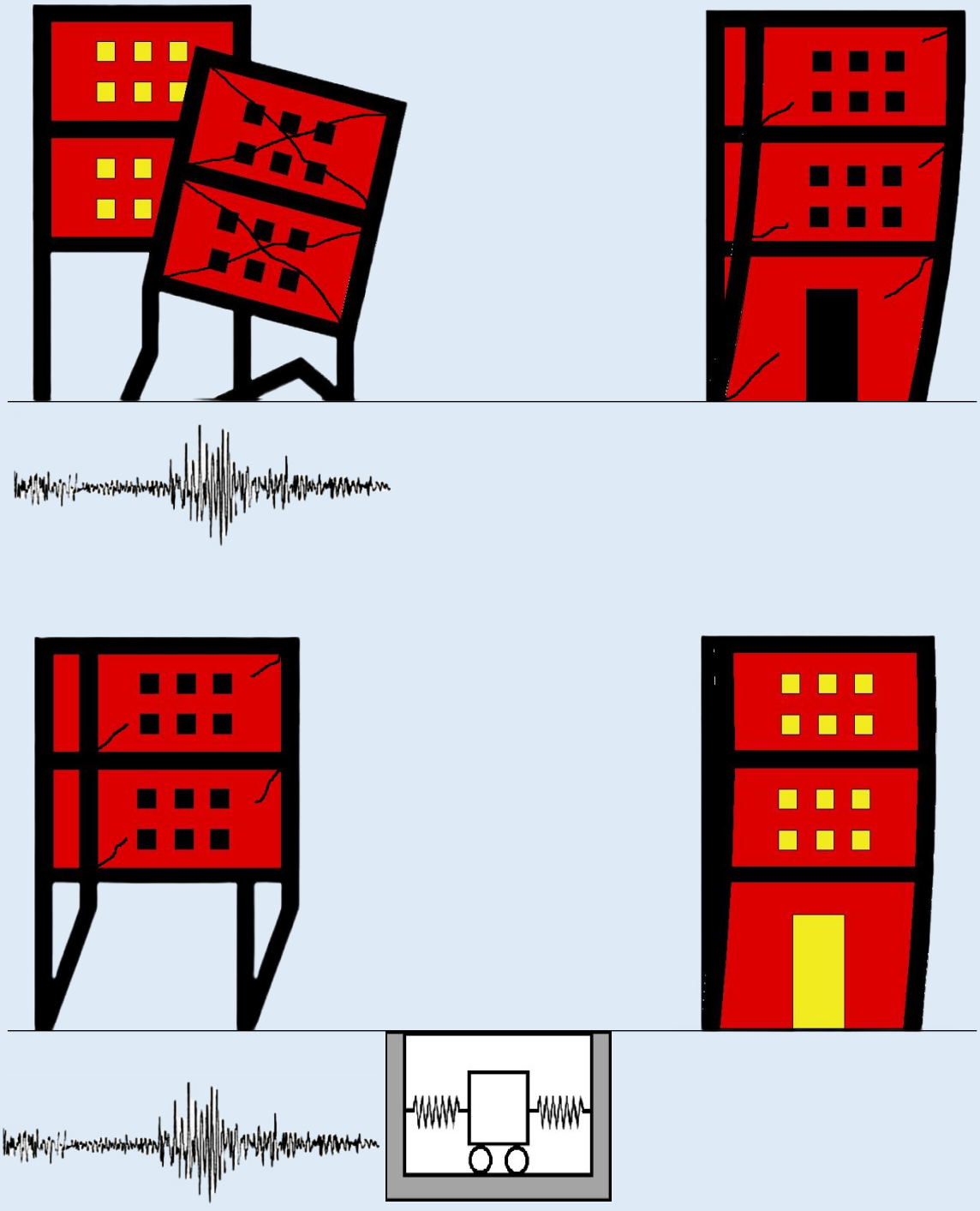

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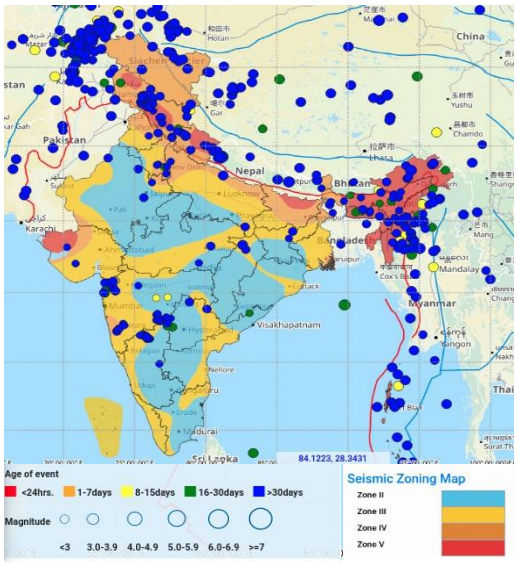
GEOMETRY AND ARCHITECTURAL FEATURES IN SEISMIC PERFORMANCE OF A STRUCTURE

Geometry and architectural features of a structure play an important role in influencing its response under a seismic excitation i.e., an earthquake. These characteristics, which include a structure's overall form, aspect ratio, symmetry, irregularity, projections, and complex features, are crucial in determining how a structure would vibrate and develop forces during a seismic event. A structural engineer after receiving these details from an architect, plans and designs a load transfer path for the structure such that the performance under earthquake remains within the acceptable limits. One of the key attributes a structure should possess is that an imaginary line connecting any two points in the structure should lie entirely within the plan of the structure. This ensures a consistent load path during an earthquake. It is also recommended that a structural engineer and an architect collaborate and plan the structure together to ensure the safety of its occupants and minimize loss. *(Know more)*

RECENT EARTHQUAKES

Seismic activity in the Indian subcontinent from Aug 01, 2022 to Dec 15, 2022.



Source: https://seismo.gov.in/MIS/riseq/earthquake

LEARNING FROM EARTHQUAKES

2011 THE GREAT TOHOKU EARTHQUAKE, JAPAN

Source: https://peacewindsamerica.org/relief_recovery/tohoku-tsunami-9-0-earthquake/

On March 11, 2011, a powerful earthquake with magnitude 9.1 M_w occurred in north-eastern Japan and it was followed by a tsunami. The epicentre was located 130 km east of the city of Sendai, with coordinates as (38.322°N 142.369°E). The earthquake was one of the costliest natural disasters, with an estimated loss of $300 billion and 19,759 deaths. The seismic event followed by a tsunami caused one of the deadliest event known as Fukushima Daiichi nuclear plant disaster. The disaster led to the modification of various codal provisions especially for nuclear power plants. Moreover, the need for risk assessment beyond the design basis event and enhancement in site selection criteria became evident. However, the lack of awareness and unwillingness prevent mankind from being ready for the unknowns that can be probabilistically known or foreseen with scientific and technological advancements, thus inviting many more such disasters. *(Know more)*

VIBRATING BARRIER

Vibrating Barrier (ViBa) is a novel device that has the potential to reduce the dynamic response of a cluster of adjacent structures subjected to the earthquake ground motion. Its working is based on structure-soil-structure interaction phenomenon, whereby, this device is placed inside the soil, detached from the adjacent structures, and it can absorb a significant portion of vibrational energy from the adjacent soil medium. In this way, the dynamic load and response of the adjacent structures is mitigated, consequently reducing the chances of damage. ViBa has the potential to be useful in scenarios where the utilization of traditional localized vibration control devices like dampers, base isolation devices, etc. may be restricted. For example, in case of a heritage building it may be impractical to make significant alterations to the structure in order to incorporate the vibration control device. *(Know more)*

SEISMOTECH
DEEPSOIL

DEEPSOIL is a one-dimensional free field ground response analysis program that is based on wave propagation theory. The program can perform 1-D nonlinear/ equivalent linear/ linear analyses in time and/or frequency domain. The software is beginning to acquire popularity as a result of its key features, which include:

- Strength-controlled nonlinear model
- Frequency-independent damping formulation
- Strain dependent stiffness and damping
- Pore water pressure generation and dissipation models
- Graphical user interface
- Parallel-processing capability. *(Know more)*

Download: http://deepsoil.cee.illinois.edu/

EARTHQUAKE ENGINEERING CONFERENCES AND EVENTS

- 9th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering. Athens, Greece, June 12-14, 2023. Check out for more at https://2023.compdyn.org/
- 2nd Croatian Conference on Earthquake Engineering (2CroCEE). The Westin Zagreb, Croatia, March 22-24, 2023. Check out for more at https://crocee.grad.hr/event/2/
- 10th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, Politecnico di Milano, Italy, Aug 30- Sep 1 2023. Check out for more at https://www.evaces2023.polimi.it/

EERI IIT BOMBAY NEWS
SDC 2023 ORIENTATION

Two orientation sessions, one for sophomores on October 9, 2022 and another for freshmen on October 27, 2022, were organized with the goal of introducing the EERI IIT Bombay Student Chapter. The students were made aware of different activities of the student chapter. Moreover, an introduction about the undergraduate Seismic Design Competition (SDC), that is conducted every year in United States of America by Student Leadership Council (SLC) of EERI, was provided. The students were encouraged to explore the field of earthquake engineering outside the scope of their academic curriculum and were invited to participate in future SDCs by joining the IIT Bombay SDC team.

EERI IIT Bombay Student Chapter

ALL ABOUT EERI

The Earthquake Engineering Research Institute (EERI) is the leading non-profit membership organization dedicated to understanding earthquake risk and increasing earthquake resilience in communities worldwide. EERI membership includes researchers, practitioners, and students in engineering, geoscience, social science, architecture, planning, government, emergency management, public health, and policymaking. For more info https://www.eeri.org/

EERI IIT BOMBAY STUDENT CHAPTER

The EERI IIT Bombay student chapter aims to learn about earthquakes and their social, economic, and environmental impact and practices to reduce earthquake risk.This Chapter motivates students to pursue a career in the field of earthquake engineering and related fields. EERI Student Chapter at IIT Bombay provides a platform to participate in several EERI competitions and activities.

SUPPORT US

Sponsors from a variety of industries and academic areas are invited to support the EERI IIT Bombay Students Chapter. Our alliance will be built on teamwork, with reciprocal benefits for both parties.

BECOME EERI MEMBER

EERI membership will help you stay current with the latest scientific and engineering advances, better understand the social and economic impacts of earthquakes and serve as an advocate for seismic safety. Follow the link: join-eeri-today

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