QUAKE ZONE

Newsletter of EERI IIT Bombay Student Chapter

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IN THIS ISSUE

SEISMIC RESILIENCE?

The notion of resilience is frequently employed in the study across a wide range of fields, including environmental science and engineering, psychology, sociology, and economics. Resilience is defined as a system's or a community's ability to recover or bounce back, or counteract, or adjust after a disruptive occurrence (say earthquake). The ability of a system to lessen the likelihood of a disruptive occurrence, absorb such a disturbance if it occurs and recover swiftly after a shock (re-establish normal performance) has been termed seismic resilience.   A resilient system has the following characteristics:

- Reduced failure probabilities;
- Reduced failure consequences in terms of lives lost, property damage, and adverse economic and societal implications;
- Reduced recovery time (returning a given system or combination of systems to their "normal" level of functional performance) *(Know more)*

LEARNING FROM EARTHQUAKES
1999 CHAMOLI EARTHQUAKE

(Photo: https://nicee.org/eqe-iitk/uploads/EQR_Chamoli.pdf)

RECENT EARTHQUAKES

Seismic activity in the Indian subcontinent from 1st October 2021 to 30th November 2021

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

On 29 March 1999, an earthquake of magnitude 6.6 Mw struck near the Chamoli district of Uttar Pradesh (now in Uttarakhand), India. The maximum intensity of VIII, on the MSK scale, was recorded at a number of locations. In addition to the nearby districts, the effect was felt at distant places like Delhi, Kanpur, and Shimla. It caused approximately 100 casualties, and the number of injured ran in hundreds, maximum damage being inflicted in Chamoli district itself with 63 deaths and over 200 injured people. The infrastructure damage included 2,595 house collapses, and more than 10,850 houses were partially damaged. Several lessons have been learned from this earthquake, such as the improved seismic resistance imparted by lintel bands in masonry structures, the satisfactory performance of simple configuration RC frame structures with masonry infills, etc. Moreover, damage to non-structural elements in some buildings in Delhi indicated the vulnerability of infrastructure in the capital. *(Know more)*

TENNIS BALLS AS SEISMIC ISOLATION BEARINGS

Earthquakes are impossible to predict, but engineers can plan for them. Seismic-isolation systems, incorporated into the foundations of certain buildings in high-risk areas, use sophisticated concrete, rubber, and metal structures to limit quake damage by absorbing horizontal oscillations in the ground, similar to how a car's suspension absorbs the vertical motion. However, such adjustments are costly. The mechanics of rolling are used in a new seismic-isolation technology to develop a simpler, lower-cost alternative using readily available materials: recycled tennis balls. Hundreds of tennis balls from adjacent tennis clubs that had lost their bounce were injected with cement-like mixtures. Researchers created a low-cost prototype of four filled tennis balls sandwiched between two concrete slabs. It could withstand simulated earthquake shaking while supporting eight kilonewtons of force per ball—roughly twice what isolation systems might encounter under one-story houses. To dampen vibrations without cracking during tests, the balls needed to contain precisely the right amount of the mixture (the researchers used a pastry bag to fill them). The experimental results showed that the investigated system has the potential to reduce the inertia forces transmitted to the superstructure. *(Know more)*
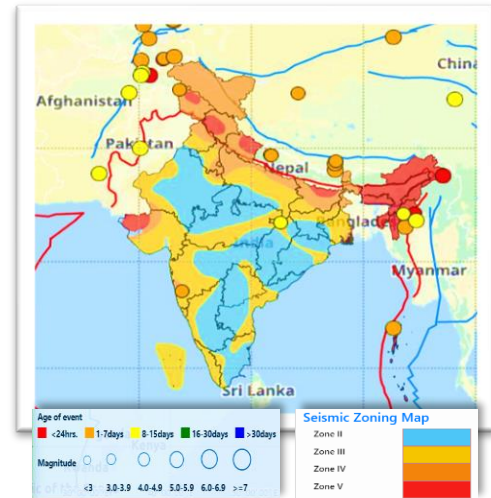
UTTARAKHAND BHOOKAMP ALERT: EARTHQUAKE EARLY WARNING

The Indian Institute of Technology (IIT) Roorkee has released 'Uttarakhand Bhookamp Alert,' a first-of-its-kind application in India, with the goal of providing alerts about an incoming Earthquake and providing timely warning to individuals who are regrettably caught somewhere during the quake. Uttarakhand has thus become the first state in the country to make use of such an application. Earthquake Early Warning (EEW) is a real-time earthquake information dissemination system that sends out warnings before any major earthquakes strike. In addition, the programme attempts to provide an estimated arrival time for the earthquake, as well as the strength of the tremor, in order to prevent any fatalities. Professor Kamal, the project's investigator, said in an official release that the Uttarakhand Bhookamp Alert app is the first app in the world that locates people who are stuck someplace during a natural disaster and sends their information to the Disaster Response Force.

Download from Play Store: Bhookamp Alert
*Download from App Store: Bhookamp Alert*

## EARTHQUAKE ENGINEERING CONFERENCES AND EVENTS

- The Seventeenth East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-17) will be held on 27–30 June 2022. Check out for more at https://easec-17.org/

- The Third European Conference on Earthquake Engineering and Seismology in Bucharest from September 4 to September 9, 2022. Check out for more at https://3ecees.ro/conference/

Inauguration of EERI IIT BOMBAY Students Chapter

On October 9, 2021, Head of Civil Engineering Department Prof. Deepankar Choudhury formally inaugurated the EERI IIT Bombay Student Chapter. Mr Vipul Ahuja, director of Ahuja Consultants Pvt Ltd, EERI IIT Bombay Student Chapter's Industry Contact Person, encouraged students and inaugurated the Chapter's newsletter. Prof. Meera Raghunandan, the Chapter's faculty advisor, gave a brief introduction to the Chapter and encouraged students. There were also glimpses of the prior year's Seismic Design Competition. We appreciate the support of our distinguished guests, teachers, and students. Prof. Meera Raghunandan, Faculty advisor of the chapter gave brief introduction of chapter and motivated students. Further, Glimpse of the previous year's Seismic design Competition is also provided. We thank our esteemed guests, professors and students for their support.
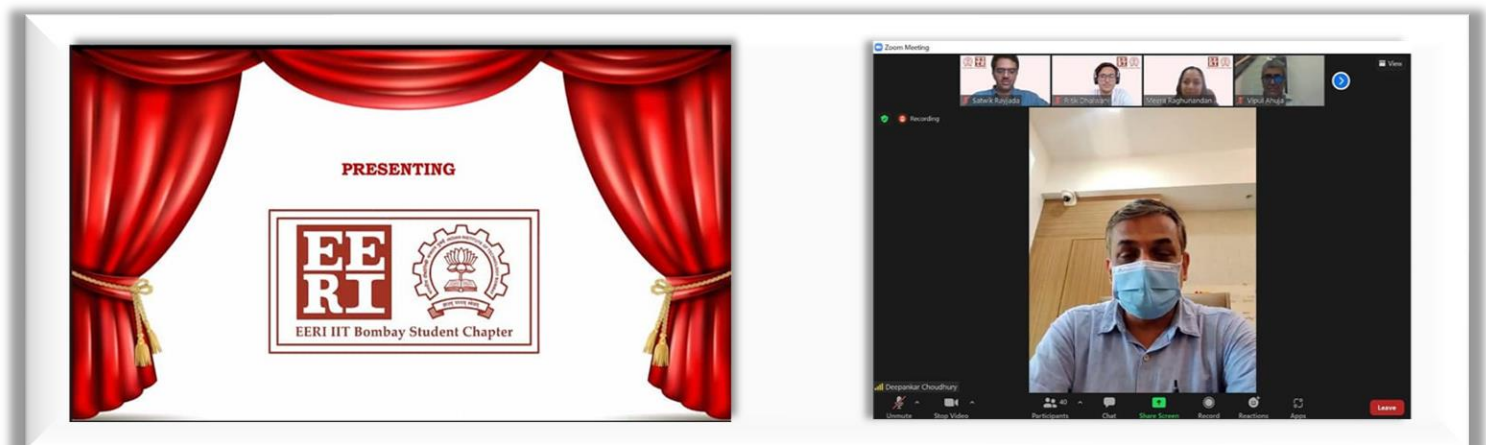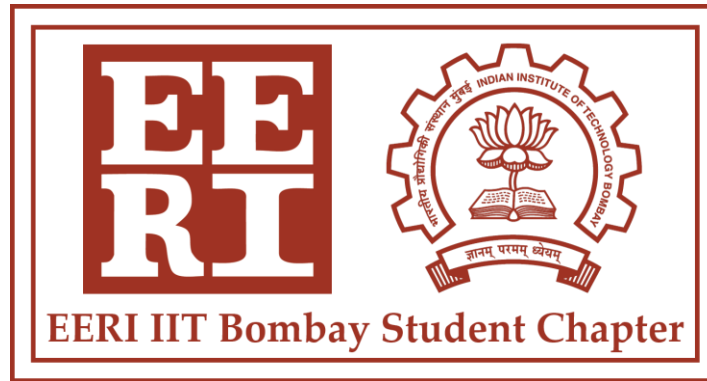
ALL ABOUT EERI

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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