

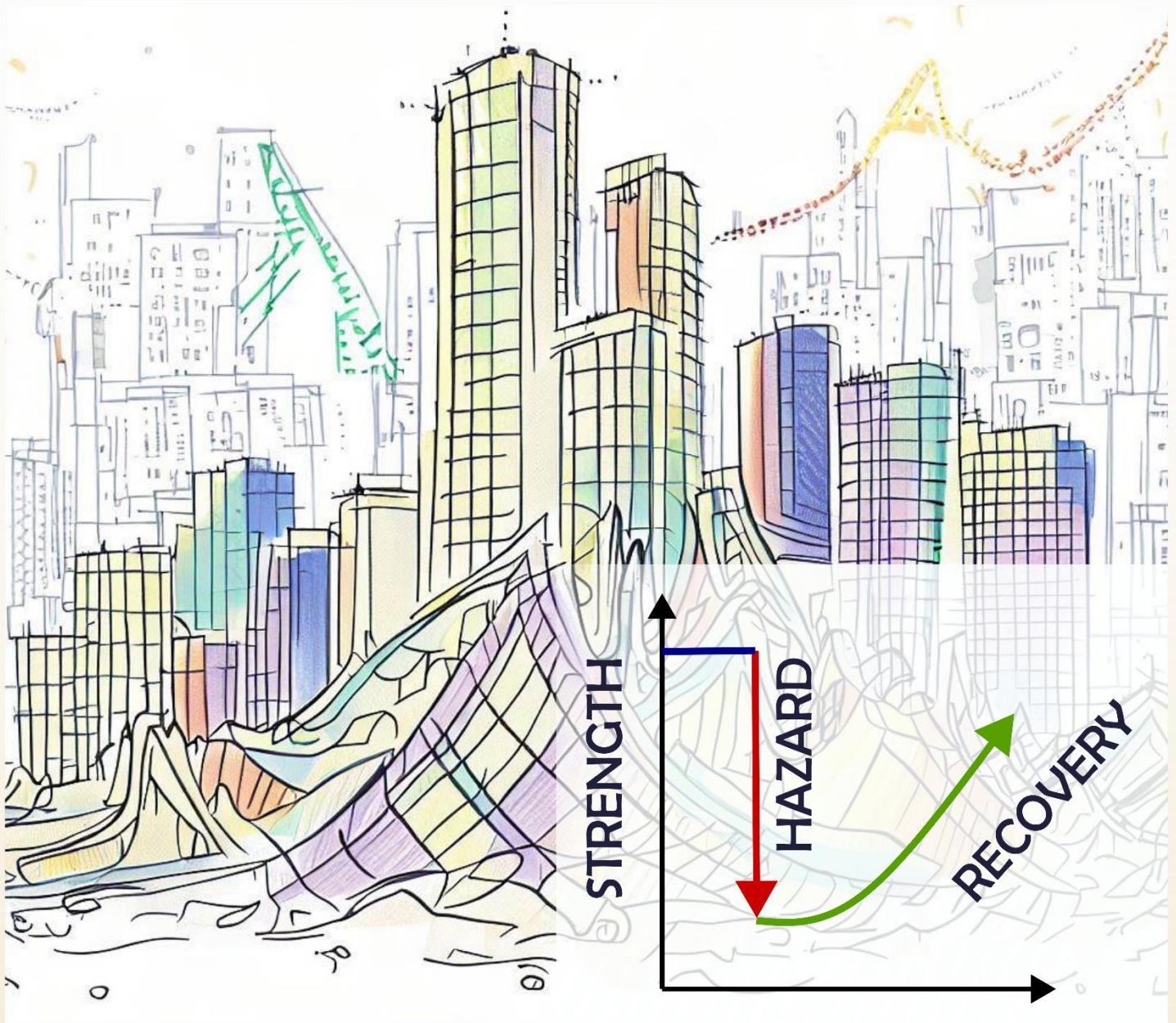
QUAKE ZONE



Newsletter of EERI IIT
Bombay

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Student Chapter



IN THIS ISSUE

Page 1 | Seismic Resilience

Page 1 | Steel Plate Shear Wall

Page 2 | RiskScape

Page 3 | Earthquake Enigma 2023

SEISMIC RESILIENCE

Seismic resilience refers to the ability of an infrastructure system or preparedness of a community to cope with and recover from the consequences of an earthquake. It encompasses a holistic approach that aims for the ability to resist the initial shock with limited damage and less casualties, and ensure a prompt recovery, thus minimizing the socio-economic disruptions caused by an earthquake. This necessitates strengthening existing structures like bridges and buildings by appropriate retrofitting, and designing new structures as per the latest codal requirements. Proper education of public and policy makers, to create awareness on earthquake preparedness and safety measures is also required to minimize the impact. Moreover, planning post-earthquake recovery efforts to efficiently restore critical services and economic activities contributes towards the community seismic resilience. All these activities imbibe the features of robustness, redundancy, resourcefulness and rapidity in our built infrastructure, mitigation and administration services. An investment in seismic resilient infrastructure and communities can enhance overall sustainability and minimize the long-term effects of seismic hazards. Therefore, a collaborative effort from government, policymakers, engineers, architects, and public is highly desired to achieve the same. (<https://courses.washington.edu/cee518/Bruneauetal.pdf>)

LEARNING FROM EARTHQUAKES NORTHRIDGE EARTHQUAKE



On Jan 17, 1994, the densely populated Northridge area of Los Angeles experienced a moderately strong earthquake of M6.7 with a focal depth of 18.20 km. This is one of the worst ever pulse recorded in the United States. The epicenter of the earthquake was located in the San Fernando Valley (34.213°N, 118.537°W). The earthquake caused an estimated damage cost of \$20 billion with 61 deaths and 1600 seriously injured. One important learning from this earthquake was that serious damage may occur even at far distances from the earthquake epicenter due to the effects of soil-structure interaction. This event also revealed the insufficiency of the then ACI 318 guidelines with respect to the design of underground braced walls and seismic design of diaphragm walls. Additionally, this event led to further interest and studies on redundancy in structural design of column, full scale testing, extra precaution for welds, check for hidden damage etc.

(https://www.learningfromearthquakes.org/component/lfe_reports/?view=lferports&id=249&layout=default)

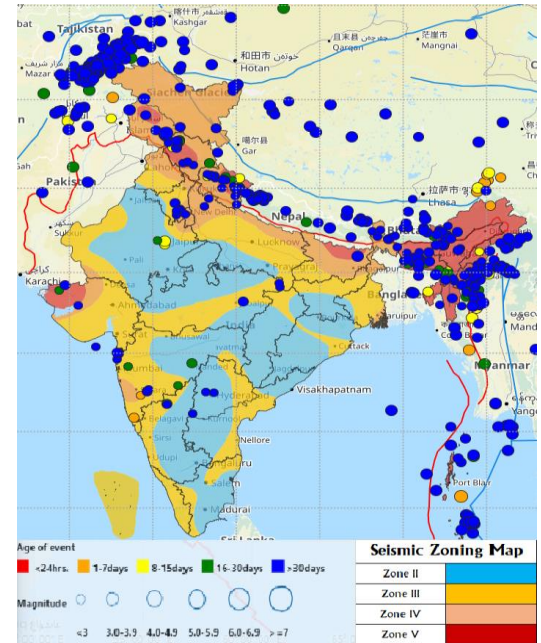
Source: [Wikipedia](#)

STEEL PLATE SHEAR WALL SYSTEM FOR EARTHQUAKE ENGINEERING

Steel plate shear wall (SPSW) system is an innovative load transfer structural system adopted in seismic design. This system provides seismic load resisting capacity through its lateral force resistance and energy dissipation. The basic load transfer mechanism for gravity loads is via the main building frame and SPSW boundary elements. During a seismic event under lateral loads, the steel plate is in compression along one diagonal direction and in tension along the other diagonal direction. The system utilizes post buckling capacity, by virtue of the tension carrying behavior through one of the diagonals. Apart from this, SPSW systems are very ductile, show stable hysteretic characteristics, have less wall thickness and reduced construction time. Some of the buildings where SPSW system has been adopted are: a) a 56-storey hotel and residence in Los Angeles, b) a 6-storey Sylmar hospital building in Los Angeles and c) New University of Minnesota TCF Bank Stadium. (https://en.wikipedia.org/wiki/Steel_plate_shear_wall)

RECENT EARTHQUAKES

Seismic activity in the Indian subcontinent from Apr 01, 2023 to July 31, 2023.



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

SEISMOTECH RISKScape

RiskScape is an advanced software tool revolutionizing earthquake risk assessment and resilience planning. Developed by NIWA and GNS Science, it empowers decision-makers to comprehensively evaluate potential damages, losses, and impacts associated with seismic events. With integration of geospatial data and hazard modeling, RiskScape analyzes vulnerability of infrastructure, lifelines, and communities, considering factors like building types, population density, and critical facilities. With the ability to simulate various earthquake scenarios for multi hazard risk analysis, decision-makers can prioritize mitigation efforts and make informed decisions on land use planning, building codes, and emergency response strategies. RiskScape is therefore, a powerful ally in enhancing earthquake preparedness and resilience, contributing to safer and more resilient communities. (<https://riskscape.org.nz/>)



Download: [RISKScape](#)

EARTHQUAKE ENGINEERING CONFERENCES AND EVENTS

- 18th World Conference on Earthquake Engineering (WCEE2024). Milan, Italy, 30th June, 2024 to 5th July 2024. Check out for more at <https://www.wcee2024.it/>
- The 18th World Conference on Seismic Isolation, Energy Dissipation, and Active Vibration Control of Structures (18WCSI), Antalya, Turkey, Nov 6- Nov10, 2023. Check out for more at <https://18wcsi.org/>

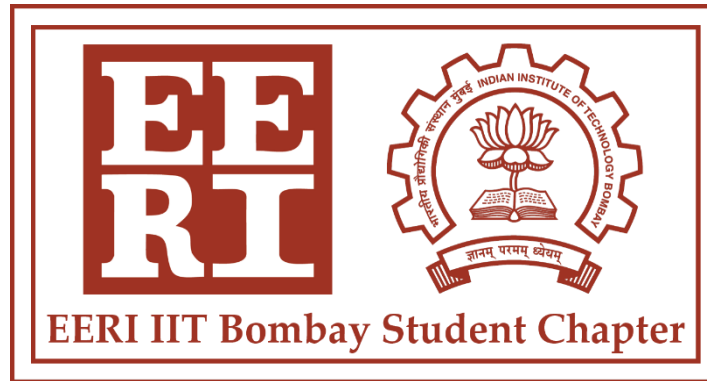
EERI IIT BOMBAY NEWS SEISMIC DESIGN COMPETITION 2023

Seismic Design Competition (SDC), one of the prestigious competitions for civil engineering undergraduates was conducted this year in San Francisco, USA from 11-14 April 2023. A total of 34 different universities participated in the competition from across the world and IIT Bombay, represented by EERI IITB team, secured 8th place on the ranking list. Team IIT Bombay presented their remarkable work in the form of a 19 storey twin towers model made of balsa wood. The model withstood two different ground motions and the load transfer system adopted proved to be one of the most economical solution with reduced annual seismic cost.

EARTHQUAKE ENIGMA 2.0

On June 3, 2023, EERI IIT Bombay successfully conducted an online earthquake quiz under the banner of Earthquake Enigma'23. An online "Googler" in which students had to find answers to the questions/problems

with a google search! It challenged students' thinking and gave them the opportunity to explore the earthquake engineering field. The quiz was open to all the colleges with any background. Earthquake Enigma'23 attracted total 226 participants across 30 colleges of India. Mir Ifam (IIT Roorkee), Sanket Bajad (IISc Bangalore) and Haroon Rashid (IIT Bombay) were declared first, second and third position holders of the online quiz contest, respectively.



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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