GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
**RAJYA SABHA**
**STARRED QUESTION NO. *218**
ANSWERED ON 20/03/2025

## EARTHQUAKE THREAT IN DELHI AND SURROUNDING AREAS

***218. # Shri Upendra Kushwaha:**

Will the Minister of **Earth Sciences** be pleased to state:

(a) whether the National Capital Territory of Delhi is highly vulnerable to earthquakes due to its location in a tectonically active zone;
(b) whether the unregulated and extensive construction activities in Delhi are exacerbating the risk of seismic events; and
(c) if so, the steps being taken by Government in view of the increasing threats of earthquakes?

**ANSWER**
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) to (c): A statement is laid on the table of the House.

**STATEMENT REFERRED TO IN REPLY TO PARTS (A) TO (C) OF RAJYA SABHA STARRED QUESTION NO. *218 REGARDING 'EARTHQUAKE THREAT IN DELHI AND SURROUNDING AREAS' FOR ANSWER ON 20TH MARCH, 2025**

(a) Yes,

- the National Capital Region (NCR) of Delhi is vulnerable to earthquakes due to its geographical location. Delhi region falls in seismic zone IV, as per seismic zoning map of India, prepared by Bureau of Indian Standards. Seismic zone –IV, also, known as "severe intensity zone region", is broadly associated with seismic intensities of up to VIII on Modified Mercalli Intensity (MMI) scale based up on the peak ground acceleration (PGA) with reference to maximum credible earthquake generating faults (e.g., Main Central Thrust; Main Boundary Thrust; Himalayan Frontal Thrust) located in the Himalayan region regarded as the Far Field Impact to Delhi-NCR. This classification is based on the region's proximity to the active Himalayan seismic belt, the ongoing collision between the Indian and Eurasian Plates.

- The near field impacts of earthquakes due to the presence of multiple active fault systems, including the Delhi- Haridwar Ridge, Mahendragarh- Dehradun Fault, Sohna Fault, Mathura Fault, Great Boundary fault and the Aravalli Fault System. These geological factors contribute to Delhi's susceptibility to both moderate and strong earthquakes shallow crustal depths.

- Because of presence of several sub-surface paleo-riverine and lacustrine water channels, weakening the earthquake source strata and causing micro to moderate earthquakes at shallow depths through hydrofracturing.

In addition to local earthquakes, major to moderate earthquakes of the nearby Himalayan region and outside India like Afghanistan, Nepal Himalaya etc. are also felt in the Delhi NCR region.

(b) and (c) Not solely responsible.

- Only those old unregulated and extensive construction activities in Delhi without following the earthquake risk resilient codes may exacerbate the risk of seismic events. The city's rapid urbanization has led to extensive proliferation of buildings and structures that are now being constructed following the sound Building design codes developed by BIS-India. This vulnerability is heightened by the city's soft alluvial soil, which can amplify seismic waves, making even moderate tremors feel stronger. In response to the increased threat of earthquakes, the Government has initiated several measures:

  - **Seismic Monitoring in Delhi NCR**: National Centre of Seismology (NCS) under Ministry of Earth Sciences (MoES) has deployed 20 permanent seismic stations in Delhi NCR out of 166 stations nationwide and these are connected to VSAT for the online monitoring of the data on a 24/7 basis. The information of all recorded earthquakes is disseminated to the disaster management authorities and all stakeholders in least possible time. This information is also made available on the website of NCS, mobile app and other social media platforms in public domain.

- **Seismic Microzonation of Delhi**: NCS, MoES has also completed the seismic microzonation of Delhi-NCR on 1:10,000 scale, which provide additional inputs relating to the effects of the underlying soil on the structures in the assessment of damage potential. These seismic microzonation maps are useful in land use planning and formulation of site-specific design and construction criteria for the buildings and structures towards minimizing the damage to property and loss of life caused by earthquakes.

- **Home Owner's Guide for Earthquake & Cyclone Safety (2019):** This guide is tailored for individuals constructing homes or purchasing flats in multi-storey buildings. It outlines best practices for ensuring that masonry or reinforced concrete (RC) structures meet safety standards, empowering homeowners with knowledge to make informed decisions.

- **Simplified Guidelines for Earthquake Safety (2021):** These guidelines specify the minimum requirements for constructing earthquake-resistant homes. Designed for ease of understanding and implementation, the document ensures accessibility for all stakeholders involved in building construction.

- **A Primer on Rapid Visual Screening (RVS) for Earthquake Safety (2020):** This document serves as a foundational reference for visually assessing a building's seismic performance. It assists professionals in identifying features that may compromise structural safety during earthquakes, consolidating national efforts toward earthquake risk assessment.

- **Guidelines on Seismic Retrofitting of Deficient Buildings and Structures (2014):** These guidelines address the seismic risk associated with existing buildings and structures in India. They provide a structured approach for: Identifying vulnerable structures, Prioritizing interventions, Determining the extent of retrofitting required, Recommending suitable retrofitting methods to enhance seismic resilience.

- **Public Awareness Campaigns**: Educational programs are being conducted to inform residents about earthquake preparedness, safe construction practices, and emergency response protocols. In order to reduce the vulnerability and risk posed by earthquakes, the NDMA undertakes proactive measures to enhance disaster preparedness and risk reduction across the country. Regular mock exercises and tabletop exercises are conducted to evaluate and improve the preparedness of States including UP. To raise public awareness, NDMA runs TV and radio campaigns focused on earthquake preparedness, highlighting critical do's and don'ts during seismic events. Special programs like Aapda ka Samna, aired on Doordarshan, feature expert discussions on prevention and mitigation strategies, equipping the public with actionable knowledge to safeguard lives and property. NDMA, as part of its mandate, develops guidelines and formulates programs targeting earthquake risk mitigation to mitigate losses in a systematic and coordinated manner. These initiatives have been documented, shared with States, and made publicly accessible on the NDMA website.

- **Disaster Preparedness Drills**: Regular earthquake drills and simulations are organized to train emergency responders and the public in effective disaster response strategies.

These initiatives aim to reduce the seismic risk to Delhi's infrastructure and residents, acknowledging the city's vulnerability due to its geological setting and urban development patterns.

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