

**GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
RAJYA SABHA  
STARRED QUESTION No. \*130  
TO BE ANSWERED ON THURSDAY, JULY 28, 2016**

**DELHI NCR UNDER SEVERE SEISMIC ZONE**

**\*130. SHRI B.K HARIPRASAD:**

**Will the Minister of EARTH SCIENCES be pleased to state:**

- (a) whether Delhi and the National Capital Region (NCR) come under the category of severe seismic zone and the buildings are generally not earthquake proof; and**
- (b) if so, the details thereof along with the preventive measures taken/being taken by Government in this regard particularly for homes/buildings which are not earthquake proof?**

**ANSWER  
MINISTER OF FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND  
MINISTRY OF EARTH SCIENCES  
( Dr. HARSH VARDHAN)**

**(a)to(b): A Statement is laid on the Table of the House.**

**STATEMENT LAID ON THE TABLE OF THE RAJYA SABHA IN REPLY TO PARTS (a) to (b) TO STARRED QUESTION NO. \*130 REGARDING "DELHI NCR UNDER SEVERE SEISMIC ZONE" TO BE ANSWERED ON THURSDAY, JULY 28, 2016.**

- (a) **Yes Sir. As per Bureau of Indian Standards [IS-1893 (Part- 1): 2002], based on the past seismic history, Delhi lies in Zone-IV that has fairly high seismicity where the general occurrence of earthquakes is of 5-6 magnitude and occasionally of higher magnitude. Delhi lies among the high-risk areas.**
- (b) **A state-of-the-art 16 station Seismic Telemetry System is already in operation by National Centre for Seismology (NCS) to detect and locate earthquakes in and around Delhi. The data generated by this network is useful in understanding the changing profile of seismicity and seismotectonics of the region. NCS has also completed the seismic microzonation of Delhi-NCR on 1:10,000 scale, that provides additional inputs relating to the effects of the underlying soil on the already structures in the assessment of damage potential. These seismic microzonation maps have become 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.**

**In a pilot mode, studies have been taken up for Delhi region through rapid visual screening (RVS) of assessing the structural safety of buildings due to existing complex socio cultural and built environment encompassing wide range of dwelling units from non engineered units with traditional skill to the most modern buildings. Essentially RVS procedure considers different building types that are most commonly found in India. Whereas the building categories considered for the purpose includes Type A, Type B, Type C and Type X categories as detailed in annexure-1.**

**By imparting professional training to the Engineers of the civic bodies, Delhi Government is enhancing the technical capabilities of field engineering wings to survey potentially weak buildings. Guidelines for improving Earthquake Resistance of Low Strength Masonry Buildings (IS 13828:1993) that covers the special features of design and construction for improving earthquake resistance of buildings of low-strength masonry are already in force to supplement these efforts.**

**Guidelines have also been published by the Bureau of Indian Standards (BIS), Building Materials & Technology Promotion Council (BMTPC) and Housing and Urban Development Corporation (HUDCO) etc. for the design and construction of earthquake resistant structures to minimize the loss of life and damage to property caused by earthquakes (Annexure II). These guidelines are in wide circulation amongst the public and the administrative authorities responsible for the design and construction of earthquake resistant structures in earthquake prone areas.**

**Ministry of Home Affairs has taken steps to see at least from now that all new buildings constructed under various National and State schemes should be made earthquake resistant (as per the Bureau of Indian Standards detailed at Annexure-III) in the first instant so that no new additions to the stock of existing unsafe buildings are made. Central Public Works Department (CPWD) has prepared an Handbook of Siesmic Retrofit of Buildings for existing buildings that do not meet the seismic strength requirement.**

## Annexure-I

### Building Category

<b>Type-A</b>	<b>Rural structures bamboo reinforced Biomass wall cladding, thatched/CI Sheet roof, un-burnt brick house, Assam Type Houses in timber frame.</b>
<b>Type-B</b>	<b>Brick Masonry Wall 6"X6" to 10"X10" Corner columns with lintel bend and tie, timber trussed CI sheet roof, buildings of the large block and prefabricated type, half-timbered structures, building in natural hewn stone.</b>
<b>Type-C</b>	<b>Reinforced Concrete Building- Engineered &amp; Non-Engineered With beam, column &amp; slab construction, well built wooden structures.</b>
<b>Type-X:</b>	<b>Other types not covered in A, B,C.</b>

**Brochures and Guidelines published by Housing and Urban Development Corporation (HUDCO) & Building Materials & Technology Promotion Council (BMTPC) for construction and retrofitting of buildings:**

- 1. Brochure for mitigating damage to dwellings (in English, Hindi, Tamil, Telugu, Oriya and Bengali by HUDCO).**
- 2. Brochures on house construction in Jabalpur and Chamoli earthquake-affected areas (in Hindi, by HUDCO).**
- 3. Retrofitting of stone houses in Marathwada area of Maharashtra, (BMTPC), 1994.**
- 4. Guidelines for repair, strengthening and reconstruction of houses damaged in the 30 September, 1993 earthquake in Maharashtra (Government of Maharashtra), 1994.**
- 5. Earthquake and Building, A guidebook to understand the relationship between the two, (TARU), 1994.**
- 6. Build Your Home with Earthquake Protection, (BMTPC), 1995.**
- 7. Guidelines 1 – Earthquake-resistant construction of houses in Jabalpur earthquake-affected areas (in Hindi, English, BMTPC), 1997.**
- 8. Guidelines 2 – Repair and retrofitting of damaged houses in Jabalpur earthquake-affected areas (in Hindi, English, BMTPC), 1997.**
- 9. Guidelines 1 – Visual Damage Identification for Chamoli earthquake-affected areas of Uttar Pradesh (in Hindi, English, BMTPC), 1999.**
- 10. Guidelines 2 – Repair and retrofitting of damaged houses in Chamoli earthquake-affected areas of Uttar Pradesh (in Hindi, English, BMTPC), 1999.**
- 11. Guidelines 3 – Reconstruction and New Construction of Buildings in Chamoli earthquake-affected areas of Uttar Pradesh (in Hindi, English, BMTPC), 1999.**

**LIST OF RELEVANT INDIAN STANDARDS ON EARTHQUAKE RESISTANT DESIGN AND CONSTRUCTION**

<b>S.No.</b>	<b>IS No.</b>	<b>Title</b>
*1	<b>IS 1893: 1984</b>	<b>Criteria for earthquake resistant design of Structures</b>
2	<b>IS 1893(Part 1): 2002</b>	<b>Criteria for earthquake resistant design of structures: Part 1 General Provisions and buildings.</b>
*3	<b>IS 1893(Part 4) : 2005</b>	<b>Criteria for earthquake resistant design of Structures: Part 4 Industrial structures including stack like structures.</b>
*4	<b>IS 436:1993</b>	<b>Code of practice for earthquake resistant design and construction of buildings</b>
5	<b>IS 4991:1968</b>	<b>Criteria for blast resistant design of structures for explosions above ground</b>
6	<b>IS 6922:1973</b>	<b>Criteria for safety and design of structures subject to underground blasts</b>
7	<b>IS 13827: 1993</b>	<b>Improving earthquake resistance of earthen building – Guidelines</b>
8	<b>IS 13828:1993</b>	<b>Improving earthquake resistance of low strength masonry building – Guidelines</b>
9	<b>IS 13920:1993</b>	<b>Ductile detailing of reinforced concrete structures subjected to seismic forces- code of practice.</b>
10	<b>IS 13935: 2009</b>	<b>Seismic evaluation repair and strengthening of masonry buildings – Guidelines</b>

\* Under Revision

**FINALISED DRAFTS UNDER PRINT**

<b>S.No.</b>	<b>DOC Number</b>	<b>Title</b>
1	<b>DOC.CED 39 (7231)</b>	<b>Criteria for Earthquake Resistant Design of Structures; Part Liquid Retaining Tanks</b>
2	<b>DOC.CED 39 (7620)</b>	<b>Seismic Evaluation and Strengthening of Existing Reinforced Concrete Building - Guidelines.</b>
3	<b>DOC.CED 39 (7620)</b>	<b>Earthquake Resistant Design and Construction of Building – Code of Practice (Third revision of IS 4326)</b>
4	<b>DOC.CED 39 (7739)</b>	<b>Draft Indian Standards criteria for Earthquake Resistant Design of Structures: Part 3 Bridges and Retaining Walls.</b>