



# Seismic Zones

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Earthquake - prone areas of the country have been identified on the basis of scientific inputs relating to seismicity, earthquakes occurred in the past and tectonic setup of the region. Based on these inputs, Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones, viz. Zone II, III, IV and V. Of these, Zone V is seismically the most active region, while zone II is the least. Broadly, Zone - V comprises entire northeastern India, parts of Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rann of Kutch in Gujarat, part of North Bihar and Andaman & Nicobar Islands. Zone - IV covers remaining parts of Jammu and Kashmir and Himachal Pradesh, National Capital Territory (NCT) of Delhi, Sikkim, Northern Parts of Uttar Pradesh, Bihar and West Bengal, parts of Gujarat and small portions of Maharashtra near the west coast and Rajasthan. Zone - III comprises Kerala, Goa, Lakshadweep islands, remaining parts of Uttar Pradesh, Gujarat and West Bengal, Parts of Punjab, Rajasthan, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Maharashtra, Orissa, Andhra Pradesh, Tamilnadu and Karnataka. Zone - II covers remaining parts of country.

A list of important cities falling in various seismic zones, has also been prepared by BIS and is given below:-

Town	State/UT	Zone	Town	State/UT	Zone
Agra	Utter Pradesh	III	Chitradurga	Karnataka	II
Ahmedabad	Gujarat	III	Coimbatore	Tamil nadu	III
Ajmer	Rajasthan	II	Cuddalore	Tamil Nadu	III
Allahabad	Utter Pradesh	II	Cuttack	Orissa	III
Almora	Uttrakhand	IV	Darbhanga	Bihar	V
Ambala	Haryana	IV	Darjeeling	West Bengal	IV
Amritsar	Punjab	IV	Dharwad	Karnataka	III
Asansol	West Bengal	III	Dehradun	Uttrakhand	IV
Aurangabad	Maharastha	II	Dharmपुर	Tamil Nadu	III
Baharich	Utter Pradesh	IV	Delhi	Delhi	IV
Bangalore	Karnataka	II	Durgapur	West Bengal	III
Barauni	Bihar	IV	Gangtok	Sikkim	IV
Bareilly	Utter Pradesh	III	Guwahati	Assam	V
Belgaum	Karnataka	III	Goa	Goa	III
Bhatinda	Punjab	III	Gulbarga	Karnataka	II
Bhilai	Chattigarh	II	Gaya	Bihar	III
Bhopal	Madhya Pradesh	II	Gorakhpur	Utter Pradesh	IV

Bhubaneswar	Orissa	III	Hyderabad	Andhra Pradesh	II
Bhuj	Gujarat	V	Imphal	Manipur	V
Bijapur	Karnataka	III	Jabalpur	Madhya Pradesh	III
Bikaner	Rajasthan	III	Jaipur	Rajasthan	II
Bokaro	Jharkhand	III	Jamshedpur	Jharkhand	II
Bulandshahr	Utter Pradesh	IV	Jhansi	Utter Pradesh	II
Burdwan	West Bengal	III	Jodhpur	Rajasthan	II
Cailcut	Kerala	III	Jorhat	Assam	V
Chandigarh	Chandigarh	IV	Kakrapara	Gujarat	III
Chennai	Tamil Nadu	III	Kalapakkam	Tamil Nadu	III
Kanchipuram	Tamil Nadu	III	Pondicherry	Pondicherry	II
Kanpur	Utter Pradesh	III	Pune	Maharastha	III
Karwar	Karnataka	III	Raipur	Chattisgarh	II
Kohima	Nagaland	V	Rajkot	Gujarat	III
Kolkata	West Bengal	III	Ranchi	Chattisgarh	II
Kota	Rajasthan	II	Roorkee	Uttrakhand	IV
Kurnool	Andhra Pradesh	II	Rourkela	Orissa	II
Lucknow	Utter Pradesh	III	Sadiya	Assam	V
Ludhiyana	Punjab	IV	Salem	Tamil Nadu	III
Madurai	Tamil Nadu	II	Simla	Himanchal Pradesh	IV
Mandi	Himanchal Pradesh	V	Sironj	Madhya Pradesh	II
Mangalore	Karnataka	III	Solapur	Maharastha	III
Monghyr	Bihar	IV	Srinagar	Jammu & Kashmir	V
Moradabad	Utter Pradesh	IV	Surat	Gujarat	III
Mumbai	Maharastha	III	Tarapur	Maharastha	III
Mysore	Karnataka	II	Tezpur	Assam	V

Nagpur	Maharastha	II	Thane	Maharastha	III
Nagarjunasagar	Andhra Pradesh	II	Thanjavur	Tamil Nadu	II
Nainital	Uttrakhand	IV	Thiruvananthapuram	Kerala	III
Nasik	Maharastha	III	Tiruchirappali	Tamil Nadu	II
Nellore	Andhra Pradesh	III	Tiruvennamalai	Tamil Nadu	III
Osmanabad	Maharastha	III	Udaipur	Rajasthan	II
Panjim	Goa	III	Vadodara	Gujarat	III
Patiala	Punjab	III	Varanasi	Utter Pradesh	III
Patna	Bihar	IV	Vellore	Andhra Pradesh	III
Pilibhit	Uttrakhand	IV	Vijayawada	Andhra Pradesh	III
			Vishakhapatnam	Andhra Pradesh	II

Bureau of Indian Standards (BIS) has published criterion for construction of earthquake resistant structures. Buildings are now being made earthquake resistant.

BIS has prepared guidelines for retrofitting in existing structures. A list of code books on construction practices of buildings and structures, to minimize the earthquake losses, is available. In addition to this, Housing and Urban Development Corporation (HUDCO) & Building Materials & Technology Promotion Council (BMTPC) have also published guidelines and brochures for construction and retrofitting of buildings. 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.

Loss of life and damage of property due to earthquakes could be considerably reduced through proper planning and implementation of pre- and post-disaster preparedness and management strategies by respective State and Central Government agencies in a coordinated manner following the above mentioned guidelines. These studies involving preparation of geological, geomorphologic and land use maps followed by drilling, geological logging, standard penetration test and geophysical studies to demarcate the zones of least to most damage prone areas within the urban areas so as to helps the respective town and country planning agencies to formulate perspective planning within the overall earthquake impact minimization efforts. Based on the above steps it is mandatory for all infrastructure/building/ development agencies (Public and Private) to design appropriate earthquake resistant building plans based on the relevant BIS Codes and other guidelines of BMTPC, HUDCO and NDMA for across the country.

National Disaster Management Authority (NDMA), Ministry of Home Affairs (MHA), Ministry of Earth Sciences and other state Disaster Management Authorities, have also taken up various initiatives to educate and enhance awareness amongst general public and school children on the general aspects of earthquakes, their impacts and measures to mitigate losses caused by them. A National Disaster Response Force (NDRF) is also functional under the general superintendence, direction and control of the NDMA for the purpose of specialized response to natural and man-made disasters.

This information was given by Minister of State for Ministry of Science & Technology and Ministry of Earth Sciences Shri Y.S.Chowdary in a written reply to a question in Lok Sabha today.

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