

HYDERABAD , NOVEMBER 26, 2019

## **56% area of India prone to earthquakes: IIIT-H study**



Indian soldiers and locals remove debris from a damaged building after an earthquake in Imphal, on Jan. 4, 2016. | Photo Credit: AP

### **NDMA, IIIT-H develop Earthquake Disaster Risk Index for cities from high seismic zones**

An Earthquake Disaster Risk Index (EDRI), prepared by the National Disaster Management Authority (NDMA) in association with IIIT-Hyderabad here, showed that about 56% area of

India is vulnerable to moderate to major earthquakes where about 82% of the population live.

The index developed for 50 cities and one district (Bareilly in Uttar Pradesh) from high seismic zones on a pilot basis were chosen based on population density, housing threat factor and cities identified for 'Smart Cities' project has shown that no city has a low hazard level.

Those with hilly terrain showed to have low exposure, whereas cities with flat terrain and high populations have high exposure. Vulnerability of each city depends only on construction typology adopted and is found to be low in five cities, medium in 36 cities and high for nine cities.

## **13 cities at high risk**

Final result is that only seven cities have low level risk, whereas 30 cities have medium level risk and 13 cities have high level risk. "This scenario is alarming and needs immediate attention," said the index report released recently. High hazard with high risk cities include Aizawl, Pithoragarh, Srinagar, Uttarkashi, Nainital and Bhagalpur while medium hazard with high risk are Darbhanga, Ghaziabad, Itanagar, Guwahati, Dispur, Port Blair, Imphal, Shillong, Kohima, Agartala, Chamoli, Jammu and Mathura.

The list of high risk and exposure cities has Aizawl, Solan, Gangtok, and Vijayawada; medium risk with high exposure are Ghaziabad, Pune, and Mumbai; high risk with high vulnerability include Shimla, Aizwal, Pithoragarh, Nainital, and Uttarkashi; and medium risk with high vulnerability are Darbhanga, Patna, Mandi and Chennai.

The report was prepared based on the field visit of 25 cities and collection of secondary data from officials of the remaining cities. IIIT-H researchers at Earthquake Engineering Research Centre (EERC) have been working on assessing the risk of earthquakes on buildings since 2006 and say that "technically speaking, 4 out of 5 people are under earthquake threat," according to Pradeep Ramancharla.

Over a course of 13 years that spanned three projects across various states and cities, the IIIT-H team created the EDRI comprising earthquake hazard, exposure and vulnerability of a city. "Earthquake hazard refers to the amount of ground shaking that an area will experience; exposure refers to the number of buildings present in that area, and vulnerability refers to the strength of the building to withstand an earthquake," he explains.

"Hazard is governed by nature, town planning, and the local government bodies influence exposure. So our focus was on vulnerability which is in the hands of architects and engineers," says Mr. Ramancharla.

## Vibration data recorded

Using a combination of physical surveys on ground and risk assessment, the team also recorded vibration data on selected buildings. This was then fed into computer modelled buildings to simulate the effects of earthquakes of varying intensities to quantify physical damage to buildings during earthquakes. The risk which is initially estimated of individual building typology in a city, is eventually projected onto the city using the census data of total number of buildings in that city of that typology. The project also aims to increase general public awareness about earthquake safety and to make homes earthquake resilient.

One way is to educate architects and engineers in putting in place an adequate framework for new buildings, second is to determine the risk of existing buildings and suggest techniques for reinforcing them.

Mr. Ramancharla suggests a detailed structural evaluation of vulnerable buildings so that suitable riders can be put in place on developmental activities along with retrofitting measures adopted by the policy makers. The complete report is available on [https://ndma.gov.in/images/guidelines/EDRI\\_Report\\_final.pdf](https://ndma.gov.in/images/guidelines/EDRI_Report_final.pdf).

<https://www.thehindu.com/news/national/telangana/56-area-of-india-prone-to-quakes/article30088657.ece>