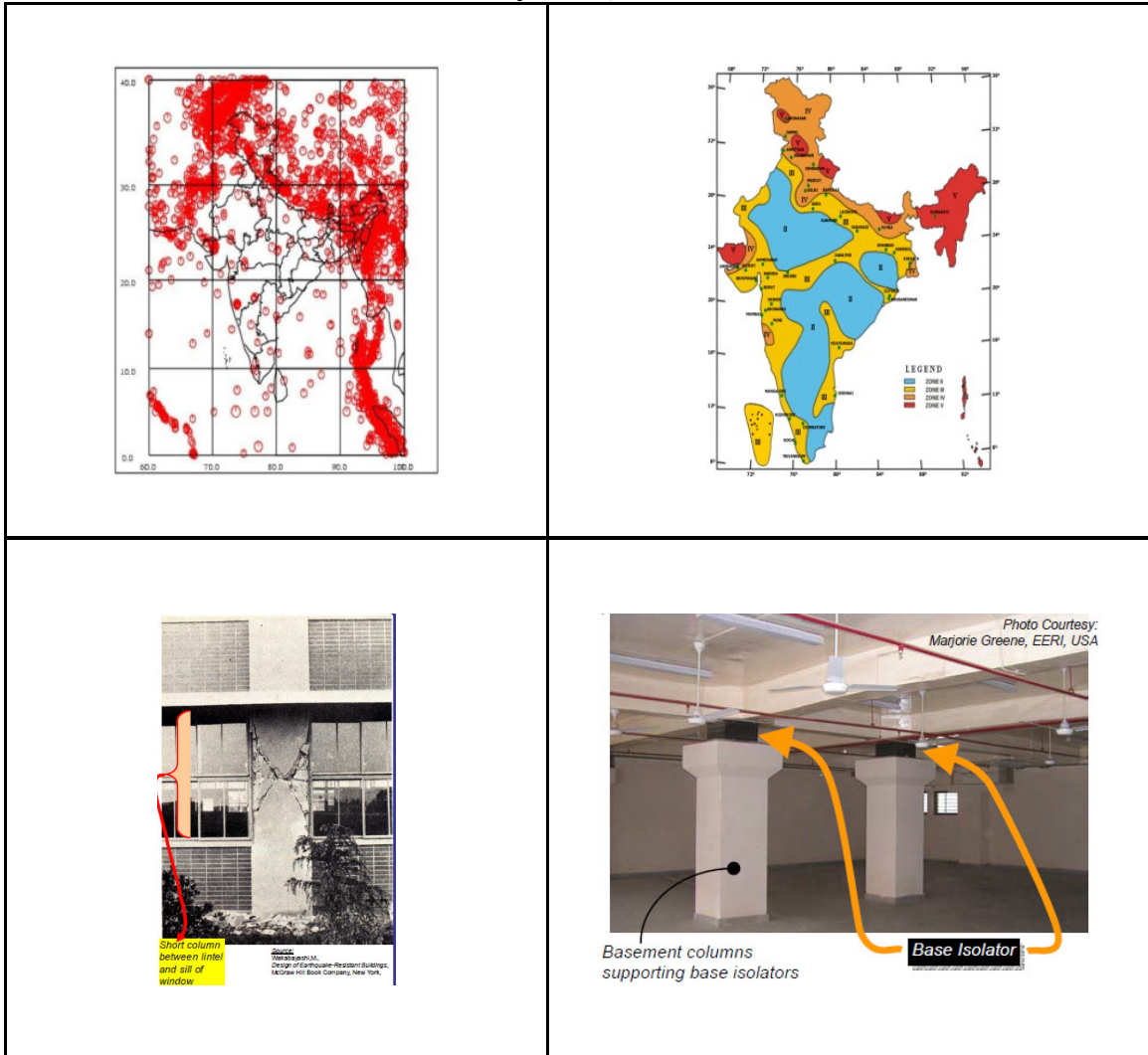


Training Programme on Earthquake Resistant Construction Practices and Recent Building Codes

(July 16-20, 2018)



Organized by:



National Institute of Disaster Management South Campus
(Ministry of Home Affairs, Govt. of India)

**A-wing, 4th Floor, NDCC-II Building, Jai Singh Road,
New Delhi – 110001**

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Introduction

Earthquakes are one of the most destructive natural hazards. They may occur at any time with sudden impact and no/little warning. They can destroy buildings in seconds, killing or injuring the inhabitants. Earthquakes not only destroy entire cities but may destabilize the government, economy and social structure of a country.

India on account of geo-physical setting is highly prone to earthquakes of varying intensities. The country has faced several devastating earthquakes in the past resulting in a large number of deaths and severe property damage. During the last century, five earthquakes measuring M8 or more had struck different parts of the country; Great Assam earthquake (1897), Kangra earthquake (1905), Bihar-Nepal earthquake (1934), Andaman-Nicobar earthquake (1941) and Assam earthquake (1950) had caused untold misery to the affected community and enormous damage to infrastructure and public and private property.

In recent past, damaging earthquakes had been experienced in different parts of the country e.g. Assam (1988) M 7.2, Bihar- Nepal (1988) M 6.5, Uttarkashi (1991) M 6.6, Latur (1993) M 6.4, Jabalpur (1997) M 6.0, Chamoli (1999) M 6.8 and Bhuj (2001) M 6.9. Most recent earthquakes affecting the country include Sikkim (2011) 6.9 and Manipur (2016) 7.7. Few of the earthquake events, which did occur outside Indian Territory, had a very severe bearing on the nation as well e.g. Muzaffarabad earthquake (POK), (2005) M7.6 had its bearing on Jammu and Kashmir; similarly, Great Sumatra earthquake, (2004) M9.1 created a severe tsunami affecting Indian coastline with severe impact.

As per the current seismic hazard map of the country (IS 1893: 2016), about 60% of India's land area is under threat of moderate to severe seismic hazard, i.e., prone to shaking of MSK Intensity VII and above (BMTPC, 2006).

The frequent occurrence of damaging earthquakes clearly demonstrates the high seismic hazard of the country and highlights the need for a comprehensive earthquake risk mitigation programme. To carry the earthquake risk mitigation programme forward, there is a need for trained manpower.

National Building Code of India 2016

The National Building Code of India (NBC) provides guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); building and plumbing services; approach to sustainability; and asset and facility management. The Code was first published in 1970 at the instance of Planning Commission and then first revised in 1983. Thereafter three major amendments were issued to the 1983 version, two in 1987 and the third in 1997. The second revision of the Code was in 2005, to which two amendments were issued in 2015. The revised Code has been brought out in 2016 as National Building Code of India 2016 reflecting the state-of-the-art and contemporary applicable international practices.

The comprehensive NBC 2016 contains 12 Parts some of which are further divided into Sections totaling 33 chapters. The salient features of the revised NBC include, apart from other changes made, the changes specially in regard to further enhancing our response to meet the challenges posed by natural calamities.

The NBC 2016 contains chapters on development control rules and general building requirements, fire and life safety, building materials, structural design, construction management, practices and safety and building services besides others.

Rapid Visual Screening

While the safe dwelling constructed in the world over has been the kingpin for advancement of human civilization, it also poses a potential hazard in the event of earthquakes and other related hazards. A lacuna in the construction quality brings loss in the life. Hence, there is a definite urgency to inspect the vulnerability of these built infrastructures so as to take timely corrective steps to prevent failure. Identifying potential danger arising out of many ill-conceived structures rampantly mushrooming in the major cities of India has to be taken up with utmost national priority. Rapid Visual Screening (RVS) of building is one such simple tool to classify vulnerability class based on professional judgment. Therefore, a training programme has been mooted for the building professionals of Meghalaya at Shillong.

The paradigm of sustainable development as a prime necessity in the realm of India's soaring economy, even though it was in existence in different form to developed nations, has been a latecomer to the Indian context. The upsurge of real estate developments across the country necessitates quality monitoring and regulation. While the safe dwellings constructed in the world over have been the kingpin for the advancement of human civilization, it also poses a potential hazard in the event of earthquakes and other related natural hazards. A lacuna in the construction quality brings in loss of life and disastrous economic consequences. Hence, there is a definite urgency to inspect the vulnerability of these built-infrastructures so as to take timely corrective steps to prevent failure. Identifying potential dangers arising out of many ill-conceived structures rampantly mushrooming in the urban/ city of India is to be taken up with utmost national priority. Rapid Visual Screening (RVS) of building is one such simple tool to classify vulnerability class based on professional judgment. Therefore, a training programme under the broad framework of NIDM was mooted for the building professionals of the seismic prone establishment of the country.

Rapid Visual Screening (RVS) is a cheap and fast procedure in assessing the safety of buildings and classifying them according to the risk that they pose in times of strong earthquakes. As per Indian Standard Code the Rapid Visual Screening method is designed to be implemented without performing any structural calculations. The procedure utilizes a damageability grading system that requires the evaluator to

- a. identify the primary structural lateral load-resisting system, and
- b. Identify building attributes that modify the seismic performance expected for this lateral load-resisting system along with non-structural components.

A building must go for detailed evaluation if the following conditions are met:

- (a) The building fails to comply with the requirements of the preliminary evaluation.
- (b) A building has six storeys and higher in RC and steel; and three storeys and higher in unreinforced masonry.
- (c) Buildings located on incompetent or liquefiable soils and/or located near (less than 12 km) active faults and/or with inadequate foundation details.

- (d) Buildings with inadequate connections between primary structural members, such as poorly designed and/or constructed joints of pre-cast elements.

Visually assessable variables, namely, storey number, cantilever extension, soft storey, weak storey, building quality, pounding effect, hill-slope effect, and peak ground velocity etc. are noted as earthquake hazard category. The inspection, data collection and decision-making process typically occurs at the building site, and is expected to take couple of hours for a building, depending on its size, accessibility and societal response. The screening is based on Code based Seismic Intensity, Building Type and Damageability Grade as observed in past earthquake and covered in MSK/European macro-intensity. The RVS procedure can be integrated with GIS-based city planning database and can also be used with advanced risk analysis software. The methodology also permits easy and rapid reassessment of risk of buildings already surveyed based on availability of new knowledge that may become available in future.

The main uses of this procedure in relation to seismic upgrading of existing buildings are:

- To identify if a particular building requires further evaluation for assessment of its seismic vulnerability.
- To assess the seismic damageability (structural vulnerability) of the building and seismic rehabilitation needs.
- To identify simplified retrofitting requirements for the building (to collapse prevention level) where further evaluations are not considered necessary or not found feasible.

To develop a cadre of trained professionals in the area of earthquake risk mitigation, National Institute of Disaster Management (NIDM) –South Campus is organizing this training programme with following details:

Objectives of the Programme

1. To enhance understanding concerning
 - the nature and extent of the threats due to earthquake; and
 - the concept and issues involved in earthquake risk mitigation and management;
2. To describe different activities involved in earthquake risk mitigation/ preparedness including building codes;
3. To develop capability to analyze plans for better earthquake risk preparedness and mitigation measures to minimize the impact of earthquake; and
4. To provide a forum for inter-changing of ideas and views pertaining to earthquake risk mitigation.

Target Group

This programme is primarily designed for people across the humanitarian to development spectrum, who may in some capacity be involved in earthquake risk mitigation activities at different levels. The programme will be useful for architects, engineers, planners, administrators, and faculty involved in teaching and research in this area.

Venue and Duration

The programme will be organized at NIDM/YMCA, New Delhi. The training programme will start on Monday, July 16, 2018 and will conclude on Friday July 20, 2018.

Registration

The participants of the programme will assemble at NIDM/YMCA and register themselves on Monday, July 16, 2018, at 9.30 a.m. onwards. NIDM Team will assist them in registration.

Programme Details

The training programme schedule, list of participants, faculty involved and the programme staff assisting this programme are included.

Faculty for the Programme

Besides NIDM, faculty from various leading organizations working in the area of earthquake risk reduction and building codes will be invited for interaction with the participants of the programme.

Evaluation of the Programme

The final session of the programme will be devoted to panel discussion, evaluation of the course content and valediction. The participants will be supplied with an evaluation proforma, which may be completed and handed over to the programme staff.

Certificate

A Certificate of participation will be awarded to each participant on successful completion of the programme.

Detailed Programme Schedule (Tentative)

Hrs	Monday (February 19)	Tuesday (February 20)	Wednesday (February 21)	Thursday (February 22)	Friday (February 23)
9:30	Registration				
10:00-10:15	Inauguration	Recapitulation – 1 st day	Recapitulation – 2 nd day	Recapitulation – 3 rd day	Recapitulation – 4 th day
10:15-11:30	Expectations, Experience Sharing & Ground Rules - NIDM Faculty	Engineering Approaches for Seismic Risk Mitigation - NIDM Faculty	National Building Code - 2016 and its implications in Earthquake Risk Mitigation - External Resource Person	Field Visit for conducting Rapid Visual Screening of Buildings - NIDM Faculty	Schools and Hospitals Preparedness for Earthquake Risk Mitigation - NIDM Faculty
11:30	Tea Break	Tea Break	Tea Break	Tea Break	Tea Break
11:45-13:00	Earthquake risk & hazard profile of India earthquake with phenomenon, causes and consequences - NIDM Faculty	<i>-Do-</i>	<i>-Do-</i>	<i>-Do-</i>	Administrative concerns for earthquake safety of buildings – External Resource Person
13:00	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break
13:45-15:15	<i>-Do-</i>	Non-structural mitigation of earthquake risk with a short field visit - NIDM Faculty	Seismic Micro-zonation studies for earthquake risk mitigation - External Resource Person	Discussion on RVS exercise and preparing earthquake risk mitigation plan – <i>an exercise</i> - Participants / NIDM Faculty	Training evaluation exercises Valedictory Function
15:15	Tea break	Tea break	Tea break	Tea break	Tea break
15:30-17:00	Local Built Environment and Earthquake Risk Mitigation – a discussion - NIDM Faculty	Architectural and Planning Approaches for Seismic Risk Mitigation - External Resource Person	RVS of buildings – a tool to mitigate the earthquake risk - NIDM Faculty	Retrofitting Techniques for earthquake risk mitigation - External Resource Person	
17:00-17:15	Summary of 1 st day's program	Summary of 2 nd day's program	Summary of 3 rd day's program	Summary of 4 th day's program	

Faculty for the Programme

NIDM Faculty (to be involved)

Name	Address	Contact details
Shri B H Anil Kumar, IAS	Executive Director, NIDM	
Prof. C. Ghosh	Faculty, NIDM	
Dr. Amir Ali Khan	Faculty, NIDM	

External Resource Persons

Name	Address	Contact details

Programme Staff

1. Programme Support

- Dr. Amir Ali Khan - Programme Coordinator
- Ms. Santosh Mishra – DEO
- Shri Laxman Singh - MTS

2. Logistics Support (tentative)

- Shri Anil Shekhawat – Assistant Commandant (training)
- Shri J N Jha – Junior Engineer

Contact Address:

National Institute of Disaster Management (NIDM)

(Ministry of Home Affairs, Government of India)

A-wing, 4th floor, NDCC-II Building,

Jai Singh Road,

New Delhi – 110001

Phone: 011 – 23438285; Fax: 011- 23438286

Website: www.nidm.gov.in