

NIDM GUIDELINES ON EARTHQUAKE

NDMA had released its details earthquake guidelines in 2007. The guidelines prescribe measures for Central Ministries and Departments and State Governments to prepare disaster management plans having specific components on earthquake risk management. The basic premise of these guidelines includes six pillars of Earthquake management to be implemented in three phases

SIX PILLARS OF EARTHQUAKE MANAGEMENT



Earthquake-Resistant Design and Construction of New Structures

In most earthquakes, the collapse of structures like houses, schools, hospitals and public buildings results in the widespread loss of lives and damage. Earthquake also destroys public infrastructure like roads, dams and bridges, as well as public utilities like power and water supply installations. Past earthquakes show that over 95% of the lives lost were due to the collapse of buildings that were not earthquake-resistant. Though there are buildings codes and other regulations which make it mandatory that all structures in earthquake-prone areas in the country must be built in accordance with earthquake-resistant construction techniques, new constructions often overlook strict compliance to such regulations and building codes. Faculty members in engineering colleges, architecture colleges, Industrial Training Institutes (ITIs) and polytechnics will also be provided adequate exposure to earthquake resistance design and construction techniques, so that students are made aware of earthquake-resistance design and construction. While the implementation of these Guidelines in areas within seismic Zone III will be initiated during Phase I, these efforts will be intensified in these during Phase II.

Seismic Strengthening and retrofitting of Lifeline and Priority Structures

There are approximately 12 crore buildings in seismic Zones III, IV and V. Most of these buildings are not earthquake-resistant and are potentially vulnerable to collapse in the event of a high intensity earthquake. As it is not practically feasible or financially viable to retrofit all the existing buildings, these Guidelines recommend the structural safety audit and retrofitting of select critical lifelines structures and high priority buildings. Such selection will be based on considerations such as the degree of risk, the potential loss of life and the estimated financial implications for each structure, especially in high-risk areas, i.e. seismic Zones III, IV and V. While these Guidelines indicate an illustrative list of such buildings and structures, the state government/SDMAs will consultation with their SEMCs and Hazards Safety Cells (HSCs), review their existing built environment, and prepare such lists.

Regulation and Enforcement

A periodic revision of the codes and standards relating to earthquake-resistant construction will be undertaken by drafting groups within a fixed time-frame of five years or even earlier on priority basis, in keeping with international practices. Other than the BIS, there are a number of other bodies that develop design codes and guidelines in the country, e.g. the Indian Roads Congress (IRC), Ministry of Shipping, Road Transport and Highway (MoSRT), Research Designs and Standards Organisation (RDSO), Ministry of Railways (MoR), and the Atomic Energy Regulatory Board (AERB), Department of Atomic Energy (DAE). Codes developed by these organisations will also be updated and made consistent with the current state-of-the-art techniques on earthquake-resistant design and construction. These agencies also have a number of construction practices regulated through internal memos, the review of which will also be undertaken at the earliest.

Design provisions are required on many topics that have been addressed so far in the existing codes or guidelines in India. Such topics include:

- Seismic design of non-structural elements and components of buildings and structures.
- Seismic design of reinforced masonry structures.
- Seismic evaluation and strengthening of structures.
- Seismic design of buried and above ground pipelines.
- Seismic design and ductile detaining of steel structures.
- Seismic design and ductile detaining of bridge piers.
- Seismic design, construction and manufacture of facilities, structures and components related to electrical power generation, transmission and distribution.
- Seismic design of tunnels.

Awareness and Preparedness

A comprehensive awareness campaign will be developed and implemented on the safe practices to be followed before, during and after an earthquake. This campaign will also emphasise the prevalent seismic risk and vulnerability of the states as well as highlight the roles and responsibilities of all communities and stakeholders in addressing this risk.

Creation of Public Awareness on Seismic Safety and Risk Reduction

- The guidelines say that a handbook on earthquake safety will be prepared for the general public highlighting the safety of persons (i.e., indoors, outdoors, and driving), buildings and

structures and non-structural contents of buildings. {This handbook is available on NDMA site}.

- A home owners seismic safety manual will be prepared emphasising earthquake-resistant techniques for new buildings and for the seismic strengthening and retrofitting of existing buildings.
- A manual on structural safety audit of infrastructure and lifeline buildings will be prepared.
- Translations of the above documents into local and regional languages will be undertaken for easy comprehension.
- Video films will be prepared for the general public to articulate the earthquake risk, vulnerability and preparedness and mitigation measures.

Capacity Development (Including Education, Training, R&D and Documentation)

The developments of high-quality education materials, textbooks, field training and the improvement of the quality of teaching at all levels will be given due emphasis. Education and training programmes will be designed, with greater attention on developing the capacity and skills of trainers and trained teachers. Appropriately designed science and technology courses will be introduced to orient all targets groups including school teachers and health professionals in the subject. The central and state government will encourage knowledge institutions to undertake research, teaching and training, which will further contribute to improving earthquake education in India.

Response

The management and control of the adverse consequences of future earthquakes will require coordinated, prompt and effective response systems at the district and the community levels. Many of the components of response initiatives are the same for different types of disasters and systems need to be developed considering the multi-hazard scenario of various regions in order to optimally utilise available resources. Ensure the incorporation of earthquake-resistant design features for the construction of new structures. Facilitate selective strengthening and seismic retrofitting of existing priority and lifeline structures in earthquake-prone areas. Improve the compliance regime through appropriate regulation and enforcement. Improve the awareness and preparedness of all stakeholders. Introduce appropriate capacity development interventions for effective earthquake management (including education, training, R&D, and documentation). Strengthen the emergency response capability in earthquake-prone areas.

Disaster Management Plans

- Preparation of state and district DM plans, with specific reference to the management of earthquakes.
- Revision of town planning bye-laws and adoption of model bye-laws.
- Wide dissemination of earthquake-resistant building codes, the National Building Code 2005, and other safety codes.
- Training of trainers in professional and technical institutions.
- Training professionals like engineers, architects, and masons in earthquakeresistant construction.
- Launching public awareness campaigns on seismic safety and risk reduction and sensitising all stakeholders to earthquake mitigation.

- Developing seismic strengthening and retrofitting standards and guidelines for existing critical lifeline structures.
- Operationalising the NDRF battalions.
- Operationalising the SDRF battalions in the states.
- Strengthening the medical preparedness for effective earthquake response, etc.
- Enforcement and monitoring of compliance of earthquake-resistant building codes, town planning bye-laws and other safety regulations.

NDMA Guidelines on Urban Flooding in India

Urban flooding differs from rural flooding as urbanisation leads to developed catchments which increases the flood peaks and flood volumes. As a result, flooding occurs very quickly due to faster flow times, sometimes in a matter of minutes. As urban areas are centres of economic activities, any damage to vital infrastructure has a bearing not just locally but could even have global implications. Both rich and poor living cities suffer due to flooding. Urban flooding associated with damage to property and loss of life. There is a possibility of secondary issues of possible epidemics and exposure to infections. Therefore, management of urban flooding has to be accorded top priority.

Urban Flood Risk in India

In the past several years, there is an increasing trend of urban flood disasters in India. The notables of them are Hyderabad in 2000, Ahmedabad in 2001, Delhi in 2002 and 2003, Chennai in 2004, Mumbai in 2005, Surat in 2006, Kolkata in 2007, Jamshedpur in 2008, Delhi in 2009, Guwahati and Delhi in 2010, and Chennai in 2015. Heavy rainfall during monsoons is a special feature in India. Storm surges can also affect coastal cities/ towns. Sudden release or failure to release water from dams can also have severe impact. The urban heat island effect and global climate change is resulted in episodes of high intensity rainfall events occurring in shorter periods of time. Coastal cities are also facing threat from sea-level rise.

National Disaster Management (NDMA) Guidelines on Urban Flood Management

- Create a National Hydro-meteorological Network.
- The guidelines say that for providing early warning, the Central Water Commission (CWC) should maximize the real-time hydro-meteorological network to cover all urban centres to effectively deal with the problem of urban flooding
- Use of Doppler Weather Radar to be expanded to cover all urban areas in the country
- An inventory of the existing stormwater drainage system to be prepared. The inventory will be both watershed-based and ward-based.
- Catchment to be the basis for planning and designing the stormwater drainage systems in all ULBs (URBAN LOCAL BODIES)
- All future road and rail bridges in cities crossing drain to be designed such that they do not block the flows resulting in backwater effect
- Every building in an urban area must have rainwater harvesting as an integral component of the building utility.
- Low-lying areas in cities have to be reserved for parks and other low-impact human activities.

- Encroachments on the drain should attract penal action.
- Pre-monsoon desilting of all major drains to be completed by March 31 each year.
- Urban Flooding has to be dealt as a separate disaster, de-linking it from riverine floods which affect the rural areas.
- Suitable interventions in the drainage system like traps, trash racks can be provided to reduce the amount of solid waste going into the storm sewers.
- Inlets to be provided on the roads to drain water to the roadside drains and these have to be designed based on current national and international practices.
- Every building in an urban area must have rainwater harvesting as an integral component of the building utility.
- Concept of Rain Gardens to be incorporated in planning for public parks and on-site stormwater management for larger colonies and sites that are to be developed.
- Flood hazard assessments should be done on the basis of projected future scenarios of intensities and duration of the rainfall and land-use changes.

NDMA ISSUED URBAN FLOODING MANAGEMENT FOR URBAN FLOODING

Introduction -Climate Change, Urbanisation and Pressure on Land

Institutional Framework and Arrangements- Institutional Framework, Role of Central Ministries and Departments, The State Governments, Urban Local Bodies

Early Warning System and Communication-Data Networks for Monitoring and Early Warning, Flood Alert System, Regional Networks

Design and Management of Urban Drainage System-Catchment as basis for Design, Real-Time Rainfall Data, Rainwater Harvesting

Urban Flood Disaster Risk Management-Issues in Urban Flood Disaster Risk Management, Estimation of Flood Damages, Spatial Decision Support Systems for Urban Flood Management

Techno-Legal Regime-Legal Support for Planned Development of Urban Areas, Study by Experts Committee

Response -City Disaster Management Plan, Response Actions

Capacity Development, Awareness Generation and Documentation-Urban Flood Education, Household Level, Community Level, Institutional Level, Role of Public Representatives, Role of Media

Implementation of the Guidelines: Preparation of DM Plans-Mainstreaming DM into Development, Implementation and Coordination at the National Level. Financial Arrangements for Implementation