NEWS LETTER
CENTRE FOR DISASTER MANAGEMENT
Towards building a safe and disaster resilient India
St. PETERS UNIVERSITY
Avadi, Chennai 600054
www.stpetersuniversity.org

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St. PETER'S UNIVERSITY

St. Peter's Institute of Higher Education and Research (St. Peter's University) is a deemed University located at Avadi in the Chennai metropolitan city. It was formally functioning as a self-financing engineering college since 1993 in the name of St. Peter's Engineering College. After attaining deemed University status in 2008, the institution has been focusing on academic excellence, higher education and research. The University offers 14 undergraduate and 15 postgraduate programs in engineering, technology, management studies and architecture, besides M.Phil. and Ph.D. programs. For encouraging innovation and entrepreneurship development, Technology Business Incubator sponsored by the Department of Science and Technology, Ministry of Science and Technology, and SPIHER – MSME Business Incubator, sponsored by the Ministry of Micro, Small and medium Enterprises, Government of India, are functioning within the campus.

CENTRE FOR DISASTER MANAGEMENT

Disasters disrupt progress and destroy the hard-earned fruits of painstaking developmental efforts, often pushing nations, in quest for progress, back by several decades. Thus, efficient management of disasters, rather than mere response to their occurrence has, in recent times, received increased attention both within India and abroad.

Relevance to India

- 58.6 % of the landmass is prone to earthquakes of moderate to very high intensity;
- over 40 million hectares (12 % of land) is prone to floods and river erosion;
- of the 7,516 km long coastline, close to 5,700 km is prone to cyclones and tsunamis;
- 68 % of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches.
- Vulnerability to disasters/ emergencies of Chemical, Biological, Radiological and Nuclear (CBRN) origin also exists.

Objectives of the Centre

- To disseminate knowledge on various aspects of disaster management among the students, faculty and practising engineers;
- To organize special lectures, staff development programmes and seminars to facilitate exchange of knowledge and latest developments;
- To identify and introduce courses at undergraduate and post graduate levels in the specialized areas;
- To identify the research requirement and take up Ph.D. and research projects;
- To take up collaborative programmes with other institutions at national and international level.

MESSAGE

I am glad that the Centre for Disaster Management is publishing News Letter to inform about the activities of the Centre and disseminate knowledge on Disaster Management. I hope the information given in the News Letter will be useful to the readers.

Dr.D.S.Ramachandra Murthy
Vice Chancellor

Elective Subject on Disaster Management introduced.

An elective on Disaster Management has been introduced for B.E. (Civil Engineering) and M.E. (Structural Engineering) programs from the academic year 2013-14. Syllabus has been framed to introduce the students to the various types of disasters, principles of disaster management and concepts of disaster preparedness, disaster prevention and mitigation, post disaster recovery and rehabilitation, and the National policy on disaster management.

International Conference ICDM'14 and Pre-conference Workshop on Disaster Management, January 21-24, 2014

An international conference on Disaster Management is being organized at the University campus from 23rd to 24th January 2014. A two-day workshop will also be conducted prior to the conference from 21st to 22nd January 2014. The details of the program is available in www.stpetersuniversity.org.

Broad areas of topics to be covered are given below.

- Types of disasters (natural and manmade) and Principles of disaster management
- Disaster reduction - Engineering and management approach
- Disaster management – issues
  Disaster prevention; Disaster mitigation; Disaster preparation; Response and Reconstruction.
- Engineering approach for disaster reduction
  Disaster mitigation; Standards and recommendations/Guidelines; Risk and vulnerability analysis; National and international organizations.
- Preventive measures for disaster reduction
  Forecasting/Prediction; zone maps; measures of adjustment to natural hazards
- Disaster preparation
  Early warning systems; education on disasters;

community involvement; adjustment of human population to hazards and disasters; Role of media; Institutions involved.

- Response and relief measures
  Organisations involved; Information management; Remote sensing and GIS technology; Emergency facilities and Management of casualities; Relief measures; Temporary shelters.

- Rehabilitation/reconstruction
  Assessment of damage; Strengthening methods for buildings and/ structures (materials and techniques); Resettlement of affected people; Quick reconstruction technologies; Restoration of normalcy

- Financial and legal issues

- National Policies on Disaster Management

- Case studies; simulation models.

Authors may send abstract of the paper not exceeding 200 words in A4 size by e-mail before 30th July 2013. Announcement can be seen in www.stpetersuniversity.org For further details, contact *icdm14@stpetersuniversity .org*.

Terminologies relating to Disaster Management

Disaster - a catastrophe, mishap, calamity or grave occurrence from natural or man-made causes, which is beyond the coping capacity of the affected community.

Hazard - a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.

Natural hazards - hazards which are caused because of natural phenomina (hazards with meteorological, geological or even biological origin). Examples: cyclones, tornados, tsunamis, earthquake, volcano, fire.

Manmade hazards - hazards which are due to human negligence. Examples: explosions, leakage of toxic waste, pollution, dam failure, wars or civil strife, terrorist acts etc.

Vulnerability - the extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of a particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area.

Capacity - resources, means and strengths which exist in households and communities, and which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster.

Risk - measure of the expected losses due to a hazard event occurring in a given area over a specific time period. Risk is a function of the probability of a particular hazardous event and the losses each would cause.

Disaster mitigation - all actions to reduce the impact of a disaster that can be taken prior to its occurrence, including preparedness and long-term risk reduction measures; includes both planning and implementation of measures to reduce the risks associated with natural and human-made hazards, and the process of planning for effective response to disasters which do occur.

Disaster Management - a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for:

- Prevention of danger or threat of any disaster.
- Mitigation or reduction of risk of any disaster or its severity or consequences.
- Capacity building including research and knowledge management.
- Preparedness to deal with any disaster.
- Prompt response to any threatening disaster situation or disaster.
- Assessing the severity or magnitude of effects of any disaster.
- Evacuation, rescue and relief.
- Rehabilitation and reconstruction.

Disaster risk management - a series of actions (programmes, projects and/or measures) and instruments expressly aimed at reducing disaster risk in endangered regions, and mitigating the extent of disasters.

Disaster preparedness - a continuous cycle of planning, organizing, training, equipping, exercising, evaluation and improvement activities to ensure effective coordination and the enhancement of capabilities to prevent, protect against, respond to, recover from, and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters.

Disaster prevention - the formulation and application of long-term permanent measures which will serve either to avert the impact of potentially dangerous hazard or to withstand them as far as possible and mitigate their harmful consequences.

NATIONAL POLICY ON DISASTER MANAGEMENT

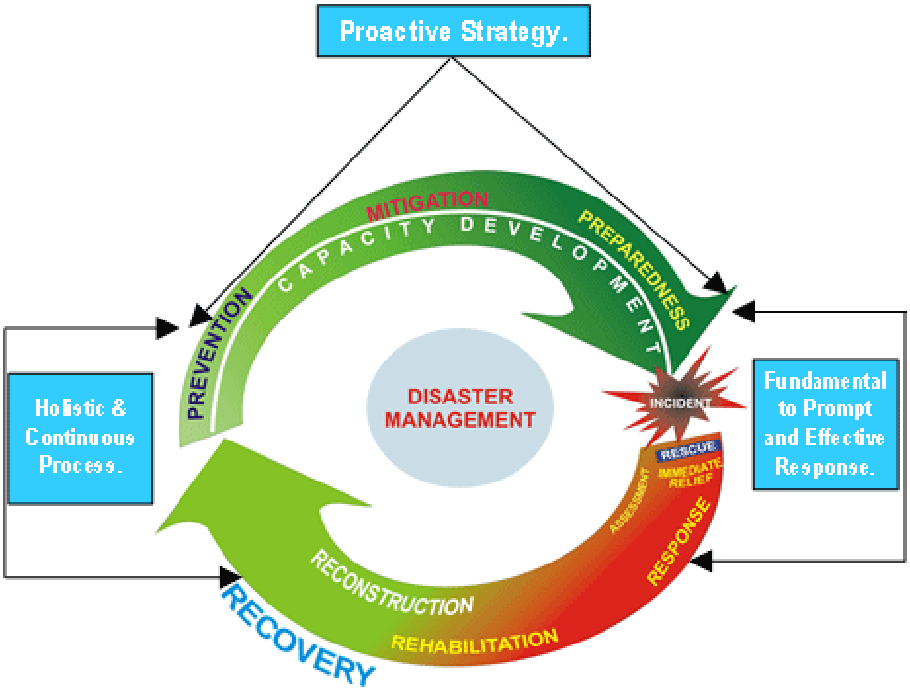
On 23 December, 2005, the Government of India (GoI) took a defining step by enacting the Disaster Management Act, 2005, (hereinafter referred to as the Act) which envisaged the creation of the National Disaster Management Authority (NDMA), headed by the Prime Minister, State Disaster Management Authorities (SDMAs) headed by the Chief Ministers, and District Disaster Management Authorities (DDMAs) headed by the Collector or District Magistrate or Deputy Commissioner as the case may be, to spearhead and adopt a holistic and integrated approach to DM. There will be a paradigm shift, from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving developmental gains and also to minimise losses of life, livelihoods and property.

Vision

To build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response.

Extracted from the National Disaster Management Authority (NDMA) website www.nidm.gov.in

DISASTER MANAGEMENT CONTINUUM



Institutional Framework for Disaster Management

- National Disaster Management Authority (NDMA) – Apex Body
- National Executive Committee
- State Disaster Management Authority
- *District Disaster Management Authority (DDMA)*
- *Local Authorities*
- *National Institute of Disaster Management (NIDM)*
- *National Disaster Response Force (NDRF)*
- *Armed Forces*
- *Central Para Military Forces*
- *State Police Forces and Fire Services*
- *Civil Defence and Home Guards*
- State Disaster Response Force (SDRF)
- *National Cadet Corps (NCC), National Service Scheme (NSS) and Nehru Yuva Kendra Sangathan (NYKS)*

International Journals on Disaster Management

- Applied Ocean Research
- Asian Journal of Civil Engineering (Building and Housing)
- Asian Journal of Environment and Disaster Management (AJEDM)
- Disaster Prevention and Management - an International Journal
- Disaster Management and Response
- Earthquake Engineering and Engineering Vibration
- Earthquake Engineering and Structural Dynamics
- Engineering Structures
- International Journal of Advanced Fire, Explosive, Environment Safety and Disaster Management
- International Journal of Climatology
- International Journal of Emergency Management
- International Journal of Disaster Resilience in the built environment
- International Journal of Disaster Risk Reduction
- International Journal of Disaster Risk Science
- International Journal of Engineering Under Uncertainity: Hazards Assessment and Mitigation
- The International Journal of Epidemiology
- International Journal of Geotechnical Earthquake Engineering (IJGEE)
- International journal of mass emergencies
- International Journal of Meteorology
- International Nuclear Safety Journal
- International Journal of Nuclear Safety and Security
- International Journal of Soil Dynamics and Earthquake Engineering
- Journal of Earthquake Engineering
- Journal of Flood Risk Management
- Journal of Offshore Mechanics and Arctic Engineering
- Journal Nature
- JSEE - Journal of Seismology and Earthquake Engineering
- Journal of Sound and Vibration
- Journal of Structural Engineering, ASCE
- Journal of Structural Engineering, CSIR-SERC
- Journal of Wind Engineering & Industrial Aerodynamics
- Natural Hazards. Journal of the International Society for the Prevention and Mitigation of Natural Hazards
- Natural Hazards and Earth System Sciences
- Structural Safety
- The Journal of Flood Engineering (JFE)
- The Structural Design of Tall and Special Buildings
- Tropical Cyclone Research and Review
- Wind Engineering
- Wind and Structures - International Journal

KNOW ABOUT EARTHQUAKE & ITS EFFECTS

What is an earthquake?

In an earthquake, seismic waves arise from sudden movements in a rupture zone (active fault) in the earth's crust. Waves of different types and velocities travel different paths before reaching a building's site and subjecting the local ground to various motions. The ground moves rapidly back and forth in all directions, usually mainly horizontally, but also vertically.

What is the duration of the ground motions?

For example, an earthquake of average intensity lasts approximately 10–20 seconds, a relatively short duration. What is the maximum amplitude of the motions? For example, for a typical «Valais Quake» of an approximate magnitude of 6 (similar to the earthquake that caused damage in the Visp region in 1855), the amplitudes in the various directions of the horizontal plane can reach about 8, 10, or even 12 cm. During an earthquake of magnitude 6.5 or more (similar to the «Basel Quake» that destroyed most of the city of Basel and its surroundings in 1356), ground displacements can reach 15-20 cm, and perhaps somewhat more.

What happens to the buildings?

If the ground moves rapidly back and forth, then the foundations of the building are forced to follow these movements. The upper part of the building however would prefer to remain where it is because of its mass of inertia. This causes strong vibrations of the structure with resonance phenomena between the structure and the ground, and thus large internal forces. This frequently results in plastic deformation of the structure and substantial damage with local failures and, in extreme cases, collapse.

The ground motion parameters and other characteristic values at a location due to an earthquake of a given magnitude may vary strongly. They depend on numerous factors, such as the distance, direction, depth, and mechanism of the fault zone in the earth's crust (epicentre), as well as, in particular, the local soil characteristics (layer thickness, shear wave velocity). In comparison with rock, softer soils are particularly prone to substantial local amplification of the seismic waves. As for the response of a building to the ground motion, it depends on important structural characteristics (eigen frequency, type of structure, ductility, etc). Buildings must therefore be designed to cover considerable uncertainties and variations.

Devastating induced hazards

Apart from structural hazards due to ground shaking, extensive loss can be caused by the so-called induced hazards such as landslides, liquefaction, fire, retaining structure failures, critical lifeline failures, tsunamis and seiches. For example, the 2001 San Salvador earthquake induced 16,000 landslides causing damage to 200,000 houses. In the 1970 Chimbote earthquake (Peru), a gigantic landslide triggered by the earthquake caused 25,000 fatalities, more than a third of the total fatalitites. In the 1906 San Francisco earthquake, most of the damage was caused by uncontrolled fire. In the 1995 Kobe earthquake fire was responsible for 8% of the destroyed houses.

Sway mechanisms are often inevitable with soft storey ground floors (Izmit, Turkey 1999).

The modern reinforced concrete building to the left collapsed after pounding against the older very stiff building to the right (Mexico 1985).

Earthquakes Don't Kill People, Buildings Do. Hence Follow …

Seismic Conceptual Design of Buildings

- The architect and engineer collaborate from the outset. Follow seismic provisions of building codes.
- No significant additional cost thanks to modern methods.
- Avoid soft-storey ground floors. Avoid soft-storey upper floors.
- Avoid asymmetric bracing, Avoid bracing offsets,
- Discontinuities in stiffness and resistance cause problems,
- Two slender reinforced concrete structural walls in each principal direction. Avoid mixed systems with columns and structural masonry walls.
- Avoid bracing of frames with masonry infills. Brace masonry buildings with reinforced concrete structural walls. Reinforce structural masonry walls to resist horizontal actions.
- Match structural and non-structural elements. In skeleton structures, separate non-structural masonry walls by joints.
- Avoid short columns. Avoid partially infilled frames.
- Ductile structures through capacity design.
- Anchor facade elements against horizontal forces. Anchor free standing parapets and walls. Fasten suspended ceilings and light fittings. Fasten installations and equipment.
- Design steel structures to be ductile. Separate adjacent buildings by joints. Assess the potential for soil liquefaction.

Ref.: Seismic Conceptual Design of Buildings – Basic principles for engineers, architects, building owners, and authorities - Hugo Bachmann