3-DAYS RESIDENTIAL TRAINING PROGRAMME ON CYCLONE AND EARTHQUAKE RESISTANT CONSTRUCTION OF CRITICAL INFRASTRUCTURES (BUILDINGS & BRIDGES)

DATE: 31ST AUGUST – 02ND SEPTEMBER, 2023

GUJARAT INSTITUTE OF DISASTER MANAGEMENT
BUILDING RESILIENCE

Gujarat Institute of Disaster Management
Behind Pandit Deendayal Petroleum University
Raisan Village, Gandhinagar, Gujarat,
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3-Days Residential Training

on

'Cyclone and Earthquake Resistant Construction of Critical Infrastructures (Buildings & Bridges)'

Date: 31st August, 01st & 02nd September, 2023

CONCEPT NOTE

1. BACKGROUND

In the face of natural or man-made disasters, the criticality of structures takes centre stage in ensuring the safety and well-being of communities. From earthquakes and storms to fires, these catastrophic events pose significant threats to the built environment and the lives of those within it. The understanding and management of structural criticality play a pivotal role in disaster preparedness, response, and recovery efforts.

When a disaster strikes, structures bear the brunt of its impact. The performance of buildings, bridges, dams, and other infrastructure systems during such events can determine the magnitude of destruction and the ability of communities to withstand and recover from them. The criticality of structures refers to their ability to resist, absorb, and dissipate the forces exerted upon them during disasters, thereby minimizing the potential for collapse and ensuring the preservation of life and property.

One of the key considerations in assessing structural criticality is the vulnerability of the built environment. This vulnerability encompasses factors such as design deficiencies, aging infrastructure, inadequate maintenance, and improper construction practices. Understanding the vulnerability of structures helps identify potential weak points and prioritize interventions to improve their resilience.

The criticality of structures is also closely linked to the concept of resilience. Resilient structures are designed and constructed to withstand extreme forces, adapt to changing conditions, and quickly recover functionality after a disaster. Enhancing the resilience of buildings and infrastructure not only safeguards lives but also minimizes economic losses and facilitates the rapid restoration of essential services.

Criticality of Structures in the context of Gujarat:

Gujarat, a vibrant state in western India, is known for its rapid industrialization, urbanization, and susceptibility to natural hazards. In this context, understanding the criticality of structures becomes crucial in ensuring the resilience of the built environment and the safety of its inhabitants.

Gujarat's geographical location makes it prone to various disasters, including earthquakes, cyclones, and floods. The devastating earthquake of 2001, with its epicentre in Bhuj, highlighted the importance of building structures that can withstand seismic

forces. It served as a wake-up call for the state, prompting significant advancements in seismic-resistant design and construction practices.

Since then, Gujarat has made commendable progress in enhancing the criticality of its structures. The state has implemented stringent building codes and regulations to ensure that new constructions meet seismic safety standards. Additionally, efforts have been made to retrofit existing structures, especially those of historical and cultural significance, to improve their resilience against earthquakes.

In recent years, Gujarat has also recognized the importance of holistic urban planning and infrastructure development to mitigate disaster risks. By integrating disaster risk reduction strategies into urban development plans, the state aims to create resilient cities and towns that can effectively respond to and recover from disasters.

Moreover, the criticality of structures in Gujarat extends beyond seismic resilience. The state faces cyclones and floods along its coastal regions, demanding the construction of structures that can withstand high wind speeds and resist water ingress. Attention is also given to the critical infrastructure systems, such as power grids, transportation networks, and healthcare facilities, to ensure their functionality during emergencies.

2. OBJECTIVES

1. The primary objective of the training programme is to provide participants with comprehensive knowledge and understanding of the criticality of structures in the context of earthquake and cyclone hazards.

2. To familiarize participants with the specific earthquake and cyclone hazards prevalent in the state. By understanding the local geological and meteorological characteristics, participants can gain insights into the unique challenges faced by structures in the area and develope tailored strategies for mitigating risks.

3. To equip participants with the necessary skills and tools to assess the vulnerability of structures to earthquake and cyclone hazards.

4. To share best practices and lessons learned from past earthquakes and cyclones. Participants will learn about successful case studies and examples of resilient structures, as well as the common causes of failure and the associated consequences.

5. To emphasizes the need to integrate risk reduction measures into all phases of a structure's lifecycle, from design and construction to operation and maintenance. Participants will learn about the importance of adopting a multi-hazard approach, considering both earthquake and cyclone hazards, and integrating risk reduction strategies into building codes, regulations, and urban planning frameworks.

4. NEED FOR THE TRAINING PROGRAMME

The need for the training program on the criticality of structures focusing on earthquake and cyclone hazards arises due to several compelling reasons:

- **Vulnerability to seismic and wind hazards:** Certain regions are prone to frequent earthquakes or cyclones due to their geographical location. In these areas, structures

are particularly susceptible to damage and failure during such events. The training program is necessary to educate professionals and stakeholders about the unique challenges posed by these hazards and equip them with the knowledge and skills to address them effectively.

- **Safety and protection of lives:** Structures that are not designed or constructed to withstand earthquake and cyclone forces can pose a significant risk to human life. By providing training on structural criticality, the program aims to enhance the safety of individuals residing or working in these areas. It emphasizes the importance of designing and maintaining structures that can withstand the intense forces generated by earthquakes and cyclones, thereby reducing the potential for casualties.

- **Minimizing economic losses:** Disasters like earthquakes and cyclones can result in substantial economic losses due to infrastructure damage, business interruption, and the cost of rebuilding. By promoting the criticality of structures, the training program aims to minimize these losses by ensuring that structures can withstand the forces of these hazards, reducing repair and reconstruction costs, and facilitating faster recovery after the events.

- **Strengthening disaster resilience:** Enhancing the criticality of structures is a crucial component of building disaster resilience in vulnerable regions. By training professionals and stakeholders on the design, construction, and retrofitting techniques specific to earthquake and cyclone hazards, the program aims to contribute to the development of resilient communities. Resilient structures are better equipped to withstand disasters, minimizing their impact on communities and enabling faster recovery.

- **Compliance with regulations and standards:** Governments and regulatory bodies often establish building codes and standards to ensure the safety and structural integrity of structures. The training program helps professionals stay up-to-date with these regulations and equips them with the knowledge to comply with the prescribed standards. By doing so, participants can contribute to the overall improvement of construction practices and adherence to safety guidelines.

- **Bridging the knowledge gap:** The field of structural engineering and disaster risk reduction is continuously evolving. There is a need to bridge the knowledge gap by disseminating the latest advancements, best practices, and lessons learned from previous events. The training program addresses this need by providing a platform for professionals to exchange knowledge, learn from experts, and gain insights into emerging trends and technologies in the field of structural criticality.

5. TARGET PARTICIPANTS

Sr. No.	Departments/ Organisations	Designation	Level of Participants

1.	Road and Building Department	1. Dy. Executive Engineer 2. Assistant Engineer 3. Additional Assistant Engineer	L1, L2

6. TRAINING METHODOLOGY

The proposed methodology for delivering the training program will include lectures, site visits, case studies, group discussions and games. The concepts will be explained in an interactive manner with use of videos, presentation, online tools like slido, open source applications etc. to enhance participant engagement and learning outcomes.

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