GIDM-Webinar

Concept note for a one hour GIDM webinar topic

Cyclone Resistant Construction of Buildings

Background

India is no stranger to coping with climate extremes and natural emergencies, but this year is likely to lodge in the national memory as one of the most challenging in recent history.

The Covid-19 pandemic is a global scourge, but India also has many regional and national afflictions to make 2020 a year to forget – a massive heatwave, its strongest recorded cyclone, thunderstorms bringing huge hailstones, and floods. It was the strongest storm ever recorded in the Bay of Bengal. When it hit the coast on 20 May more than 80 people died. West Bengal, on the eastern coast bordering Bangladesh, suffered a trail of destruction. The winds even damaged the tiger stronghold of the Sunderbans, the islands whose mangrove forests in the delta of three major rivers normally give Bengal some protection from the storms.

Amphan's rampage caused the evacuation of 300,000 people to shelter. Many acres of agricultural land near the coast were flooded by salty water and are now unusable. Amphan's tail also left its mark on the northeastern state of Assam, which experienced heavy rainfall and flooding in low-lying areas, and then several days later a massive thunderstorm. On 27 May, as the Brahmaputra and its tributaries rose above danger point at several places, over 300 villages experienced heavy flooding. Amphan was flowed by 'Nisarga' in Arabian sea which was also extreme in nature.

A long coastline of about 1600 km of flat coastal terrain, shallow continental shelf, high population density, geographical location and physiological features of its coastal areas makes Gujarat, extremely vulnerable to cyclones and its associated hazards like storm, high velocity wind and heavy rains.

Most of the cyclones affecting the State are generated in the Arabian Sea. They move northeast and hit the coast particularly the southern Kutch and southern Saurashtra and the western part of Gujarat. Two cyclonic storm seasons are experienced in Gujarat: May to June (advancing southwest monsoon) and September to November (retreating monsoon). Many a severe cyclone had originated in the Arabian Sea and passed through the state in last 100 years. Many districts are prone to cyclone viz., Kutch, Junagadh, Narmada, Rajkot, Jamnagar, Porbandar, Amreli, Bhavnagar, Kheda, Surat, Vadodara, Ahmedabad, Anand, Bharuch, Kheda, and Valsad. The Gulf of Kutch and Gulf of Khambhat also witness surge as the funneling effect takes place at both the places. The Gulf of Khambhat is most vulnerable due to recurrent cyclone strike to the southeastern coast of Saurashtra. The eastern reach of the Gulf of Kutch is the next most vulnerable region due to its low lying flat topography and high population density.

About 10 million people (about 25 per cent of the State population) live in coastal talukas of Gujarat and this includes 75 coastal towns and 41 ports (1 major, 11 intermediate and 29 minor).

Gujarat's coastal population is growing at a faster rate than the rest of the State due to rapid growth of ports, energy infrastructure and saltpans.
According to CRED (2002) report, the annual loss of life in Gujarat due to various disasters is 2000. It is estimated that 33% out of it is due to cyclone and surges.

The Gujarat Hazard Risk and Vulnerability Atlas (GSDMA/TARU, 2005) indicates that out of 675,000 residential buildings in the region vulnerable to cyclonic wind damage, about 248,000 residential buildings can be damaged due to a 100-year return period cyclone.

Since Gujarat's most critical infrastructure is located along the Khambhat coast, storm surge can impact a large number of settlements. Rivers flowing into the Arabian Sea are flood prone with very gentle slopes causing large areas to be inundated followed cyclone-induced rain.

It is therefore necessary that the settlements along the coastal area must be protected from the devastating effect of the cyclone. It is not the hazard that kills the people, not the building but the poorly constructed buildings. The building construction in the cyclone prone areas should be cyclone resistant. After the 2001 Bhuj earthquake, the approach was shifted from disaster response to disaster management and now it is the time that, it must be shifted to disaster risk management.

Objectives:

- To develop a sound understanding about cyclone and its impact on buildings
- To enhance the knowledge of engineers in cyclone resistant construction
- To encourage the use of relevant building codes and guidelines towards cyclone resistant construction
- To promote cyclone resistant building construction practices in hazard prone areas
- To encourage strengthening of existing buildings to cyclone resistant buildings through retrofitting

Program schedule

Date: 25th June 2020

Time: 4.00 pm - 5.10 pm

Session	Topic	Speaker	Time
-	Opening remarks and introduction	GIDM	5 min
1	Introduction to cyclone risk in Gujarat	Shri Piyush Ramteke, RSPM-GIDM	15 min
2	Effects of cyclone on buildings	Dr. Manish Kumar, Assistant Professor - IITGN	15 min
3	Construction of cyclone resistant buildings	Prof. C S Sanghavi, LDCE,	15 min

4	Repair and retrofitting of buildings in cyclone prone areas	Shri S K Patel, Staff Training College, Gandhinagar *(TBC)*	15 min
-	Q & A and closing remarks	GIDM	5 min

Moderator: Mr. Piyush Ramteke - RSPM, GIDM

Target audience –

S.No.	Department	Target Participants	
		L-1	L-2
1	R&B Dept.	Executive Engineer	Dy. Executive Engineer, Assistant Engineer
2	Education Dept.	Executive Engineer	Dy. Executive Engineer, Assistant Engineer
3	Panchayat, Rural Housing and Rural development dept.	Executive Engineer	Dy. Executive Engineer, Assistant Engineer
4	Urban Development & Urban Housing dept.	Addl. City Engineer	Dy. City Engineer, Assistant City Engineer, Assistant Engineer
5	Narmada, Water resource, water supply and Kalpsar dept.	Executive Engineer	Dy. Executive Engineer, Assistant Engineer
6	Gujarat Police housing corporation	Executive Engineer	Dy. Executive Engineer, Assistant Engineer
7	PIU health dept.	Executive Engineer	Dy. Executive Engineer, Assistant Engineer

Relevance to the International frameworks

The webinar would have the relevance with the following frameworks

S.No.	Framework	No.	Brief description
1	SFDRR	Priority-3	Investing in disaster risk reduction for resilience
2	PM 10 point agenda	Agenda point-8	Build on local capacity and initiative
3	SDG	Goal -11	Make cities and human settlements inclusive, safe resilient and sustainable

Session Plan

S.No.	Session	Details
1	**Session-1**	The first session will be focused on the • Basics of cyclone hazard • Risk posed by cyclone hazard along the coastal area of the State • Cyclone prone areas in Gujarat
2	**Session-2:**	It will be focused on:

		• Behavior of buildings elements during cyclone • Effects of wind speed, storm surge and inundation affects the building strength • Damages associated with buildings
3	**Session-3**	It will be focused on: • Planning aspects of a building in cyclone prone areas • Designing of cyclone resistant buildings (Engineered and Non-Engineered)
4	**Session-4**	It will be focused on: • Repair and retrofitting of buildings in cyclone prone areas • Methods of retrofitting of buildings