

BACKGROUND NOTE

ROLE OF BUILDERS AND TOWN-PLANNERS IN DISASTER MANAGEMENT

Background

The Government of NCT of Delhi has constituted the Delhi Disaster Management Authority (DDMA) under the Chairmanship of the Hon'ble Lt. Governor. Important objectives of the DDMA include an institutional mechanism for disaster management, a techno-legal regime to oversee seismic safety in ongoing and forthcoming constructions, capacity building in the public and private sectors, awareness generation of the masses against disasters, partnership with all possible stakeholders and mitigation measures like retrofitting of lifeline buildings and seismic microzonation. Delhi Government has already conducted various training and sensitization programmes for architects, engineers and masons towards promoting seismic safe construction. Sensitization for Delhi MPs, MLAs and Senior Bureaucrats was also one of the vital initiatives under the programme. The Government of Delhi is also implementing the 'GOI-UNDP Disaster Risk Management Programme' to reduce the vulnerability of the communities to the natural and manmade disasters

Looking at the vulnerability profile of the country, a National Expert Committee was set up in September 2004, by the Ministry of Home Affairs to develop the Model Building Bye-laws and review the City, Town and Country Planning Act and Zonal regulations. The committee also recommended additional provisions to be incorporated in the development control regulations and building bye- laws (Summary of recommendations is attached as Annexure 'A').

In this regard, **Govt. of Delhi had called a meeting on Amendment in Urban Development Legislations/regulations/Building Bye-laws for incorporating Disaster Management related provisions** on 04.02.2005 under the chairmanship of the Divisional Commissioner. The meeting was attended by senior officers of DDA, PWD, MCD and BMPTC (Minutes of meetings are

attached as Annexure 'B'). During the meeting it was suggested that since the **Draft Master Plan of Delhi-2021 is being finalized, recommendations of the National Expert Committee can be incorporated** at this stage.

Recommendations suggested by the committee mainly address the inclusion of:

- Definitions of natural hazards, disaster mitigation, disaster management
- Preparation of hazard zoning map and
- Revision of land use zoning, building bye-laws and Development Control Regulations

Role of Builders and Town Planners

Builders and Town Planners are important players in the construction of the built environment around us. With the view to sensitize them on safe construction practices and the amendment of building byelaws suggested by the National Expert Committee, a sensitization workshop on the "Role of Builders and Town Planners in Disaster Management" was organized on the 21st of July, 2005 at the PHDCCI Auditorium, Khel Gaon Marg, New Delhi.

This workshop was foreseen as an eye opener to local bodies like DDA and MCD to expedite incorporation of the Disaster Management recommendations made by the expert committee in the Master Plan 2021 and Building Bye-laws respectively.

ROLE OF BUILDERS AND TOWN PLANNERS IN DISASTER MANAGEMENT

WORKSHOP PROCEEDINGS

21ST JULY 2005

1.1 INTRODUCTION

The Government of Delhi has constituted the Delhi Disaster Management Authority (DDMA), to reduce vulnerabilities of communities to disasters. During the past few years the Government has taken various initiatives towards reducing disaster risks and vulnerabilities. Recent earthquakes in India (Uttarkashi 1991, Latur 1993, Bhuj 2001) have exposed the fact that most of the structures collapsed and got damaged due to non-compliance of Building Byelaws and basic structural norms. There is a growing realisation within the Government that there is a need to develop capacities of those professionals who are directly or indirectly related to the constructions of buildings. With this view, the Government of NCT of Delhi has already organized various sensitization and training programmes for Architects, Engineers and Masons from both government and private sector on safe construction practices apart from policy-makers.

The town-planner and builder and fraternities also have an important role to play in developing disaster resistant built environment. There is an urgent need to revise existing building bye-laws, development control regulations and Master Plan of Delhi- 2021 by incorporating amendments on disaster management as suggested by the National Expert Committee in September 2004. During past earthquakes majority of building collapses and structural damages have occurred in private constructions and in most of these cases, the builders were held responsible. The reason identified was the lack adherence to basic structural construction norms in these constructions.

Looking at the frequency of disasters today, it is also important to maintain the quality standards in building constructions.

Keeping this in mind, the Delhi Government organised this workshop for Builders and Town-Planners in order to sensitize them toward the seriousness of the issue.

1.2 AIM AND OBJECTIVES:

To sensitise builders and town planners in their role in the disaster management

Following are the Objectives of the workshop:

- Sensitization of builders and town planners in disaster management
- Identification of their roles in disaster management
- Discussion on implementation of the amendments proposed by the Ministry of Home, GOI in present legislation, building regulations and development control regulations and Delhi Master Plan- 2021etc.

1.3 Preparation STEPS FOR CONDUCTING THE WORKSHOP:

- 1 Collection of nominations of the important Builders and Town Planners
- 2 Selection of resource persons as per the subject requirement
- 3 Invitation letters to the participants, guests and resource persons.
- 4 Indoor and out door Logistics arrangements for participants and resource persons

1.4 CHIEF GUEST AND VENUE

The Hon'ble Lt. Governor of Delhi, Shri B. L. Joshi graced the occasion as Chief Guest. This workshop on "Role of builders and town planners in Disaster Management" was organized in the Auditorium of the PHD Chamber of Commerce and Industry near Hauz Khas.

1.5. PARTICIPANTS AND RESOURCE PERSONS

Participants included contractors, builders and town planners from both government and private organizations including Delhi Development Authority, Public Works Department, Municipal Corporation of Delhi, NDMC, National Thermal Power Corporation, School of Planning and Architecture, Associations of members of

Development Authority, HUDCO, DGHS, AC & ORG-Marg, and other leading private consultancies. Prominent officers from the Government also participated during the inaugural session. The list of participants is attached as Annexure 'C'.

The Resource persons included Renowned academicians and national level experts namely Prof. A.S. Arya, Prof. Subir Saha, Prof. S.C. Gupta and Prof. V. Suresh. Sh. A.K. Jain (Commissioner, Planning-DDA) and Sh. A.K. Sahai (Chairman –Builders of Associations) etc were the other eminent speakers of the workshop. The programme schedule is attached as Annexure D.

Photo 1: Participants



Photo 2: Registration Desk



2.1 INAUGURAL SESSION: BY SH. B.L. JOSHI HON'BLE LT. GOVERNOR

The workshop commenced at 10.30 am after the registration of the participants. The Divisional Commissioner of Delhi welcomed the eminent guests on the dais, resource persons and the participants.

Photo 3: Inaugural Session of the programme



Photo 4: Divisional Commissioner hosting Inaugural Session



In his inaugural address, the Hon'ble Lt. Governor acknowledged the fact that as disasters are intimately connected to development, our developmental efforts are at risk and thus require a sense of concern and urgent attention especially in the context of Delhi. He recognized the fact that holding such a sensitization programme by Delhi Disaster

Photo 5: Inaugural Address by Hon'ble Lt. Governor



Management Authority is to put in place an institutional mechanism in disaster management i.e. having techno-legal regime to oversee seismic safety in ongoing and forthcoming construction, awareness generation among the masses on disaster management, building partnership with all stake holders and key mitigation measures like retrofitting of lifeline buildings and seismic microzonation.

He stated that problem with natural disaster is that they can not be predicted. While the prediction of floods and to some extent of cyclone can be determined, but their intensity is difficult to assess. However natural disasters like earthquake and Tsunami pose problems of advance information – both in terms of their timing and intensity. Therefore, these need preparedness of highest order to reduce the damage to precious life and property.

He emphasized town planners, architects and builders who shape the cities, its infrastructure and buildings have a crucial role to play in this respect. They have a key role in making the city and habitation prepared for any eventualities so that its impact is minimized. He also emphasized the role of

town planners start from day one when a new city or settlement is conceived. The planner has to identify and make a study of the area available to them and has to decide the land use as per the susceptibility of particular area to natural disaster. Now microzonation of areas more susceptible to earthquake is available. GIS technology provides enormous potential in this respect. The area with low intensity development where as area with higher soil-bearing capacity can be planned for higher intensity uses as well as structures.

He provided example of Bhuj earthquake where loss of life and property could have been minimized, had the building there been constructed in compliance with National Building Codes. IS Codes for earthquake resistant construction are available for design of various types of buildings. Shapes and forms of the building which are not good for earthquake prone areas should be avoided. He stated that to address these problems, the National Expert Committee has been constituted by the Ministry of Home Affairs to revise building bye laws, development control regulations, town and country planning legislations etc. As far as Delhi is concerned, the National Informatics Centre has prepared detailed utility and land use maps for Delhi. Department of Science and Technology has taken up the preparation of microzonation map in Delhi. Similarly other organizations, especially Ministry of Urban Affairs and Employment has also identified areas having a bearing on housing, town planning and related infrastructures where initiatives need to be taken with regard to disaster prevention.

He also acknowledged that the Govt. of NCT of Delhi has recently finalized National Capital Regional Plan 2021. The Master Plan of Delhi 2021 is also being finalized. He felt that this was the right time to give thrust on the issue, so that it permeates down to the town planners and other stake holders so that disaster resistant provisions are incorporated in these documents. New building bye laws for Delhi are also being drafted and issues of stability of structure of the building and ISI code for making it earthquake resistant needs to be addressed and emphasized.

He also shared his own experiences of San Francisco, USA, as it also sits near a major fault. But the city planners and builders have made difference by their efforts in making buildings and bridges safe enough to withstand the fury of nature by utilizing latest technologies and knowledge. In his closing remarks, he wished participants success in identifying their crucial role in making Delhi a safe city.

3 PROCEEDINGS OF SESSIONS:

Session1: Shri S.K. Jha (Jt. Secretary, DDMA): Introduction to vulnerability profile of Delhi and Delhi Government Initiatives in Disaster Management

Shri S. K. Jha (Joint Secretary, DDMA) reiterated the vulnerability profile of the Delhi. He stated that Delhi lies in seismic high risk zone (Seismic Zone IV) and any

Photo 6: Sh. S.K. Jha delivering lecture on Government initiatives in Disaster Management



earthquake of high magnitude - even in Uttranchal can lead to colossal damage to the city. He strongly stressed that scientists around the world uniformly believe that the next earthquake of intensity greater than 8 on the Richter scale is likely to occur in the Himalayas in an area near to Delhi.

He stated that out of 25 lakh buildings in the capital, 21 lakh buildings are made up of ordinary bricks, most of which have not followed the basic seismic safety measures. He exclaimed that the brick structures having scant respect for building norms on the sandy soil of Yamuna are among the most vulnerable. Sadly, these structures have a very high density of population living in them.

He further highlighted the role of the Delhi Government in continuing the proactive efforts in managing disaster in Delhi. He added that the Govt. of NCT of Delhi is taking various initiatives to reduce the vulnerabilities within communities. Awareness generation of masses, institutional arrangements, capacity building of various stake holders, development of techno-legal regime and preparation of disaster management plans are a few of them.

The state has constituted Delhi Disaster Management Authority (DDMA) under the chairmanship of Hon'ble Lt. Governor. The government is also implementing 'Gol-UNDP Disaster Risk Management Programme'. He said that DDMA is working towards development of Techno-Legal Regime to support various stakeholders of Disaster Management to effectively enforce the minimum standards of seismically safe built environment. All the nine districts of Delhi have constituted the District Disaster Management Committees under the chairmanship of the respective Deputy Commissioners. State Steering Committee has been constituted for the overall supervision of the disaster management activities. All the nine districts including State are running Emergency Operations Centres. To build the capacities of the government officers and to strengthen the institutional mechanism, the Government has conducted two mock-drills of earthquake and chemical disasters at state level. He also provided an insight into the ongoing activities like printing and distribution of Information, Education and

Communication material among the masses and various other initiatives for training various stakeholders like teachers, architects, engineers, masons, and policy makers etc., preparation of Community Based Disaster Management Plans and District Disaster Management Plans etc.

On the occasion of the workshop, he stressed upon the need to amend building bye-laws, development control regulations, legislations and Delhi Master Plan. He stated that we have already conducted a meeting at the Divisional Commissioner's Office to discuss the implementation requirements of the amendments provided by the National Expert Committee in Sept. 2004. In the meeting it was suggested that since draft master plan of Delhi-2021 is under consideration, it was the appropriate time to incorporate recommendations of disaster management in the documents. He concluded by reiterating the requirement of mainstreaming earthquake resistant construction practices which will make Delhi a world-class city.

Session 2: Prof. A. S. Arya: Effects on Building and Infrastructure: and familiarization with codal provisions for Earthquake resistant constructions

Prof. Arya started his presentation with the details of losses incurred during the Bhuj earthquake. Over 5000 health units were destroyed and 50,000 school rooms were damaged. There was massive damage to telecom, power, water supply and transport infrastructure. More than a million people suffered during the Bhuj Earthquake. Out of

Photo 7: Prof. A.S. Arya on codal provisions for earthquake resistant buildings



the 25 districts in Gujarat, 21 were severely affected. Amongst the direct losses incurred, Prof. Arya mentioned the loss of human lives, livestock, animals, private property and municipal infrastructure etc. Indirect losses include losses to export/ import, agriculture output, remittance income and health hazards etc. Losses to long term development, overall investment climate, funds relocation and community migration form the Tertiary losses.

Prof Arya explained that the main cause building collapse and structural damage in Gujarat was because of the poor performance of RC framed structures, which was mainly due to :

1. Soft first storey without necessary design
2. Inadequate design for earthquake forces
3. Long period effect
4. Local soil conditions
5. Sub standard quality of material

Prof. Arya also discussed the importance of building configuration. He explained how poor configuration can lead to poor performance of structure during an earthquake. He highlighted that in seismic design, the proportions of a building are more important than its absolute size. The more slender a building, the worse the overturning effects of an earthquake and the greater the earthquake stresses in the outer columns.

He stressed on the importance of symmetry of buildings in earthquake resistance. Soil structure interaction and applicable codes, for seismic resistance were also discussed. He explained how extra cost for building and earthquake resistant houses varies with seismic zones.

Prof. Arya also explained that the seismic risk is equal to the product of the hazard, the exposed value and the vulnerability of the building stock. The current building stock is constantly enlarged by addition of new buildings, many with significant or even excessive earthquake vulnerability

Prof. Arya gave an example of the Yugoslavia earthquake where pancake type failures were witnessed. He also mentioned that how facades are

popular in Teheran and how they behaved during earthquakes. He concluded his presentation by underlining the urgent action required. He said that there is a large deficit in the structural measures *for seismic protection*: New buildings must be designed to be reasonably earthquake resistant to prevent the constant addition of new vulnerable structures to a building stock that is already seriously threatened. Action must be initiated for structural assessment and retrofitting of large occupancy and existing lifeline buildings and people need to be encouraged to retrofit their weak/unsafe residences.

Session 3: Presented by Prof. S.C. Gupta: Proposed Amendments in Town and Country Planning Legislations, Land-use Zoning Regulations, Development Control Regulations,

Prof S.C. Gupta spoke on the proposed amendment in Town and Country Planning Legislations, Land use Zoning and Development Control Regulations. He provided a background of the evolution of legislations, codal provisions and acts in the country. Delhi Development Act 1957 was Delhi's first legislation. Urban Development Planning Formulation and Implementation Guidelines were developed by the expert committee of Indian Town Planners Association of India and were circulated in the country. In 1973-74, constitutional amendments also came up and power of plan formulation and implementation was given to the urban local bodies or development authorities.

Further he stated that Urban Legislation need amendments in the techno-legal regime, techno-financial regime and techno-managerial regime. The National Expert Committee was setup to address issues related to

Photo 8: Prof. S.C. Gupta giving lecture of proposed amendments in present legislations and acts



techno-legal regime. The Committee studied the Model Town & Country Planning legislation framed during 1960, based on which most of the State Town & Country legislation are enacted. Also the Committee studied the revised Model Regional & Town Planning & Development Law 1985 framed by Town & Country Planning Organization, Ministry of Urban Development & Poverty Alleviation. Later on, the Ministry of Urban Development & Poverty Alleviation undertook the task of Urban Development Plans Formulation & Implementation Guidelines (UDPFI). As a part of this exercise, Model Urban & Regional Planning and Development Law was also formulated keeping in view the earlier Model Planning Legislation and incorporating various provisions of 73rd and 74th constitutional amendments.

He briefed the gathering regarding recommendations made by the committee. He stated that the committee proposed ***amendments in the above mentioned documents by incorporating the various terminologies pertaining to natural hazards, natural hazard proneness and mitigation.*** Master Plan of Delhi, Perspective Plans of State and Zonal development Plans required various amendments in various chapters by including disaster mitigation aspect. Existing land-use map shall indicate ***hazard proneness of the area and keep in view the regulations for Land Use Zoning*** and regulations for Natural Hazard Prone areas. For example ***in flood zone area: land use like parks or playground and gardens while restricting any building activity.*** Studies should be carried out to determine the extent of damage as per the soil conditions, probable intensity of earthquake, physiographic conditions of the area, fault trace. On the basis of results, land use zoning and planning should be conducted.

To conclude, he stated that implementation of these recommendations is the most important part. The committee has suggested provisions of rules and regulations for disaster management: formats, requirements, details of structural design and sanctioning authority etc have been suggested in the report (also circulated to the participants) which can be utilised for implementing the recommendations.

Session 4: Prof. A.S. Arya: Proposed Amendments in Building Byelaws

Prof. Arya stressed upon the amendments proposed in the building byelaws in the National Expert Committee constituted by MHA. He stated that BMPTC has been nominated to discuss the BIS Codes in the states. The revisions of codes suggest the changes in the old codes by incorporating amendments. He listed BIS codes to be compiled with structural design: for general structural safety, for cyclone/wind protection, for earthquake protection and for land slide protection. He suggested that in compliance of the design with the mentioned Indian Standard, the Structural Engineer on Record will submit a structural design basis report in the Performa prescribed covering the essential safety requirements specified in the Standard. Four parts have been suggested in the "Structural Design Basis Report (SDBR)" (given in the form VI-committee report) i.e. Part-1 - General Information/ Data , Part-2 - Load Bearing Masonry Buildings; Part-3 - Reinforced Concrete Buildings and Part-4- Steel Buildings.

He also discussed the Performa in detail and concluded that this form may take 15 to 20 minutes more to fill but it encompasses all the important structural mitigation measures. It also help in recognizing the fact that Structural engineers should know the codal provisions and architect-engineers must work together.

Towards the end, he also explained the other measures like provision of seismic safety or retrofitting, review of structural design, proof checking of requirements, certification regarding structural safety design, provision of proactive measures in natural hazard prone areas, registration of professions , quality control and inspections, structural requirements for low costing house, professional fees for Structural Engineer on Record, Structural Design Architect on Record, Construction Engineer on Record and appointment of professionals etc. which are very essential and also explained in the Committee report. Forms have been given in the various annexure attached to the report.

Session 5: Prof. V. Suresh: Emerging Trends of Urban Risks and the Challenges

Ahead

Sh V. Suresh gave an all comprehensive presentation on the subject. He explained the vulnerabilities of the Asian region, which is highly susceptible to multi hazard risks; the developing countries with increasing demographic growth have been worst

Photo 9: Prof. V.Suresh speaking on urban risks



affected with disasters. He compared the differing cost of disasters between Bhuj and Seattle earthquakes of same intensity, wherein the Bhuj earthquake resulted in a death toll of 10,000 people and full/partial damage of 0.8 million houses whereas in Seattle only one person died because the people of Seattle were aware of its vulnerabilities to Earthquake and were prepared in all respects. He talked at length on the repercussions of the Disasters at individual, Community and Regional levels. He talked about the extent of damages to the unsafe buildings under various use in disaster prone areas. He stressed upon the need for prudence in structural design and quality control in construction practices. Prof. Suresh explained about the three critical elements viz. Awareness, Appreciation and Application for promoting safer building construction. He stressed, that awareness needs to permeate at the level of community, professional, builders and building regulatory systems. He further said that there was a lack of appreciation among the ¹as above groups to distinguish between safe and disaster resistant construction features needed as against the unsafe and disaster prone construction presently followed. He stated that the National Building Code for disaster mitigation should be integrated with the city building regulatory documents

like the city building bylaws, city planning standards, and also makes part of the building regularity practices at various stages. He explained about information dissemination and capacity building on disaster resistant construction, Techno-Financing Regime, Quality Control, need for effective housing delivery for desired quality, building centre for technology transfer; skill up gradation, building material up gradation. Finally towards promotion of safer disaster resistant building, establishing Techno legal regime, associating the right professional, adopting the Techno financing regime, devolving appropriate technology transfer system at the cutting edge level, creating awareness among general public for application,

Session 6: – Sh. A.K. Jain; Commissioner Planning (DDA): Role of Town Planner in Disaster Management

Referring to the earlier presentations made by Prof. A.S. Arya and other speakers Sh. A.K. Jain remarked that as the technical know-how had been provided by those speakers so he will keep his session more focused on what town planners need to do and how they can incorporate the needs of disaster management in land use zoning, preparation of master plans, development plans and other provisions.

He opened with the vulnerability profile of Delhi mentioning its location in seismic zone IV and near two major fault lines i.e. Delhi-Haridwar and Delhi-Meerut. The city, he mentioned has been growing since the past many decades along with two major features that are the river Yamuna and the Ridge. With

Photo 10: Sh. A.K. Jain deliberating on Role of Town Planners in Disaster Management



the passage of time and increasing population pressures, the morphology of the growth had taken a very sensitive shape. Unregulated mixed landuse developments have happened all over, within the *mohalla* typology along

very narrow streets. This has compounded the already existing vulnerabilities of the city.

He informed that the first City Master Plan had been developed in 1962 when the population of city was 23 Lakhs and had been projected to 46 lakhs but the city had added its numbers to 56 lakhs. Beginning with 40,000 acres today we inhabited about 10,10,000 acres of land, which itself is a dangerous situation to manage if a disaster strikes this area. Therefore we have to manage population over 15 million that inhabit this haphazard growth, which was infused by attraction in employment, housing, health and sports etc.

He laid stress on the point that the management of constructions in the city was a critical issue. Today we have a large stock of non-engineered constructions. Even the ones made by DDA are tampered upon and all open spaces are encroached. He tried to illustrate all these facts by showing some cartoons.

He also mentioned that because of this entire situation DDA had made a pioneering effort to consider the aspect of disaster management in the next Master Plan. They had included the latest building Bye-laws in it to be followed. He also mentioned that they had proposed a network of 15 Disaster Management Centers within the city.

In the end he emphasized that we still need to work on certain points like: Information, Regulation, Planning, Ideas, Interpretation, Enforcement and Implementation

Session 7: Sh. Arun Sahai: The Role of Builders in Disaster Management

In his session he stressed upon the need to have well-knitted network among the Builders and the Government of Delhi for better implementation of earthquake resistant construction

Held on 21st July, 2005

Photo 11: Sh. Arun Sahai-Chairman BAI-Delhi Chapter



practices. He quoted experts, saying that a high magnitude earthquake even in Himalayans may lead to a colossal destruction in Delhi. As some preliminary steps to ensure safe construction practices he suggested the following that building byelaws and codes on safe construction practices and constant upgradation of the techniques are highly required. He also emphasised that similar training and workshops for the town planners and builders helps the construction fraternity to build their capacities. He also stated that there is a requirement to strictly follow the structural and non-structural measures of safety.

He stressed the need to inculcate accountability in the system, so that players may feel responsible executing the projects. He identified builders, civic bodies and government agencies to be responsible for the accountability. Before construction of a building, necessary certification by the architect/planner should be made mandatory. This will ensure the quality of materials used for construction and proper supervision as well. He called for an effective transfer and innovative funding mechanism which may be counted as development factors, involved in disaster resistant construction practices.

He pointed out strategies for the effective implementations as follows:

1. Association of government bodies with right professionals in the field
2. Sensitization of builders about disaster management and its significance in the building profession
3. Transfer of modern technology to the professionals
4. Promoting and highlighting model engineer houses for sample check
5. Retrofitting the existing buildings
6. Installations of fire fighting equipments in the high rise buildings
7. Awareness generation programme for general public
8. Prior submission of design and plan of a building/structure to the architect/structural engineers as the case may be for approval

He concluded that the All India Builders Association has around 30,000 members and 90 offices across India. If we create interest among these professionals, the objectives may be well addressed. He informed the gathering that an All Indian Builders Convention is scheduled to take place in February 2006 in Delhi in which various topics of disaster resistant technology are being included. He offered a separate seminar within the convention of Disaster Management in the construction industry, in collaboration with the Delhi Disaster Management Authority.

Session 8 : Prof. Subir Saha: Lessons Learnt from the Past Experiences: Need to integrate Disaster Management in the Master Plan

Prof. Saha began by reiterating the fact that builders and town planner are the key players of constructing safe built environment for the people. He emphasized that land use planning should incorporate natural hazards mitigation. He recognized that for the first time DDA has considered

Photo 12: Prof. Subir Saha-Director School of Planning sharing his experiences



incorporating disaster management in the Master Plan of Delhi- 2021. He shared that the School of Planning and Architecture is also taking initiatives by including Disaster Management as an integral part of its curriculum from the current academic year. He admitted the importance of the revisions and upgradation of the existing town planning legislations, acts and building codes and added that a National Expert Committee was setup to recommend the amendments. He gave emphasis on the land use zoning for a seismically safe settlement planning and highlighted the requirement of sufficient open spaces in the zonal and area plans. He also explained how these areas were

left unmanned in previous years but now we have realized their importance. In case of any disaster these spaces can be utilized for evacuation and temporary shelter. He cited the example of Nagapattinam where his team used open spaces as temporary shelters for the victims of Tsunami.

He stated that now government is changing its approach of disaster management from reactive to pro-active. He gave the example of Orissa where villages are preparing Community based Disaster Management Plans with the help of government and NGO's. He also appreciated the work done by the GoI-UNDP DRM Programme. He concluded with a note that there is still a lot to learn from past experiences, and awareness and sensitization of the planning and construction community is critical for making our cities seismically safe.

Session 9: Sh. Rajiv Goel, CEO, Earthcon Systems: Construction Technology and Practices for Disaster Resistant Building in Urban and Rural Area

The presentation of Sh. Rajiv Goel was mainly focusing on the past construction technology and lesson learnt from them. He had shown a case of Ahmedabad and Bhuj wherein he stated that the earthquake occurred in Bhuj was in earthquake zone V but its impact was also in nearby cities like Rajkot and Ahmedabad lying in the zone IV and III respectively. He also shown few clippings of the buildings and other constructions of Ahmedabad, Bhuj, Rajkot and Morbi etc and explained the technical reasons behind the collapse and severe damage to them. Towards the end, he concluded that besides town planners and builders, structural engineers have a major role in proper designing of building.

CONCLUSIONS

- Delhi lies in Zone IV of earthquakes. Occurrence of any earthquake of high magnitude even in Himalayans will lead to the collapse or severe damage to the city. Therefore preparedness and mitigation activities towards disaster management are urgently required.
- Town-Planners and Builders play a vital role in shaping the cities and habitation prepared for any eventualities so that its impact can be reduced.
- Microzonation studies and usage of GIS technology have imperial role in identification of potential risk zones and also in managing disasters. Various government agencies are working towards this cause.
- The Hon'ble Lt. Governor strongly emphasised that there is an urgent need of reviewing and updating building byelaws, development control regulations, town and country planning legislations and land use zoning by including disaster mitigation aspects in them. These updations are also important to be incorporated under the Master Plan of Delhi-2021 so that the issue permeates to the town-planners and

other stakeholders also. It is a right time to thrust upon the subject as draft Master Plan of Delhi-2021 is under finalisation stage.

- National Expert Committee had already set the guidelines by suggesting recommendations of inclusion of disasters related norms and definitions in the relevant documents. These recommendations need to be incorporated by the urban local bodies in relevant legislations, acts and other documents. Even for the implementation, Committee has prescribed a Performa encompassing the essential safety requirements specified in the standard. The Performa required to be filed by the structural engineers and architects which clearly indicate that engineers and architects should also work together towards disaster mitigation.
- Chairman of Builders Association of India has offered a separate seminar within the convention of Disaster Management in the construction industry, in collaboration with the Delhi Disaster Management Authority
- The workshop concluded with a hope that DDA, MCD, PWD and other stakeholders are sensitized enough to urgent pursuant measures to incorporate the Disaster Management recommendations made by the expert committee in the Master Plan of Delhi, building byelaws and town-planning legislation and acts.
