

## Annual Report 2022-2023



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Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs Government of India

## **33**<sup>rd</sup> Annual Report 2022-2023



#### **Building Materials & Technology Promotion Council**

Ministry of Housing & Urban Affairs, Government of India Core-5A, First Floor, India Habitat Centre, Lodhi Road New Delhi – 110003

#### FOREWORD

It is my pleasant duty to present the 33<sup>rd</sup> Annual Report of the Building Materials & Technology Promotion Council, for the year 2022-2023, an autonomous organization under the administrative control of Ministry of Housing & Urban Affairs, Govt. of India.

Since its beginning in 1990, BMTPC is entrusted to promote resource-efficient, climate-resilient sustainable building materials & construction technologies including disaster resistant construction practices. Since then, the globally available best building technologies & alternate building materials & components based on locally available materials, local skills & practices are successfully transferred by BMTPC for field-level applications. In its quest to foster growth of innovations in the construction sector, BMTPC has aligned its goals & objectives in line with the aspirations of the nation and working towards bridging the gap between laboratory development & field applications. Through Technology Sub-Mission of Pradhan Mantri Awas Yojana-Urban (PMAY(U) launched in June 2015, the alternate and emerging construction systems from around the globe which can not only fast track delivery of livable sustainable houses but also comply with structural, functional and safety norms stipulated in Indian Standards are being promoted across States for their adoption in the construction sector. Further, the best construction systems which are time tested and proven elsewhere are being identified, studied, evaluated under GHTC-India & certified by BMTPC. These systems are now being implemented to suit Indian geo-climatic conditions for field level applications through demonstration construction, light house projects & handholding of States. There have been encouraging response from public and private agencies including State

For wider advocacy, better outreach & replication of emerging construction systems in the field, BMTPC is entrusted by MoHUA to construct Demonstration Housing Projects in different parts of India using emerging technologies. The objective is to spread awareness about new technologies and disseminate technical know-how in the States under the Pradhan Mantri Awas Yojana (Urban) – Housing for All Mission. As reported in previous Annual Reports, BMTPC has completed DHPs at Nellore, Andhra Pradesh; Bhubaneswar, Odisha; Lucknow, Uttar Pradesh; Biharshariff, Bihar; Hyderabad, Telangana; Panchkula, Haryana and Agartala, Tripura. During the year, DHPs at Bhopal, Madhya Pradesh and Ahmedabad, Gujarat have also been completed. The Demonstration Housing Projects at Tiruppur, Tamil Nadu; Guwahati, Assam; Ayodhya, Uttar Pradesh; Dimapur, Nagaland and Jammu, J&K are at different stages of construction.

To give fillip to innovations in the construction sector, BMTPC has been evaluating and certifying prospective construction systems & new materials and products under PACS through Gazette Notification (No. I-16011/5/99 H-II in the Gazette of India No. 49 dated December 4, 1999). During the year, emerging technologies namely, Volumetric (3D) Concrete Printing Technology (VCPT), PUF Sandwich Panel with Pre Engineered Building Structure and Everest Rapicon Panel / Solid Wall Panel have been issued certificates under the Performance Appraisal Certification Scheme (PACS) and a number of other products/systems are being evaluated. Till date, BMTPC has issued Performance Appraisal Certificates (PAC) to 77 innovative products/systems covering various products, materials & technologies. With the efforts of the Ministry and BMTPC, CPWD has issued specifications and schedules of rates on most of these innovative materials & technologies.

BMTPC is extending its technical support to Ministry of Housing & Urban Affairs (MoHUA), Govt. of India besides appraisal of DPRs, onsite monitoring, Third Party Inspection & Monitoring (TPIM) and handholding of ULBs under PMAY(U). Technology Sub-Mission under Pradhan Mantri Awas Yojana (Urban) aims to facilitate adoption of innovative and green technologies for sustainable development across states. BMTPC is the technical secretariat for the sub-mission and assists Ministry and States for deploying disaster resistant, energy efficient and environment friendly technologies. The Council has also been designated as appraisal and monitoring agency under PMAY(U) for projects in various states/ UTs falling in Earthquake Zone IV and Zone V. To build capacities, the Council also hand holds various State Govts. and other agencies towards adoption of emerging technologies for affordable social mass housing.

BMTPC worked hand-in-hand as technical partner to HFA Directorate, MoHUA for the organization of Global Housing Technology Challenge – India (GHTC-India) and is nominated for implementation of Light House Projects (LHPs) in close coordination with respective State Governments. Under GHTC-India, an expo cum conference on globally available innovative & proven construction technologies along with future potential sustainable technologies was organized which was inaugurated by Hon'ble Prime Minister in March 2019. Through Challenge, a basket of 54 shortlisted proven technologies is created which are further classified into six broad categories. These proven technologies are being showcased through six Light House Projects (LHPs) being built across six locations namely, Indore, Rajkot, Chennai, Ranchi, Agartala and Lucknow, using distinct technologies from each of the six broad categories. The Light House Projects at Chennai and Rajkot have been completed & handed over to the beneficiaries by the Hon'ble Prime Minister in May

### Building Materials & Technology Promotion Council

2022 and October 2022 respectively. The LHPs at Indore, Lucknow & Ranchi are at advanced stages of completion. BMTPC is regularly interacting with the executing agencies in close coordination with the Ministry/State Govts. for any query resolution and smooth operationalization of LHPs. Under GHTC-India, it has also been planned to incubate and accelerate identified potential future technologies through Affordable Sustainable Housing Accelerator (ASHA) – India. The Council is also providing technical support under Affordable Rental Housing Complexes (ARHCs) scheme to the Ministry. A series of Webinars on Use of Emerging Construction Systems in Light House Projects (LHPs) were also organized in association with MoHUA and GIZ. The Council also assisted MoHUA with organization of Indian Urban Housing Conclave (IUHC) at Rajkot, Gujarat.

A National Urban Housing Fund (NUHF) has been created in BMTPC which aggregates the loans from lending agencies or financial institutions with the approval of Cabinet. Funds raised through Extra Budgetary Resources (EBR) for NUHF were loaned to BMTPC for its further disbursement as Central assistance to State/UT Governments and as subsidy to the CNAs under the CLSS vertical of the Mission. A Data Resource cum Monitoring Centre (DRMC) has also been established at MoHUA through BMTPC for monitoring work, data analysis, compilation & dissemination, generation of periodic reports in electronic form, undertake field visits/physical verification in a friendly manner.

One of the forte of BMTPC has been Disaster Mitigation & Management. Towards preparedness, prevention & mitigation, BMTPC is committed to adopt proactive approach and has been educating professionals and creating mass awareness amongst various stakeholders including common man. Also, an e-Course on Vulnerability Atlas of India is being implemented jointly with School of Planning & Architecture, New Delhi to build capacities & better understanding about natural hazards. The Vulnerability Atlas of India, a unique document prepared by BMTPC since 1997, helps identify regions with high vulnerability with respect to various hazards and its third digital edition was released by Hon'ble PM. During the year, as an extension of the e-course on Vulnerability Atlas of India, two new e-courses on (1) Earthquake Resistant House Construction and (2) Improving Wind/Cyclone Resistance of Buildings were started. Besides, Audio-Visual Modules on Earthquake Tips were also prepared and share on YouTube Channel of BMTPC.

On the occasion of World Habitat Day 2022, the Council organized Painting Competition for Differently Abled Children on the theme "Mind the Gap. Leave No One and No Place Behind". Also two publications namely, (i) Special Issue of Newsletter "Nirman Sarika" on the theme "Mind the Gap. Leave No One and No Place Behind", and (ii) Booklet on Piloting Innovative Technologies through Demonstration Construction were brought out. In order to strengthen the knowledge base in the construction sector, the website of the Council is being updated regularly for inclusion of latest activities and information. There is good response on website in the form of general enquiry about product and services. BMTPC in association with Ministry of Housing & Urban Affairs and School of Planning & Architecture, New Delhi is conducting a NAVARITIH : Certificate Course on Innovative Construction Technologies to build capacities of professionals in the area of emerging construction systems. So far fourteen batches of NAVARITIH have been conducted successfully wherein 1013 participants, mainly civil engineers, architects, faculty & students from various engineering and architectural colleges, participated. The Council is also using social media platform (Twitter : @bmtpcdelhi; Facebook: @bmtpc.mhua;YouTube: BMTPC) to disseminate the information about the innovative building materials and disaster resistant technologies including other activities.

It is my privilege to acknowledge the valuable guidance, support and encouragement received from the President (Hon'ble Minister of Housing & Urban Affairs) & Vice-President (Hon'ble Minister of State for Housing & Urban Affairs) and Members of the Board of Management, the Chairman (Secretary, Ministry of Housing & Urban Affairs) and Members of the Executive Committee of BMTPC and Ministry of Housing & Urban Affairs for various programmes undertaken and executed by the Council. BMTPC is grateful to NITI Aayog, Parliamentary Standing Committee on Urban Development, PMAY(U)-HFA Mission Directorate, MoHUA, various State Govts., Municipal Corporations and Urban Local Bodies, Ministry of Home Affairs, Ministry of DONER, NDMA, NIDM, DST, CSIR, IITs, CEPT, CBRI, SERC, ICI, SPA, HUDCO, BIS, NHB, NCHF, NBCC, DDA, CGEWHO, CPWD, NSIC, CIDC, GIZ, TERI, IGBC and RICS school of Built Environment for their continued support and interest in strengthening and supporting the efforts of the Council over successive years.

I would also like to place on record my deep appreciation for the cooperation of officers of BMTPC and its staff members for timely implementation of the Council's activities. The Council acknowledges the support and cooperation received from all officers and staff members of the Ministry of Housing & Urban Affairs, which helped the Council to meet its mandate and further its objectives.

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(Dr.Shailesh Kr.Agrawal) Executive Director

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### Vision

"BMTPC to be world class knowledge and demonstration hub for providing solutions to all with special focus on common man in the area of sustainable building materials, appropriate construction technologies & systems including disaster resistant construction."

### **Mission**

"To work towards a comprehensive and integrated approach for promotion and transfer of potential, costeffective, environment-friendly, disaster resistant building materials and technologies including locally available materials from lab to land for sustainable development of housing."

#### INTRODUCTION

Building Materials & Technology Promotion Council (BMTPC), established in 1990, is an autonomous organisation under the administrative control of Ministry of Housing & Urban Affairs (MoHUA), Government of India. BMTPC is entrusted to promote resource-efficient, climate responsive, disaster resistant construction practices including innovative building materials and construction technologies for field level applications. BMTPC is also one of the resource institution for the Ministry to provide S&T support in the area of alternate building materials & construction systems including disaster mitigation & management.

Since its inception, BMTPC is adopting multipronged approach through networking with academic and research institutions, public & private sectors, NGOs, foreign institutions for technology transfer of alternate/ innovative building materials and housing technologies from lab to land.The Council has also been working towards creating enabling eco-system for mainstreaming innovative, cost-effective, environment-friendly and energy-efficient alternate building materials and technologies in the construction industry, along with MoHUA.

To showcase field level application of emerging construction technologies and reach out to the stakeholders, the Council is constructing model demonstration houses including other demonstration structures in different parts of the country. As regards, technology development, promotion and dissemination efforts, the Council has promoted various cost-effective technologies for use in housing and building construction including bamboo based housing solutions.

The Council in recent years has expanded its reach towards promotion of not only sustainable technologies but also propagating emerging industrialised building systems from within the country and across the globe for affordable mass housing. The Council along with Ministry is making concerted efforts to introduce various emerging technologies, which are successful elsewhere in the world to bring resource efficiency, economy, quality, environmental protection, speed and sustainability in building construction.

BMTPC is also actively involved in disaster mitigation and management activities and working in close association with NDMA, NIDM and other related Institutions. Apart from bringing out the first ever Vulnerability Atlas of India in 1997 and 2006, the Council brought out the third edition of its Vulnerability Atlas of India (digital) in 2019 which was released by Hon'ble Prime Minister of India.

In order to educate and spread awareness about the Vulnerability Atlas of India and Disaster resistant design & construction practices, the Council organised webinars designed for engineers, architects and other stakeholders dealing with housing and infrastructure. An E-Course on Vulnerability Atlas of India developed by BMTPC and launched by Hon'ble Minister of Housing & Urban Affairs, is also being successfully run in association with School of Planning & Architecture, New Delhi. Besides, the Council regularly publishes valuable guidelines/ manuals on disaster resistant construction. Towards earthquake preparedness and disseminate earthquake resistant construction practices and seismic retrofitting, the Council has undertaken retrofitting of few buildings including life line buildings in the past and organised training programmes for professionals.

Being technical agency of the Ministry, BMTPC is entrusted to take up various activities under Technology Sub-Mission under PMAY(U). Technology Sub-Mission aims to mainstream innovative and green technologies for sustainable development across states. BMTPC works as technical secretariat for the sub-mission and assists Ministry and States for deploying disaster resistant, energy efficient and environment friendly technologies. The Council has also been designated as one of the appraisal and monitoring agency under PMAY(U) for projects in various states/UTs falling in severe & most severe earthquake zones i.e. Zone IV and Zone V. The Council is also hand holding various State Govts. and other agencies in adoption of alternate building materials & construction technologies for mass housing. BMTPC is also technical partner in the Global Housing Technology Challenge - India (GHTC-India), launched by the Ministry of Housing & Urban Affairs, Government of India.

The time tested proven technologies from the globe shortlisted under GHTC-India are being showcased now through execution of Light House Projects (LHPs) across India at six locations. The Council has been designated as technical partner by the Ministry for implementation of LHPs in close coordination with respective State Governments. During the year, the LHP at Chennai and LHP at Rajkot have been completed and handed over to beneficiaries by Hon'ble Prime Minister. The Council has also been associated in providing incubation and acceleration support to the identified potential future technologies shortlisted through Affordable Sustainable Housing Accelerator (ASHA) - India, one of the component of GHTC-India. The Council also extended its technical support to the Ministry in educating & spreading awareness about innovative technologies through Technograhis. Also MoHUA initiated Affordable Rental Housing Complexes (ARHCs) through which rental housing using innovative technologies is being incentivized & promoted. BMTPC in association with Ministry of Housing & Urban Affairs

and School of Planning & Architecture, New Delhi is conducting a NAVARITIH : Certificate Course on Innovative Construction Technologies to build capacities of professionals in the area of emerging construction systems which was launched by Hon'ble Prime Minister.

A National Urban Housing Fund (NUHF) has been created at BMTPC which aggregates loans from lending agencies / financial institutions. Funds raised through Extra Budgetary Resources (EBR) for NUHF were being loaned to BMT-PC for its further disbursement as Central assistance to State/UT Governments and as subsidy to the Central Nodal Agencies (CNAs) under the CLSS vertical of the PMAY(U). A Data Resource cum Monitoring Centre (DRMC) is also being operationalised by BMTPC under PMAY(U) through setting up of team of professionals & IT experts at MoHUA for monitoring, data analysis, compilation & dissemination, generation of periodic reports in electronic form, and other related ICT activities. A dedicated team led by BMTPC's Dy.Chief along with experts and supporting staff is stationed at MoHUA for smooth operation of DRMC.

#### **Objectives**

The broad objectives of the Council are:

- Building Materials & Construction Technologies: To promote development, standardization, mechanization and large scale field application of proven innovative and emerging building materials and technologies in the construction sector.
- Capacity Building and Skill Development: To work as a Training Resource Centre for capacity building and promotion of good construction practices to professionals, construction agencies, artisans and marketing of building technologies from lab to land.

- **Disaster Mitigation & Management:** To promote methodologies and technologies for natural disaster mitigation, vulnerability & risk reduction and retrofitting/ reconstruction of buildings and disaster resistant planning for human settlements.
- **Project Management & Consultancy:** To undertake project management and consultancy services including appraisal, monitoring and third party inspection of housing projects under the various Central/State Schemes.

#### Thrust Areas

To realise the desired objectives, BMTPC has identified following thrust areas of its activities:

- Identification, evaluation and promotion of proven and emerging housing technologies available for housing sector nationally and internationally.
- Promoting speed, economy, efficiency and quality in construction.
- Creating enabling eco-system for mainstreaming of technologies through upscaling of technologies, know-how acquisition, absorption and dissemination.
- Field level application of environmentfriendly, energy-efficient and disaster resistant technologies for proven, locally available and emerging technologies, through demonstration construction.
- Formulation of Specifications, Schedules, Standards on proven building materials/ technologies including emerging technologies/systems.
- Documentation of benefits, durability and acceptability of cost effective and innovative building materials and technologies.
- Skill upgradation of professionals and construction workers through capacity building programmes, training programmes, seminars, conferences, workshops, exhibi-

tions nationally as well as internationally.

- Promoting disaster resistant construction practices.
- Appraisal, monitoring and third party inspection of housing projects including undertaking operationalization of Data Resource cum Monitoring Centre (DRMC) under PMAY(U)
- Implementation of National Urban Housing Fund (NUHF) through Extra Budgetary Resources under PMAY(U)
- Project management and consultancy services.
- Publication of user manuals, guidelines, compendiums, directories, brochures, techno-feasibility reports, video films, demonstration CDs, interactive website, blogs including documentation of success stories.

#### Administration and Management

The administrative structure of BMTPC follows three-tier system for discharging its administrative and technical duties with following verticals:

- i. Board of Management headed by the Hon'ble Minister of Housing & Urban Affairs , Govt. of India
- ii. Executive Committee headed by the Secretary, Ministry of Housing & Urban Affairs (MoHUA)
- iii. Executive Director as head of BMTPC

The Board of Management of the Council consists of 17 Members from various Ministries and related organizations. The Executive Committee consists of 8 Members from Ministry of Housing & Urban Affairs, Housing & Urban Development Corporation (HUDCO), Central Building Research Institute (CBRI) and Technical Experts. The list of members of the Board of Management and Executive Committee is hereunder:

## Board of Management (as on 31.3.2023)

S. No.	Members	
I	Shri Hardeep S Puri Hon'ble Minister for Housing & Urban Affairs, Government of India	President
2	Shri Kaushal Kishore Hon'ble Minister of State for Housing & Urban Affairs, Government of India	Vice-President
3	Shri Manoj Joshi Secretary, Ministry of Housing & Urban Affairs, Government of India	Vice-President
4	Ms. Anna Roy Senior Adviser, Data Management & Analysis, & Frontier Technologies, Managing Urbanisation, NITI Aayog, Government of India	Member
5	Shri Kuldeep Narayan Chairman & Managing Director Housing & Urban Development Corporation (HUDCO)	Member
6.	Shri B.B. Swain Secretary, Ministry of Micro, Small & Medium Enterprises, Government of India	Member
7	Dr. Srivari Chandrasekhar Secretary, Ministry of Science & Technology, Government of India	Member
8	Dr. Lok Ranjan Secretary, Ministry for the Development of North Eastern Region, Government of India	Member
9	Shri Kamal Kishore Member & HoD, National Disaster Management Authority, Government of India	Member
10	Dr. (Mrs.) N. Kalaiselvi Director General, Council of Scientific & Industrial Research Government of India	Member
11	Shri Shailendra Sharma Director General, Central Public Works Department Government of India	Member
12	Prof. K.N. Satyanarayana Director, Indian Institute of Technology (IIT) Tirupati	Member
13	Prof. Sudhir K. Jain Former Director, IIT Gandhinagar & Vice-Chancellor of Banaras Hindu University	Member
14	Shri Satinder Pal Singh Addl. Secretary (Housing) Ministry of Housing & Urban Affairs Government of India	Member

### Building Materials & Technology Promotion Council

S. No.	Members	
15	Shri Sanjeet Joint Secretary & FA, Ministry of Housing & Urban Affairs Government of India	Member
16	Shri Kuldip Narayan Joint Secretary & Mission Director (HFA), Ministry of Housing & Urban Affairs, Government of India	Member
17	Dr. Shailesh Kr. Agrawal Executive Director, Building Materials & Technology Promotion Council	Member Secretary

#### **Executive Committee**

#### (as on 31.3.2023)

S. No.	Members	
I	Shri Manoj Joshi Secretary, Ministry of Housing & Urban Affairs, Government of India	Chairperson
2	Shri Satinder Pal Singh Addl. Secretary (Housing), Ministry of Housing & Urban Affairs Government of India	Member
3	Shri Sanjeet Joint Secretary & FA, Ministry of Housing & Urban Affairs, Government of India	Member
4	Shri Kuldip Narayan Joint Secretary & Mission Director (HFA), Ministry of Housing & Urban Affairs, Government of India	Member
5.	Shri Kuldip Narayan Chairman & Managing Director Housing & Urban Development Corporation (HUDCO)	Member
6.	Dr. Anjan Ray Director, Central Building Research Institute, Roorkee	Member
7.	Prof. Pradipta Banerji Head, Centre for Urban Science & Engineering Deptt. of Civil Engineering, IIT Bombay	Member
8.	Dr. Shailesh Kr. Agrawal Executive Director, Building Materials & Technology Promotion Council	Member Secretary

#### MAJOR INITIATIVES AND ACTIVITIES DURING THE YEAR 2022-2023

#### I. MODEL DEMONSTRATION COI EMERGING TECHNOLOGIES

#### I. Demonstration Housing Projects using Emerging Technologies under PMAY(U)

BMTPC disseminate the use of new / alternate building materials & technologies in housing through identification, evaluation, standardization, certification, capacity building, training and field level application by demonstration construction. Under Technology Sub-Mission of PMAY(U), MoHUA has taken an initiative to construct Demonstration Housing Project (DHP) through BMTPC using emerging construction systems shortlisted through GHTC-India & certified under PACS of BMTPC.

These DHPs are pilots which help build confidence and create enabling environment for the large scale adoption of alternate materials & technologies suiting to different geo-climatic regions of the country, thus making housing more affordable and sustainable. As reported earlier, BMTPC completed DHPs at (i) Nellore, Andhra Pradesh; (ii) Bhubaneswar, Odisha; (iii) Lucknow, Uttar Pradesh; (iv) Biharshariff, Bihar; (v) Hyderabad, Telangana; (vi) Panchkula, Haryana and (vii) Agartala, Tripura. During the year, DHPs at (i) Bhopal, Madhya Pradesh and (ii) Ahmedabad, Gujarat have also been completed. The Demonstration Housing Projects at (i) Tiruppur, Tamil Nadu; (ii) Guwahati, Assam; (iii) Ayodhya, Uttar Pradesh; (iv) Dimapur, Nagaland and (v) Jammu, J&K are at various stages of construction.

The construction of demonstration housing projects in different parts of the country aims to facilitate wide spread dissemination and adoption of both existing proven, emerging and sustainable building materials and technologies

### CONSTRUCTION USING

replacing conventional construction and create eco-system for mainstreaming such materials & technologies in the construction sector & adapt them as future technologies for construction. During the construction of DHPs, training to professionals, artisans & students is also being imparted on regular basis.

#### **Completed DHPs**

The details of the completed Demonstration Housing Projects during the year are given below:

#### Demonstration Housing Project at Bhopal, Madhya Pradesh

Technology Promoted: Stay In Place Formwork System - Insulating Concrete Forms (ICF)

Directorate of Urban Administration & Development, Bhopal, MP allotted the land measuring 2709 sqm. in premises of SPNIUM Campus at Bhouri, Bhopal to be used as Sports Hostel.The Bhopal Municipal Corporation approved the plan and layout consisting of 40 Dwelling Units with other provisions.The DHP is in G+3 configurations and being constructed using STAY IN PLACE FORMWORK SYSTEM - Insulating Concrete Forms (ICF).

#### **Project Profile:**

- Location: SPNIUM Campus at Bhouri, Bhopal
- State Level Nodal Agency : Directorate of Urban Administration & Development, Bhopal
- Land Allotted by: Directorate of Urban Administration & Development, Bhopal
- Usage : Sports Hostel



Recently completed Demonstration Housing Project (Sports Hostel) under PMAY(U) constructed by BMTPC using Stay In Place Formwork System - Insulating Concrete Forms (ICF) at Bhopal, Madhya Pradesh

- Plot area of project : 2709 sqm.
- No. of houses : 40 (G+3); Other Provisions includes Office with Toilet, Dining Hall with Kitchen and store, Common Room with toilet, Medical Room with toilet, Care Taker Room, Activity Rooms & Laundry
- Carpet area of each unit : 29.05 sqm.
- Built up area of each unit : 34.15 sqm.
- Total built up area : 2180 sqm.
- Technology Used: STAY IN PLACE FORM-WORK SYSTEM - Insulating Concrete Forms (ICF).
- Each Unit consists of one room, dressing, combined Bath & WC and balcony.
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, UGT, septic tank, horticulture work, boundary wall, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology:

Insulating concrete Forms (ICF) System comprises of a panel of two walls of Expandable Polystyrene (EPS) separated by a nominal distance of I50mm by hard plastic ties. These are assembled on site to hold reinforced concrete. The forms are open ended hollow polystyrene blocks which fit tightly together to form a shuttering system. Concrete poured into the hollow space to form a continuous wall. When cured, this wall supports the structural loads from floors and roofs, and the shuttering provides thermal insulation. Reinforcing steel shall be as required from design.

Upper and lower surfaces of the polystyrene panels are castellated and the vertical mating surfaces are tongue-and-groove to form a tight fit when joined together. The rigid formwork does not require supporting falsework. The inner surfaces have tapered grooves running vertically and have offset on opposite faces to ensure uniform concrete thickness. They also form locks for end stops. The outer surfaces are grooved vertically at 50mm centres to aid cutting and trimming.

In this project, the system has been used as load bearing wall panels. The thickness of ICF panel is 250mm with infill of 150mm cement concrete and 5mm polymerised cementitious plaster on both side of wall.

#### Technologies/Specifications Used:

#### Foundation

- Isolated RCC column/strip footing with Plinth beam
- Walling
- Insulating Concrete Forms (ICF) Concrete filled Expandable Polystyrene (EPS) blocks.

#### Floor Slabs/Roofing

- RCC slab/Roof as per specifications Door frame/shutters:
- Pressed steel door frame with flush shutters
- PVC door frame with PVC Shutters in toilets

Window Fame/ Shutter:

• uPVC frame with glazed panel and wire mesh shutters.

#### Flooring:

- Vitrified tile flooring in Rooms & Kitchen
- Anti-skid ceramic tiles in bath & WC
- Kota Stone Flooring in Common area and Staircase

Finishing:

- Weather Proof Acrylic Emulsion paint on external walls
- Oil Bound distemper over POP on internal walls

Others:

• Electrical fixtures such as ceiling fans, LED tube lights, exhaust fan; wooden shutters in cupboard and under kitchen cabinet

### Demonstration Housing Project at Ahmedabad, Gujarat

Technology Promoted: PRECAST CONCRETE CON-STRUCTION SYSTEM - Integrated Hybrid Solution-One

The Affordable Housing Mission, Ahmedabad, Gujarat allotted a land measuring 3400 sqm. owned by Gujarat Housing Board at Vivekanand Nagar, Hathijan, Ahmedabad for construction of Demonstration Housing Project to be allotted to PMAY(U) beneficaries. The Ahmedabad Municipal Corporation approved the layout, plans, sections etc. of the project. The DHP will consists of 40 dwelling units in G+2 configuration using new technology namely PRECAST CON-CRETE CONSTRUCTION SYSTEM - Integrated Hybrid Solution-One. The project is partially funded by Ministry of Housing & Urban Affairs as per the guidelines of PMAY(U) and remaining share is contributed by State and beneficiaries.

#### **Project Profile:**

- Location: Vivekanand Nagar, Hathijan, Ahmedabad
- State Level Nodal Agency: Affordable Housing Mission, Ahmedabad
- Land Allotted by: Gujarat Housing Board
- Usage : PMAY(U) Beneficiaries
- Plot area of project : 3400 sqm.
- No. of houses : 40 (G+2)
- Carpet area of each unit : 35.78 sqm.
- Built up area of each unit : 51.42 sqm.
- Total built up area : 2179 sqm.
- Technology Used: PRECAST CONCRETE CONSTRUCTION SYSTEM - Integrated Hybrid Solution-One
- Each Unit consists of living room, bed room, lobby kitchen, bath, WC, verandah and separate wash area.
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, UGT, septic tank, horticulture work, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology:

Load bearing 200mm thick interlocking blocks manufactured with special machines, having strength of 75 kg/cm<sup>2</sup> made out of cement, coarse sand and flyash. The blocks shall be laid without mortar. Intermediate floor / roof shall be in precast R.C. Planks & joists, system. The planks shall be precasted with moulds on vibrating table and pallets in M-25 concrete. The planks shall have 3 nos. 6mm dia main bars and



Recently completed Demonstration Housing Project under PMAY(U) constructed by BMTPC using Precast Concrete Construction System - Integrated Hybrid Solution-One at Ahmedabad, Gujarat

6mm dia at 200mm c/c distribution bars. The RC planks shall have haunches which shall be filled with M-25 in situ concrete. The joists shall be 150mm wide. The depth and reinforcement shall be as per design and shall be partially precast with M-25 concrete. The RC planks shall be placed on wall to joist, joist to joist and joist to wall. After placing the RC planks, 6mm dia extra bars will be placed through the haunches (2 nos. in each RC plank across the joists) providing temporary supports below the joists before laying in-situ concrete. Within 24 to 72 hours of laying slab, in-situ concrete a course/layer of ferrocement 12mm thick with mesh reinforcement shall be laid, mixed with water proofing compound on the slab including the walls area. Thus the total thickness of the effective slab shall be 72mm.

#### Technologies/Specifications:

#### Foundation

• Strip foundation with plinth band

#### Walling

• Load bearing Flyash interlocking blocks (Hydra Form Blocks)

Floor Slabs/Roofing

• Precast RC Planks and Joists System with concrete screed.

Door frame/shutters:

- Pressed steel door frame with flush shutters
- PVC door frame with PVC Shutters in toilets.

Window Fame/ Shutter:

• uPVC frame with glazed panel and wire mesh shutters.

Flooring:

- Vitrified tile flooring in Rooms & Kitchen
- Anti-skid ceramic tiles in bath & WC
- Kota Stone Flooring in Common area and Staircase

Wall Finishes:

- Weather Proof Acrylic Emulsion paint on external walls
- Oil Bound distemper over POP on internal walls

#### Others:

• Electrical fixtures such as ceiling fans, LED tube lights, exhaust fan; wooden shutters in cupboard and under kitchen cabinet

#### **Ongoing DHPs**

The details of the ongoing DHPs are as given under:

#### I. Demonstration Housing Project at Ayodhya, Uttar Pradesh

Technology Promoted: Light Gauge Steel Structural System - Light Gauge Steel Framework System (LGSFS)

State Urban Development Authority (SUDA), Lucknow allotted land measuring 3600 sqm.at Village Malikpur, Pargana Avadh, Tehsil Sadar, Janpad, Ayodhya, Uttar Pradesh owned by Mahila Kalyan Vibhag/ Siksha Vibhag, Ayodhya to be used as Destitute Widow Ashramand Orphanage for construction of DHP. The layout plan, architectural plans, etc. were approved by the Ayodhya Development Authority, Ayodhya. The DHP is in G+2 configuration with other provisions and a community centre (G) and being constructed using LIGHT GAUGE STEEL STRUCTURAL SYSTEM - Light Gauge Steel Framework System (LGSF) with Cement Fibre board on both side of walls and infill of rock wool.

#### **Project Profile:**

- Location:Village Malikpur, Pargana Avadh, Tehsil Sadar, Janpad, Ayodhya
- State Level Nodal Agency : State Urban Development Authority (SUDA), Lucknow
- Land Allotted by: Mahila Kalyan Vibhag/Siksha Vibhag, Ayodhya
- Usage : Destitute Widow Ashram and Orphanage
- Plot area of project : 3600 sqm.
- No. of houses : 40 (G+2); Other provisions includes Dining Hall with Kitchen & store, Common Room with toilet, General office, Medical Room with toilet, Care Taker Room, Activity Rooms and Laundry
- Community Centre having built up area of 342 sqm. consist of Single storey Multipurpose Hall with Kitchen, office, green room,



Construction work in progress at Demonstration Housing Project (view of Community Centre Building) using Light Gauge Steel Framework System (LGSF) with Cement Fibre board on both side of walls and infill of rock wool at Ayodhya, Uttar Pradesh

shops and toilet.

- Carpet area of each unit : 29.47 sqm.
- Built up area of each unit : 34.34 sqm.
- Total built up area : 2661 sqm. including community centre
- Technology Used: LIGHT GAUGE STEEL STRUCTURAL SYSTEM - Light Gauge Steel Framework System (LGSFS)
- Each unit consist of a room with attached toilet, pantry and balcony
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, UGT, septic tank, horticulture work, boundary wall, tube well, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology

Light Gauge Steel Framed Structures (LGSF) is based on factory made galvanized light gauge steel components, designed as per codal requirements. The system is produced by cold forming method and assembled as panels at site forming structural steel framework of a building of varying sizes of wall and floor. The assembly is done using special types of screws and bolts. LGSF is a well-established technology for residential construction in North America, Australia and Japan and is gaining ground in India. LGSF is typically ideal for one to three storey high buildings, especially for residential and commercial buildings. Due to its flexibility, fast construction and durability, this technology has great potential for counties like India. LGSF can be combined with composite steel / concrete deck resting on light steel framing stud walls.

In this project, the total thickness of wall is 124mm having 89mm thickness of LGSF and 9mm & 6mm thick fibre cement board with vapour barrier on outside wall and 8mm thick fibre cement board with 12mm gypsum board inside of wall. Rock wool have been used as infill material.

#### 2. Demonstration Housing Project at Tiruppur, Tamil Nadu

Technology Promoted: Precast Concrete Construction System –Precast Components Assembled At Site

The Tamil Nadu Urban Habitat Development Board, Chennai, Tamil Nadu allotted land measuring 2000 sqm. through District Collector, Tiruppur at Survey No.24/3, Village Sempiyanallur, Taluk Avinashi, Tiruppur District, Tamil Nadu for the Demonstration Housing Project to be used as Working Women Hostel & Widow Home. The layout plan, architectural plans, etc. were approved by the District Town and Country Planning Office, Tiruppur. The DHP is in G+3 configuration with other provisions and being constructed using Precast Concrete Construction System –Precast Components Assembled at Site.

#### **Project Profile:**

- Location: Survey No.24/3, Village Sempiyanallur, Taluk Avinashi, Tiruppur District, Tamil Nadu
- State Level Nodal Agency :Tamil Nadu Urban Habitat Development Board, Chennai
- Land Allotted by: District Collector, Tiruppur
- Usage : Working Women Hostel & Widow Home
- Plot area of project : 2000 sqm.
- No. of houses : 40 (G+3); Other provisions includes a Dining Hall with Kitchen and store, Common Room with toilet, General office, Medical Room with toilet, Care Taker Room, Activity Rooms and Laundry
- Carpet area of each unit : 26.66 sqm.
- Built up area of each unit : 31.51 sqm.
- Total built up area : 2044 sqm.
- Technology Used: Precast Concrete Construction System –Precast Components Assembled At Site
- Each unit consist of a room with attached toilet, kitchen and balcony
- Infrastructure facilities : CC Road, pathways



Construction work in progress at Demonstration Housing Project using Precast Concrete Construction System –Precast Components Assembled At Site at Tiruppur, Tamil Nadu

with concrete pavers, water supply work, septic tank, tube well, horticulture work, boundary wall, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.

• Includes Earthquake Resistant Features.

#### About the Technology

Precast construction technology is a system of casting concrete in a reusable mould or "form" which is then treated in a controlled environment, conveyed to the construction site and lifted to the place. Precast Construction Technology consists of various precast elements such as walls, beams, slabs, columns, staircase, landing and some customized elements that are standardized and designed for stability, durability and structural integrity of the building. Precast residential building construction involves design, strategic yard planning, lifting, handling and transportation of precast elements. This technology is suitable for construction of high rise buildings resisting seismic and wind induced lateral loads along with gravity loads. The building framing is

planned in such a way that maximum number of repetitions of moulds is obtained. These elements are cast in a controlled factory condition. The factory is developed at or near the site which provides an economical solution in terms of storage and transportation.

In this project, the system has been used as load bearing wall panels. The total thickness of wall is 150mm and precast slab of 100mm.

#### 3. Demonstration Housing Project at Guwahati, Assam

Technology Promoted: Light Gauge Steel Structural System - Light Gauge Steel Framework System (LGSFS) with V-infill walls

Mission Director, PMAY-HFA(U)-Assam, Guwahati has allotted the land measuring 1600 sqm. owned by Guwahati Municipal Corporation (GMC) at Fatashil Ambari, Guwahati to be used as rental accommodation for Contratual Safai Karamchari of GMC. The Guwahati Municipal Corporation approved the plan and layout consisting of 40 Dwelling Units with other provisions and a community centre. The houses under DHP are in G+3 configurations and community centre (G) are being constructed using LIGHT GAUGE STEEL STRUCTURAL SYSTEM - Light Gauge Steel Framework System (LGSFS) with V-infill walls and Pre-engineered Building (PEB) steel structure.

#### **Project Profile:**

- Location: Fatashil Ambari, Guwahati
- State Level Nodal Agency : Mission Director, PMAY-HFA(U)-Assam, Guwahati
- Land Allotted by: Guwahati Municipal Corporation (GMC)
- Usage : Rental accommodation for Contratual Safai Karamchari of GMC
- Plot area of project : 1600 sqm.
- No. of houses : 40 (G+3)
- Community Centre having built up area of 336 sqm. consist of Single storey Multipurpose Hall with Kitchen, office, green room, shops and toilet.
- Carpet area of each unit : 31.06 sqm.
- Built up area of each unit : 36.09 sqm.
- Total built up area : 2190 sqm. including community centre
- Technology Used: LIGHT GAUGE STEEL

STRUCTURAL SYSTEM - Light Gauge Steel Framework System (LGSFS) with V-infill walls

- Each unit consist of a living room, a bed room, a kitchen, a bath room, a W.C., a lobby and a balcony.
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, UGT, septic tank, horticulture work, boundary wall, tube well, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology

Light Gauge Framed Steel Structure (LGFSS) is based on factory made galvanized light gauge steel components produced by the cold forming method assembled as panels at site forming structural steel framework of a building and varying wall and floor construction. The panels are assembled on site with screws and bolts to form the internal and separating walls and inner leaf of the external walls of a building and floors & ceiling. The building is completed by the installation of V-Infill Wall elements.

V-Infill Wall is an innovative emerging building



Construction work in progress at Demonstration Housing Project using Light Gauge Steel Framework System (LGSFS) with V-infill walls at Guwahati, Assam

and construction technology using factory made 8/10mm fibre cement boards (Vboard) on either side of GI studs and erected to produce straight to finish walls which are filled with light weight concrete made of EPS, cement, sand and additive. The system can incorporate all types of architectural features like coving, boxes, cantilevers, projections, infill walls, mezzanine floors etc. This system can also incorporate all types of services viz. electrical, gas and plumbing etc.

In this project, the total thickness of wall is 124mm having 89mm thickness of LGSF and 9mm & 6mm thick fibre cement board with vapour barrier on outside wall and 8mm thick fibre cement board with 12mm gypsum board inside of wall.V-infill wall material have been used as infill material with Pre-engineered Building (PEB) steel structure.

### 4. Demonstration Housing Project at Bhalwal, Jammu

Technology Promoted: Prefabricated Sandwich Panel System - EPS core panel using Quikbuild Panels

The J&K Housing Board, Government of J&K allotted land measuring 4048 sqm. at Bhalwal,

Jammu for the Demonstration Housing Project to be used as Sports Hostel. The layout plan, architectural plans, etc. were approved by the J&K Housing Board, Government of J&K. The DHP is in G+2 configuration with other provisions and being constructed using Prefabricated Sandwich Panel System - EPS core Panel using Quikbuild Panels.

#### **Project Profile:**

- Location: Bhalwal, Jammu
- State Level Nodal Agency : J&K Housing Board, Government of J&K
- Land Allotted by: J&K Housing Board, Government of J&K
- Usage : Sports Hostel
- Plot area of project : 4048 sqm.
- No. of houses : 40 (G+2); Other provisions includes a Office with Toilet, Dining Hall with Kitchen & store, Activity Room cum Gym, Medical Room with toilet and store, Care Taker Room with toilet, Laundry Room.
- Carpet area of each unit : 28.57 sqm.
- Built up area of each unit : 35.35 sqm.
- Total built up area : 2054 sqm.
- Technology Used: Prefabricated Sandwich Panel System - EPS core panel using Quik-



Construction work in progress at Demonstration Housing Project using EPS core panel using Quikbuild Panels at Bhalwal, Jammu

build Panels

- Each unit consist of 2 Rooms, Kitchen, Toilet & Balcony
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, septic tank, tube well, horticulture work, boundary wall, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology

EPS core panel using Quikbuild Panels as walling (Prefabricated Sandwich Panel System)and EPS roof/slab Panel with concreting - QuikBuild panel system consists of a welded wire space frame integrated with a polystyrene insulation core. The wall panel is placed in position and a wythe of concrete is applied to both sides. The wall panel receives its strength and rigidity from the diagonal cross wires welded to the welded-wire fabric on each side. This combination produces a truss behavior, which provides rigidity and shear terms for a full composite behavior. Steel trusses are pierced through the polystyrene core and welded to the outer layer sheets of galvanized steel mesh to form a rigid panel. The shell of the structure is built by manually erecting the panels directly onto the slab with reinforcement rods. Desired utilities like doors, windows and ventilators may be pre-built while plumbing, electrical conduits may be added onsite. The wall is then finished by plastering with cement using the traditional method or by shotcreting machine to create a monolithic structure. These panels are used in the construction of exterior and interior loadbearing and non-load bearing walls and floors of buildings of all types of construction.

In this project, the system has been used as load bearing wall panels. The total thickness of wall is 180mm with EPS thickness of 80mm and 50mm shortcreting/plastering on both side of the wall.

#### 5. Demonstration Housing Project at Dimapur, Nagaland

Technology Promoted: Prefabricated Sandwich Panel System-EPS Cement Sandwich Panels with steel structure

The Works & Housing Department and Municipal Affairs Department, Government of Nagaland allotted land measuring 2819 sqmts. at PWD Housing Complex Sematila, Dimapur, Nagaland for the Demonstration Housing Project to be used as Working Women Hostel. The layout plan, architectural plans, etc. were approved by the PWD Housing, Kohima, Nagaland. The DHP consists of a Hostel Block in G+2 configuration and a community centre being constructed using Prefabricated Sandwich Panel System-EPS Cement Sandwich Panels with steel structure.

#### **Project Profile:**

- Location: PWD Housing Complex Sematila, Dimapur, Nagaland
- State Level Nodal Agency : Municipal Affairs Department, Government of Nagaland
- Land Allotted by: Works & Housing Department, Government of Nagaland
- Usage : Working Women Hostel
- Plot area of project : 2819 sqm.
- No. of houses : 40 (G+2); Other provisions includes a Dining Hall with Kitchen, Activity Room, Medical Room with toilet, Office with Toilet, Care Taker Room with toilet.
- Community Centre having built up area of 272 sqm. consist of Single storey Multipurpose Hall with Kitchen, office, two shops, two toilets & one toilet for physically handicapped.
- Carpet area of each unit : 25.21 sqm.
- Built up area of each unit : 28.60 sqm.
- Total built up area : 2050 sqm. including community centre
- Technology Used: Prefabricated Sandwich Panel System-EPS Cement Sandwich Panels with steel structure



Construction work in progress at Demonstration Housing Project using EPS Cement Sandwich Panels with steel structure at Dimapur, Nagaland

- Each unit consist of a room, a pantry, Toilet & Balcony
- Infrastructure facilities : CC Road, pathways with concrete pavers, water supply work, septic tank, horticulture work, boundary wall, drainage & disposal and external electrification using solar panels, rain water harvesting, fire fighting system, etc.
- Includes Earthquake Resistant Features.

#### About the Technology

Prefabricated Sandwich Panel System-EPS Cement Sandwich Panels with steel structure are lightweight solid core sandwich panels made of 5mm non-asbestos fiber cement boards on both sides of panels as facing sheet and the core material of expanded polystyrene beads, admixture, cement, sand, fly ash and other bonding materials in mortar form. The core material in slurry state is pushed under pressure into preset molds. Once set, it is moved for curing and ready for use with RCC or steel framed structure. These panels may be installed without any structural support up to 5m only. Due to the sheets, the panels do not require plastering and water curing. These panels are joined with tongue & groove jointing system.

These are non-load bearing panels and should be used as walling, floor and roofing with additional structural support, steel or RCC depending on the design. However, these may be used as single floor construction or stairs case slabs, kitchen/bathroom slabs etc. without support structure. Therefore, here the panels are being used with steel structure.

In this project, the total thickness of external walls is 90mm and internal walls is 75mm. The frame structure of the building is in steel (ISMB, ISMC) with prefabricated sandwich panel as infill. The roof slab is also made of prefabricated sandwich panel with concrete screed.

The status of these ongoing DHPs during the reporting period are as under:

SI. No.	Location of DHP	Usages	Status
Ι.	Tiruppur, Tamil Nadu	Working Women Hostel/ Widow Home (G+3)	Superstructure work of all floors is completed. Finishing work is in progress.

SI. No.	Location of DHP	Usages	Status
2.	Ayodhya, Uttar Pradesh	Destitute widow Ashram & orphanage (G+2) Community Centre (Single Storey)	Construction of Community centre is nearing completion. The superstructure work of main building is in progress.
3.	Bhalwal, Jammu, J&K	Sports Hostel (G+2)	Superstructure work at ground floor is in progress. Construction of Boundary wall is in final stage.
4.	Guwahati, Assam	40 DUs (G+3) for contractual safai karamcharis of GMC and Community Centre (Single Story)	Superstructure work in community centre is in progress and after completion of pile work for houses, work at plinth level is in progress. Construction of Boundary wall completed.
5.	Dimapur, Nagaland	Working Women Hostel (G+2) Community Centre (Single Storey)	Superstructure work for Community Centre and Hostel is in progress.

#### Inauguration of Demonstration Housing Project (DHP) at Agartala, Tripura

Shri Biplab Kr. Deb, the then Hon'ble Chief Minister of Tripura inaugurated the Old Age Home in the august presence of Hon'ble Minister of Social Welfare and Social Education Department, Govt. of Tripura, Smt. Santana Chakma on April 25, 2022. The Old age home has been constructed under PMAY-U as Demonstration Housing Project (DHP) using new emerging technology "Structural Stay in Place Formwork System (Coffor)".

#### Foundation Stone Laying of Demonstration Housing Project at Nagaland

Shri Hardeep S. Puri, Hon'ble Minister for Housing & Urban Affairs and Petroleum & Natural Gas laid the foundation stone of the Demonstration Housing Project at Dimapur, Nagaland in the august presence of Shri Tongpang Ozukum, Hon'ble Minister, Housing & Mechanical, Government of Nagaland on June 25, 2022 through Video Conferencing. The Demonstration Housing Project (DHP) will be used as Working Women Hostel and is being constructed using Flyash EPS Cement Sandwich Panels with steel structure.

#### Foundation Stone Laying of Demonstration Housing Project at Guwahati

The Foundation Stone for Demonstration Housing Project at Guwahati, Assam was laid by Shri Ashok Singhal, Hon'ble Minister for Department of Housing & Urban Affairs (DoHUA), Government of Assam on August 7, 2022.



Inauguration of Demonstration Housing Project (DHP) at Agartala, Tripura



Shri Hardeep S. Puri, Hon'ble Minister for Housing & Urban Affairs laying the foundation stone of DHP at Dimapur, Nagaland on June 25, 2022



Shri Ashok Singhal, Hon'ble Minister Department of Housing & Urban Affairs (DoHUA) laying the foundation stone for DHP at Guwahati, Assam on August 7, 2022

Further, the remaining States are also being requested to showcase innovative technologies through Demonstration Housing Projects and adopt emerging technologies in their construction projects.

#### Training Programmes on use of emerging technologies at Demonstration Housing Projects (DHPs)

The Council has undertaken the construction of DHPs with an objective to create awareness among stakeholders (State/UT/ULB officials, technical professionals, builders, development agencies, academic institutions and others) at the state/UT/ULB level on new/alternate technologies. To mainstream these technologies, it is necessary to build capacities of the supervisors and artisans with regard to use of new technologies. Accordingly, BMTPC organised following artisans training programmes on the technologies being used in various Demonstration Housing Projects:

S. No.	DHP Location	Date
Ι	Ahmedabad	I I <sup>th</sup> May, 2022
2	Dimapur	10 <sup>th</sup> January, 2023
3	Guwahati	24 <sup>th</sup> January, 2023
4	Jammu	9 <sup>th</sup> February, 2023
5	Tiruppur	2 <sup>nd</sup> March, 2023
6	Ayodhya	28 <sup>th</sup> March, 2023

The training programmes include both the theory and practical session on the use of emerging technologies. The participant is briefed about the technology, process of manufacturing of new materials and use of these materials in construction, the steps to be followed for ease and speedy construction, the inclusion of internal services/ finishes, precautions to be used for handling of the materials etc. The practical session includes showing the construction process/ activities at site. The training includes discussion on removal of doubts in adoption of new& innovative technologies. About 25-30 participants including workers attended the on-site training programme at each site.



Training Programmes on use of emerging technologies at Demonstration Housing Projects (DHPs) Dimapur, Nagaland on January 10, 2023



Training Programmes at DHP Bhopal on May 11, 2022



Training Programmes at DHP Tiruppur on March 2, 2023



Training Programmes at DHP Ayodhya on March 28, 2023

#### Technical Group for monitoring the progress of Demonstration Housing Projects and propagating emerging technologies

A Technical Group comprising of representative of SLNA, expert from local IIT /NIT/Research Institution, engineer member from ULB and BMTPC have been constituted to oversee the progress of Demonstration Housing Projects (DHPs) and also to propagate emerging technologies used in the DHP for wider acceptability within the State Government. During the year, Technical Group meetings have been conducted at DHPs sites at Bhopal, Ahmedabad, Jammu, Ayodhya, Tiruppur, Dimapur and Guwahati being implemented by BMTPC.

#### Evaluation & Documentation of ongoing Demonstration Housing Projects (DHPs) on Sustainable & Green Parameters

The following Institutions have been involved for evaluation and documentation of Demonstration Housing Projects:

I) CEPT University – DHP, Ahmedabad

- 2) Smrat Ashok Technological Institute, Vidisha – DHP, Bhopal
- Indian Institute of Technology, Guwahati-DHP, Guwahati
- 4) National Institute of Technology, Tiruchirappalli - DHP, Tiruppur
- 5) Dr. Ram Manohar Lohia Avadh University, Ayodhya - DHP,Ayodhya
- 6) National Institute of Technology Nagaland – DHP, Dimapur
- 7) Indian Institute of Technology, Jammu DHP, Jammu

The Punjab Engineering College Chandigarh, National Institute of Technology Agartala, Smrat Ashok Technological Institute Vidisha and CEPT University Ahmedabad have submitted their reports of the DHPs at Punchkula, Agartala, Bhopal & Ahmedabad respectively. As per the evaluation reports submitted by these agencies, the various technologies used in the DHPs have been recommended as sustainable technologies having lower energy consumption, higher speed of construction, non-use of burnt clay bricks in comparison to conventional structure.



Meeting of Technical Group for Monitoring of Demonstration Housing Projects (DHPs) at DHP Bhalwal, Jammu on February 9, 2023

#### II. PRADHAN MANTRI AWAS YOJANA – HOUSING FOR ALL (URBAN) MISSION

#### I. BMTPC's Role in Implementation of the Pradhan Mantri Awas Yojana – Housing for All (Urban) Mission

The Ministry of Housing & Urban Affairs, Government of India is implementing "Pradhan Mantri Awas Yojana (Urban) - Housing for All" Mission. The Council has been designated as an appraisal and monitoring agency for projects in various States/UTs falling in Earthquake Zone IV and Zone V and undertake TPIM review and capacity building of professionals of States/ Urban Local Bodies. During the year, the Council has undertaken the following activities as per the direction of the Ministry:

### Site Scrutiny along with DPR Desk Scrutiny of projects under BLC vertical of PMAY

- I Site Scrutiny along and Desk Scrutiny of PMAY(U) project of (646 DUs) under Beneficiary Led Construction (BLC) at Mohanpur, Tripura from April 4-6, 2022
- 2 Site Scrutiny and Desk Scrutiny of 26 BLC Houses under PMAY(U) at Nahan, Himachal Pradesh from June 21-22, 2022
- Site Scrutiny and Desk Scrutiny of 655 BLC (New Construction Houses) at Dineshpur, Uttarakhand from June 22-23, 2022
- Site Scrutiny and Desk Scrutiny of 107 BLC (New Construction Houses) at Palampur, Himachal Pradesh from September 13-15, 2022
- 5 Site Scrutiny along with DPR Desk Scrutiny of the Project of 1524 DUs (New Construction) under Beneficiary led Construction (Vertical-4) at Manglaur, Uttarakhand from January 12-13, 2023
- 6 Site Scrutiny along with DPR Desk Scrutiny of the Project of 633 DUs (New Con-

struction) under BLC at Kashipur, Uttarakhand on January 14, 2023

- 7 Site Scrutiny and Desk Scrutiny of 651 BLC (New Construction) at Dhekiajuli, Assam from February 14-15, 2023
- 8 Site Scrutiny and Desk Scrutiny of 2503 BLC (New Construction) at Dhubri, Assam from March 27-28, 2023

#### Technology Sub-Mission

A Technology Sub-Mission has been set up under "Housing for All (Urban) Mission" with the objective of providing "Sustainable Technological Solutions for Faster & Cost Effective Construction of Houses suiting to Geo-Climatic and Hazard Conditions of the Country". The Technology Sub-Mission facilitates adoption of modern, innovative and green technologies and building material for faster and quality construction of houses. Technology Sub-Mission also assists States/Cities in deploying disaster resistant and environment friendly technologies in collaboration with IITs/NITs/SPAs. BMTPC is working as Technical Secretariat of the Technology Sub-Mission.

#### Adoption of New & Emerging Technologies in Construction by CPWD

In order to facilitate adoption of alternate and emerging technologies by the State Governments, Ministry of Housing & Urban Affairs has pursued CPWD and BIS to come out with notifications, circulars, SORs, specifications etc. which will authorize State Governments to use these new construction technologies in housing projects.

In this direction, CPWD has brought out following OMs on new technologies for inclusion in Delhi Schedule of Rates (DSR) 2021 under SH-26 (New Technologies and Materials):

- I. OM No. 133/SE (TAS)/DSR/2021/477-H dated 25.11.2022 – Stay-in-place PVC Wall Formwork
- OM No. 133/SE (TAS)/DSR/2021/01-E dated 2.11.2022 – Structural Stay-in-place Formwork System with double faced panels for walls, single faced for roof/floor slabs.
- OM No. 133/SE (TAS)/DSR/2022/263-H dated 27.06.2022 - "Tunnel Formwork System" for wall panel and floor/roof panels

#### Light House Projects using Emerging Technologies shortlisted under Global Housing Technology Challenge – India (GHTC-India)

The Council is the Technical Partner to the Ministry for conduction of various technical activities under Global Housing Technology Challenge – India (GHTC-India) including construction of Light House Projects (LHPs) in close coordination with respective State Governments.

Under GHTC-India, proven innovative and alternate construction technologies have been shortlisted. A basket of 54 such proven shortlisted technologies is further divided in six broad categories, and distinct technologies from each of these broad categories are being showcased through construction of six Light House Projects (LHPs) across six regions of the Country namely, Indore, Rajkot, Chennai, Ranchi, Agartala and Lucknow. BMTPC is entrusted with the task of monitoring and interacting with the construction agencies in close coordination with the Ministry for any query resolution and smooth operationalization of LHPs. These LHPs are also projected as live laboratories to establish innovative and green construction practices

across India and will help in replication of these systems in future construction projects in the country through large scale citizen centric participation.

These LHPs are pilot housing projects which will pave the way for further adaption and use of these innovative technologies in the construction sector. The projects are showcasing construction of ready-to-live houses which are sustainable, cost-effective, resilient and built in much lesser time from the conventional cast-insitu RCC framed construction.

The Light House Projects at Chennai and Rajkot have been completed & handed over to the beneficiaries by the Hon'ble Prime Minister in May 2022 and October 2022 respectively. The LHPs at Indore, Lucknow & Ranchi are at advanced stage of completion.

An online drive for Enrolment of TECH-NOGRAHIS under GHTC-India: Light House Projects was launched by MoHUA. Technograhis are the Change Agents of innovative and sustainable technologies who will bring about technology transition in the construction sector for its adoption & replication in the country. They will act as Catalysts to Transform the Urban Landscape for New Urban India to full the vision of AatmaNirbhar Bharat. So far more than 35000 Technolograhis have registered for various LHPs. Technograhis are being exposed to the innovative construction technologies through onsite activities to learn different phases of use of innovative technologies in LHPs as well as through offsite Workshops/ Webinars, Webcasting, Mentoring on Technical know-how/Module etc.

#### Inauguration of LHP Chennai

The LHP Chennai was inaugurated by Hon'ble Prime Minister on May 26, 2022 and handed over to the beneficiaries. LHP Chennai was the first one to be completed among the other projects in record time of 12 months. The 1,152 houses at LHP Chennai are spread across 12 towers in G+5 configuration with basic infrastructure such as internal water supply, sewer lines, internal electrification, internal roads, lifts, LED Street lights, solar streetlight system, sewerage treatment plant, rainwater harvesting, etc., in place. It also comprises of anganwadi, shops, milk booth and library for the ease of families living inside the premises.

#### Inauguration of LHP at Rajkot and Participation in the "Indian Urban Housing Conclave" (IUHC) in Rajkot, Gujarat

The Ministry of Housing & Urban Affairs organised three-days "Indian Urban Housing Conclave" (IUHC) in Rajkot, Gujarat from October 19-21, 2022. Hon'ble Prime Minister inaugurated the Indian Urban Housing Conclave - 2022 along with the Light House Project (LHP) at Rajkot, Gujarat on October 19, 2022 and handed over the keys to the beneficiaries. The main components of IUHC 2022 included (a) Inauguration of Light House Project, Rajkot, (b) National Exhibition on Innovative construction practices, (c) Exhibition on best practices adopted by States/UTs under PMAY-U, (d) Deliberations on Affordable Housing Discourses, and (e) Felicitation of PMAY(U) Awards 2022. IUHC 2022 provided stakeholders with a platform to demonstrate their technologies as well as deliberate upon various options of technologies, materials and processes for large scale adoption and mainstreaming in different types of housing construction.

BMTPC along with HFA Directorate and GIZ has prepared two publications i.e. (i) Compendium of Light House Project – Chennai, Tamil Nadu under GHTC-India, and (ii) Compendium of Light House Project – Rajkot, Gujarat under GHTC-India.These publications were released by the Hon'ble Prime Minister during inauguration of the IUHC on October 19, 2022. The Council also participated in the National Exhibition during IUHC and displayed emerging construction technologies and other related activities of the Council. The Council also conducted two Thematic Sessions namely, (i) Use of Innovative Technologies by Public and Private Agencies, and (ii) Mainstreaming of Innovative Construction Technologies & Initiatives - Way Forward during the IUHC 2022. The Council also coordinated the activities of Technical Evaluation Committee during IUHC.

### Affordable Rental Housing Complexes (ARHCs)

The MoHUA is implementing the Affordable Rental Housing Complexes (ARHCs) scheme. The Council has been involved in effective and efficient operationalization of ARHCs with regard to appraisal and monitoring of projects, fund release, development of dedicated website and maintenance, documentation and maintenance of records, printing of guidelines and other IEC materials, etc. In the appraisal process the conformance of the proposals to the ARHCs Operational Guidelines is assessed including its technical & economic feasibility.

The following proposals were appraised under Model-2: Construction, Operation & Maintenance of ARHCs:

- Revised Proposal submitted by M/s Tata Electronics Private Limited ("TEPL"), Krishnagiri District, Tamil Nadu covering the total beds of 13,500 (404 Single Bedroom & 13,096 Dormitories beds).
- ii. Release of 1st Installment to M/s State Industries Promotion Corporation of Tamil Nadu (SIPCOT), Chennai, Tamil Nadu covering the total dormitory beds of 18720 Nos., based on the statutory approvals received & construction completed in all towers upto plinth level.

### Data Resource cum Monitoring Centre (DRMC)

The Ministry of Housing and Urban Affairs (MoHUA) through BMTPC, has set up a Data Resource Cum Monitoring Centre (DRMC) for monitoring work, data analysis, data compilation, data dissemination, generation of periodic reports in electronic form, undertake field visits/physical verification and also established a separate Monitoring Cell under the Mission Directorate at Nirman Bhawan, New Delhi for ease of data collection, analysis and generation of various housing and infrastructure reports, progress of construction etc. on day to day basis. A dedicated team of BMTPC officials along with experts and supporting staff is stationed at MoHUA for smooth operation of DRMC.

#### Affordable Sustainable Housing Accelerator-India (ASHA- India)

Under GHTC-India, it has also been planned to incubate and accelerate identified potential future technologies through Affordable Sustainable Housing Accelerator (ASHA) - India. The aim of ASHA-India is to catalyse research and development in housing construction sector, building materials and related products by providing a suitable platform to promote and showcase India's vibrant and dynamic community of innovators. The Affordable Sustainable Housing Accelerator - India (ASHA India) initiative supports the potential future technologies developed in India by the way of incubation and acceleration. The two categories are being supported under Potential Future Technologies include (i) Pre-Prototype Technologies for Incubation Support and (ii) Post-Prototype Technologies for Acceleration Support:

Projects sanctioned under Pre-Prototype Technologies for Incubation Support are under various stage of development, as detailed below:

- Project titled "Agro-Industrial Alkali-Activated Composites for Pre-Fabricated Building Elements and 3D Volumetric Construction" is being incubated by CSIR-NEIST Jorhat and CBRI Roorkee under ASHA-India component of GHTC-India. The proposal was approved by CSMC in its 56<sup>th</sup> meeting held on 23rd November, 2021 with project cost of Rs.9,52,17,000/-. The project is progressing as per the scheduled plan.
- Project titled "Experimental Investigations on Precast Reinforced Concrete Planks, is being incubated by Indian Institute of Technology, Roorkee for the incubate Mr. Suresh Chawla. The proposal was approved by CSMC in its 56<sup>th</sup> meeting held on 23rd November, 2021 with the project cost Rs. 5,92,80,000/-. The project is progressing as per the scheduled plan.
- 3. Project titled "Low Cost Bamboo Housing" is being incubated by Department of Architecture and Regional Planning, Indian Institute of Technology, Kharagpur, for the incubate Drishtee Foundation, Nasik, Maharashtra. The proposal was approved in 57<sup>th</sup> CSMC meeting held on 23.12.2021 at cost of Rs. 2,79,02,400/-. The project is progressing as per the scheduled plan.
- 4. Project titled "3D Printing in Construction" is being incubated by Indian Institute of Technology, Madras, for the incubate M/s Tvasta Manufacturing Solutions Pvt Ltd., Chennai. The proposal was approved in 56<sup>th</sup> CSMC meeting held on 23.11.2021 at cost of Rs. 6,23,00,000/-. The project is progressing as per the scheduled plan.
- 5. Project titled "Development of 3D Volumetric Precast Construction Technology" is being incubated by Indian Institute of

Technology, Madras, for the incubate M/s Slabs Engineering Pvt Ltd, Pune. The proposal was approved in 56<sup>th</sup> CSMC meeting held on 23.11.2021 at cost of Rs. 3,35,00,000/-. The project is progressing as per the scheduled plan.

6. Project titled "Prefabricated Prefinished Volumetric Construction using Recycled Plastic" is being incubated by Indian Institute of Technology, Roorkee, for the incubate Anant National University, Ahmedabad. The proposal was approved in 56<sup>th</sup> CSMC meeting held on 23.11.2021 at cost of Rs. 5,83,63,000/-. The project is progressing as per the scheduled plan.

#### Stakeholder Consultation of Potential Technology Providers under ASHA-India

GIZ with MoHUA is implementing Climate Smart Buildings (CSB) project with the aim to encourage sustainability in built environment through enhancing climate resilience and thermal comfort in buildings. With regard to ASHA-India, GIZ is exploring to extend technical assistance and cooperation in implementation of the ASHA-India initiative by providing technical support in form of International Mentorship to Incubators. To facilitate the same, GIZ has partnered with Fraunhofer Institute for Building Physics (IBP), Germany, which are leaders in building energy efficiency and building physics. As an important step in this direction, GIZ in association with MoHUA & BMTPC organized a Stakeholder Consultation on December 19, 2022 at New Delhi, wherein the Potential Technology Providers shortlisted under GHTC-India & undergoing Incubation Support with various ASHA-India Institutes (IITs & CSIR-NEAST), Expert from Fraunhofer Institute for Building Physics (IBP), Germany & faculties from ASHA-India institutes participated. During the deliberations, various incubatees & faculties from ASHA-India Institutes highlighted the work done by them so far. The expert from Fraunhofer Institute for Building Physics (IBP) presented areas of expertise of IBP and deliberated on the future incubation support required from them.



Stakeholder Consultation of Potential Technology Providers under ASHA-India organised on December 19, 2022 at New Delhi

#### LHP construction process

The Ministry of Housing & Urban Affairs (MoHUA) in collaboration with BMTPC and GIZ hosted series of 'e-Learning sessions and webcasting of LHP construction process' webinar to widespread the knowledge about the technologies, construction processes, sustainability, and mainstreaming to Technograhis. So far more than 35000 Technolograhis have registered for various LHPs. The main purpose of e-Learning sessions and webinars is to create awareness of the different technologies used in the construction of LHPs through technical sessions and webcasting of work at site. The virtual on-site tour to LHP site were also organised to educate the Technograhis on various stages of construction, new techniques, and key features. During the year, 14 webinars have been organised at all six LHPs. The technical session, explaining in detail about the innovative construction technologies, details and specifications of LHPs, use of technologies was shared by BMTPC. The Technograhis were shown the live construction of LHPs with virtual tour.

### Software and Website Development under PMAY(U) and GHTC-India

Activities like Development and upkeep of various portals/ websites, PMAY-Urban Dashboard/Reports, Conducting Webinars/ webcasting on LHPs, Dedicated Cell for PG Grievance Redressal & Call Centre, Progress Monitoring Cell at HFA Directorate are being undertaken by Data Resource Cum Monitoring Centre (DRMC) of PMAY-U. Recently, Indian Urban Housing Conclave – 2022 (IUHC-2022) has been conducted successfully for which entire stall bookings and delegate registration was administered only through on-line by portal developed for IUHC-2022. Apart from the above, Centralized RERA Portal & Dashboard is under development for Housing Division of MoHUA to monitor implementation of RERA Act.



E-Learning Sessions and Webcasting of LHP construction process organised jointly with MoHUA and GIZ
# III. IMPLEMENTATION OF NATIONAL URBAN HOUSING FUND (NUHF)

With the approval of Cabinet, a National Urban Housing Fund (NUHF) has been created in BMTPC which aggregates loans from lending agencies or financial institutions. Funds raised through Extra Budgetary Resources (EBR) for NUHF were loaned to BMTPC for its further disbursement as Central assistance to State/ UT Governments and as subsidy to the CNAs under the CLSS vertical of the Mission as per orders of controlling Ministry.

The Council has disbursed the central share under PMAY(U) to State Govts. as per the directions of the Ministry. So far, Rs. 33,000 crore & Rs. 20,000 crore (totaling to Rs. 53,000 crore) has been received as EBR from NSSF & HUDCO, respectively and the same has been disbursed as per the sanction letters issued by the Ministry of Housing and Urban Affairs (MoHUA), Government of India from time to time. Out of Rs. 53000 crore, Ministry has released Rs. 33,000 crore (FY 2021-22) to the BMTPC for bullet repayment of principal loan amount to NSSF and the same has been remitted to the NSSF towards bullet repayment of principal loan amount.

During Financial Year 2022-23, an amount of Rs. 2159.05 crore was paid by MoHUA towards the interest payment and same has been disbursed to NSSF and HUDCO as per the sanction letters of MoHUA.

# **IV. DISASTER MITIGATION AND MANAGEMENT**

# I. E-Course on Vulnerability Atlas of India

BMTPC developed e-Course on Vulnerability Atlas of India which was launched by Honble Minister of Housing & Urban Affairs. The e-Course is being offered jointly by the School of Planning & Architecture, New Delhi and Building Materials & Technology Promotion Council (BMT-PC), New Delhi. It is a basic e-learning course that offers awareness and understanding about natural hazards, helps identify regions with high vulnerability with respect to various hazards (earthquakes, cyclones, landslides, floods, etc.) and specifies district-wise level of damage risks to the existing housing stock. As an extension of the e-course on Vulnerability Atlas of India, the two more e-courses have been developed by the Council during the year:

**E-course on Earthquake Resistant House Construction :** It is a basic e-learning course that offers awareness and understanding about earthquake resistant house construction. The objectives of this e-learning programme are (i) to orient the strategic stakeholders about the earthquake resistant design and construction; and (ii) to bring about informed safe practices in the field of architecture, civil engineering, construction engineering and management and housing & infrastructure planning.

E-course on Improving Wind/Cyclone Resistance of Buildings: It is a basic e-learning course that offers awareness and understanding about wind/cyclone resistant house construction. The objectives of this e-learning programme are (i) to briefly explain the action of wind on buildings and state the general principles of planning and design; (ii) to bring out details to prevent the non-structural damage in the various buildings; (iii) to deal with the safety aspects of traditional non-engineered buildings; and (iv) to suggest retrofitting details which could be adopted in existing buildings to minimize the damages under high winds. Suggestions are also included for safety against storm surge.

The registration to e-Course on Vulnerability Atlas of India is through SPA's website www.spa. ac.in and ecourse.bmtpc.org. These e-courses are tools for effective & efficient disaster mitiga-



E-Course on Vulnerability Atlas of India Website : https://ecourse.bmtpc.org

tion & management in the field of Architecture, Civil Engineering, Urban & Regional Planning, Housing & Infrastructure Planning, Construction Engineering & Management and Building & Materials Research.

Till now ~1300 participants have been registered for these e-Courses. On successful completion, the participants are being given online certificates. BMTPC is constantly pursuing with various stakeholders, academic institutions and departments for giving necessary directions to their engineers and architects for undertaking the course.

# 2. Preparation of Audio-Visual Modules on Earthquake Tips

To educate and spread awareness about earthquakes and resistant design & construction, the Indian Institute of Technology Kanpur (IITK) and BMTPC launched the IITK-BMTPC series of Earthquake Tips in early 2002 and brought out its next edition in 2015. In all, 32 Tips has been released and is targeted at persons interested in earthquake - resistant building construction. The Tips cover topics such as basic introduction to earthquakes and terminology such as magnitude and intensity, concepts of earthquake resistant design, and aspects of a seismic design and construction of buildings. Utmost care is taken to ensure that despite complexity of the concepts, the Tips are simple to comprehend by one and all.

To have wider outreach, the Tips were released for publication in all interested journals, magazines and newspapers also. Further, the Tips were uploaded on the website of the National Informal Centre of Earthquake Engineering (NICEE) (www.nicee.org) and BMTPC (www.bmtpc.org). The Tips succeeded way beyond expectations. A large number of journals of architects, construction and structural engineering and many prestigious newspapers have published some or all the Tips. NICEE organizes regular quiz programme of School Children on the earthquake tips. The earthquake Tips was also brought out in other regional languages.

In order to widen the outreach of the Earthquake Tips, BMTPC brought out audio-visual modules on following Earthquake Tips and uploaded on YouTube BMTPC Channel:

EQ Tip No. I	What Causes Earthquakes?
EQ Tip No. 2	How the Ground Shakes?
EQ Tip No. 3	What are Magnitude and Intensity?
EQ Tip No. 4	Where are Seismic Zones in India?
EQ Tip No. 5	What are the Seismic Effects on Structures?
EQ Tip No. 6	How Architectural Features Affect Buildings During Earthquakes?
EQ Tip No. 7	How Buildings Twist During Earthquakes?
EQ Tip No. 8	What is the Seismic Design Philosophy for Buildings?
EQ Tip No. 9	How to Make Buildings Ductile for Good Seismic Performance?
EQ Tip No.10	How Flexibility of Buildings Affects their Earthquake Response?
EQ Tip No. I I	What are the Indian Seismic Codes?
EQ Tip No.12	How Do Brick Masonry Houses Behave During Earthquakes?
EQ Tip No.13	Why should Masonry Buildings have Simple Structural Configuration?
EQ Tip No.14	Why are Horizontal Bands Necessary in Masonry Buildings?
EQ Tip No.15	Why is Vertical Reinforcement Required in Masonry Buildings?
EQ Tip No.16	How to Make Stone Masonry Buildings Earthquake Resistant?
EQ Tip No.17	How do Earthquakes Affect Reinforced Concrete Buildings?
EQ Tip No.18	How do Beams in RC Buildings Resist Earthquakes?

	How do Columns in RC
	Buildings Resist Earthquakes?
	How do Beam-Column
EQ Tip No.20	Joints in RC Buildings Resist
	Earthquakes?
	Why are Open-Ground
EQ Tip No.21	Storey Buildings Vulnerable in
	Earthquakes?
FO Tip No 22	Why are Short Columns more
	Damaged During Earthquakes?
	Why are Buildings with Shear
EQ Tip No.23	Walls Preferred in Seismic
	Regions?
FO Tip No.24	How to Reduce Earthquake
= <b>Q</b> p . to.= .	Effects on Buildings?
FO Tip No 25	Why are Load Paths Important
	in Buildings?
EO Tip No.26	What Harms Load Paths in
- 2po.=0	Buildings?
	How can Non-structural
EQ Tip No.27	Elements be protected against
	Earthquakes?
EO Tid No.28	What is a Confined Masonry
- 2	Construction?
EQ Tip No.29	What are the Essential Features
	of Confined Masonry Houses?
	VVhat is Important in
EQ TIP No.30	Foundations of Earthquake-
	Resistant Buildings?
EQ Tip No.31	VVhy do Buildings Sink into the
•	Ground during Earthquakes?
EQ Tip No.32	vvny is Quality critical in
- 1	Earthquake-Resistant Buildings?

The audio-visual modules on Earthquake Tips were viewed by various stakeholders on the YouTube Channel of BMTPC.

# 3. Sharing of Data on Vulnerability Atlas of India

The Council has prepared the Vulnerability Atlas of India on ArcGIS platform by digitizing the various base maps w.r.t. earthquakes, wind/cyclones, floods, etc. Also, landslides incidence maps and thunderstorm incidence maps have been included in this edition from the available datasets. These maps now include number of layers for respective hazards and allied information.

The Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry for Gati Shakti Portal, Sterlite Power Transmission limited (SPTL) and Deptt. of Water Resources, Government of Punjab requested BMTPC for sharing of GIS shape files of hazards layers as given in the third edition of Vulnerability Atlas of India.

Being premier govt. agencies dealing with disaster mitigation and management, the following were shared:

- I. Earthquake Hazard Maps Shape files
- 2. Wind/Cyclone Hazard Maps Shape files
- 3. Flood Hazard Maps Shape files
- 4. Landslide Incidence Map database file
- 5. Thunderstorm Incidence Map database file

Sharing of the data related to disaster prone areas in India has helped these organizations in the domain of natural hazard mapping and assessment.

# V. STRENGTHENING THE INFORMATION AND DATABASE IN THE CONSTRUCTION SECTOR

# I. Publication of the "Nirman Sarika" – Special Issue of BMTPC Newsletter

Like preceding years, the Ministry of Housing & Urban Affairs celebrated the World Habitat Day 2022. To mark the occasion, BMTPC brought out a Special Issue of its Newsletter "Nirman Sarika" on the theme "Mind the Gap. Leave No One and No Place Behind", chosen by United Nations. This special publication focused on the various issues related to the theme of the World Habitat Day besides highlighting the activities of the Council. The "Nirman Sarika" was released by Shri Hardeep S. Puri, Hon'ble Minister for Housing & Urban Affairs in the presence of Shri Kaushal Kishore, Hon'ble Minister of State for Housing & Urban Affairs, Shri Manoj Joshi, Secretary, Ministry of Housing & Urban Affairs & other dignitaries from UN-Habitat and MoHUA on October 3, 2022 at New Delhi during the event organized to celebrate World Habitat Day 2022.

## 2. Publication of Booklet on Piloting Innovative Technologies through Demonstration Construction

BMTPC works towards field level application of alternate innovative building materials & construction systems with the objective to facilitate proliferation & successful transfer of these innovations in the field. One of the most significant steps in technology transfer cycle is to run pilots through Demonstration Construction i.e. learning by doing. These demonstration construction projects not only help assimilate the nuances of innovative technology for further adaption but also work towards wider advocacy & outreach, sensitizing masses, training professionals & artisans.

Under PMAY-U, a flagship mission of Ministry of Housing & Urban Affairs (MoHUA), Govt. of India to provide pucca house to poorest of the poor urban household, a Technology Sub Mis-



Shri Hardeep S. Puri, Hon'ble Minister of Housing & Urban Affairs releasing Special Issue of its Newsletter "Nirman Sarika" in the presence of Shri Kaushal Kishore, Hon'ble Minister of State for Housing & Urban Affairs on October 3, 2022 at New Delhi during the event organized to celebrate World Habitat Day 2022



Shri Hardeep S. Puri, Hon'ble Minister of Housing & Urban Affairs releasing Booklet on Piloting Innovative Technologies through Demonstration Construction in the presence of Shri Kaushal Kishore, Hon'ble Minister of State for Housing & Urban Affairs on October 3, 2022 at New Delhi during World Habitat Day event

sion (TSM) is setup to facilitate adoption of modern, innovative & green technologies for faster & quality construction of houses across the country. Under TSM, MoHUA entrusted BMTPC to execute Demonstration Housing Projects (DHPs) at least one in each state of India showcasing different innovative construction systems & other sustainable practices.

BMTPC brought out a booklet on Piloting Innovative Technologies through Demonstration Construction containing technical information which can be readily used by stakeholders willing to use these technologies. It is also pertinent to mention here that alternate construction systems being used in these DHPs are the approved shortlisted technologies through Global Housing Technology Challenge-India organized by MoHUA in 2019. Also, most of these systems are evaluated & certified by BMTPC through Performance Appraisal Certification Scheme (PACS). Prior to PMAY-U also, BMTPC has been showcasing alternate technologies in different parts of the country through construction of houses, community buildings & other social structures.

The information in this publication will help engineers & architects including policy makers to explore these emerging construction technologies which are resource efficient, climate responsive, cost effective, disaster resilient and above all fast track the construction with superior structural & functional performance than the conventional brick-mortar/cast-in-situ frame construction.

The Booklet on Piloting Innovative Technologies through Demonstration Construction was released by Shri Hardeep S. Puri, Hon'ble Minister for Housing & Urban Affairs on 3<sup>rd</sup> October, 2022 at New Delhi during the event organized to celebrate World Habitat Day 2022.



Hon'ble Prime Minister releasing Compendiums of Light House Project – (i) Chennai and (ii) Rajkot on October 19, 2022 during the Inauguration of "Indian Urban Housing Conclave" (IUHC) in Rajkot, Gujarat

# 3. Publication of Compendium of Light House Project – Chennai, Tamil Nadu

Technology Sub mission under PMAY-U has been quite successful in field level implementation of alternate, sustainable building materials such as fly ash bricks, solid, hollow & interlocking blocks along with innovative construction systems other than conventional load bearing masonry/ cast-in-situ RCC framed construction for the houses being built across states. However, the major thrust to the concerted effort came into limelight when Hon'ble PM urged use of globally available best construction practices which can speed up the construction thereby ensuring faster delivery of houses. Accordingly, GHTC-India was organized by MoHUA and 54 emerging construction systems which are superior in terms of structural & functional performance, safe, sustainable & speedier are shortlisted and now being showcased through six Light House Projects (LHPs) using six distinct technologies across six states.

The LHP at Chennai using precast concrete construction technology has been completed within a span of one year & handed over to the beneficiaries by Hon'ble PM on 26<sup>th</sup> May 2022. Light houses projects are also being projected

as live laboratories for learning, adaption & replication of such systems as future construction systems for the county & therefore, it was felt that the LHP should be documented in form of a compendium which will contain all general & technical information about the project, technology being used, construction process, project implementation & management including IEC activities. Accordingly, HFA Directorate, Ministry of Housing & Urban Affairs along with BMTPC & GIZ brought out the Compendium of Light House Project – Chennai, Tamil Nadu under GHTC-India to reach out to the stakeholders for further adaption & replication of the technology in the country.

The Compendium is useful for concerned stakeholders who intend to use precast concrete construction for their future projects and will go a long way in establishing Precast Concrete Construction as the future technology for the country.

The Compendium on Light House Project – Chennai, Tamil Nadu under Global Housing Technology Challenge-India was released by Hon'ble Prime Minister on 19<sup>th</sup> October, 2022 during the Inauguration of "Indian Urban Housing Conclave" (IUHC) in Rajkot, Gujarat.

# 4. Publication of Compendium of Light House Project – Rajkot, Gujarat

In LHP Rajkot, 1144 houses with basic and social infrastructure have been successfully constructed with globally proven Monolithic Concrete Construction using Tunnel Form System of France, now being manufactured in Pune under Make in India initiative, along with environment frie3ndly Autoclave Aerated Concrete block masonry. The speed of the technology can be ascertained with the fact that two towers of Stilt+13 each using two Tunnel Forms sets comprising of 208 DUs (39.77 sq.mt. each) were completed in 45 days at LHP Rajkot. In addition, being monolithic concrete construction, its structural performance w.r.t. earthquakes, cyclones including service loads is far superior than conventional RCC framed & brick-mortar construction.

Light houses projects are also being projected as live laboratories for learning, adaption & replication of such systems as future construction systems for the county & therefore, it was felt that the LHP should be documented in form of a compendium which will contain all general & technical information about the project, technology being used, construction process, project implementation & management including IEC activities.

A Compendium on LHP Rajkot has been prepared jointly by MoHUA, BMTPC & GIZ. The Compendium on Light House Project – Rajkot, Gujarat under Global Housing Technology Challenge-India was released by Hon'ble Prime Minister on 19<sup>th</sup> October, 2022 during the Inauguration of "Indian Urban Housing Conclave" (IUHC) in Rajkot, Gujarat for wider dissemination of the innovative technology & further adaption & replication in the country.

# 5. Standardization and Product Evaluation

# Performance Appraisal Certification Scheme (PACS)

Performance Appraisal Certification Scheme (PACS), being operated by BMTPC (vide Gazette Notification No.I-16011/5/99 H-II in the Gazette of India No. 49 dated December 4, 1999), is a third party voluntary scheme for providing Performance Appraisal Certificate (PAC) to manufacturers or installers of a product which includes building materials, products, components, elements and systems etc. after due process of assessment.

Since the Scheme is operated for the products/ systems where no relevant Indian Standards are available, it is required to first work out the desired specifications for Performance Appraisal. For the items where no Indian codes are available, international practices are also being referred. In few cases the specifications recommended by the manufacturers have to be modified based on global practices to improve the quality and performance.

Various State Governments and their departments are also promoting and using emerging technologies and materials for construction of mass housing in their states. As such PACS has become an important tool for introduction of innovative materials & products for housing.

# Award of PACs

The Performance Appraisal Certificate (PAC) were issued to the following technologies/products as approved by Technical Assessment Committee (TAC) of PACS in its 18<sup>th</sup> meeting:

i. Volumetric (3D) Concrete Printing Technology (VCPT)

- ii. PUF Sandwich Panel with Pre Engineered Building Structure
- iii. Everest Rapicon Panel / Solid Wall Panel
- iv. WPC Door Shutter and WPC Frame

# **Renewal of PACs**

Based on receipt of Renewal applications along with requisite details, the following PACs were renewed during the year. During the renewal process, technical conformance aspects are ensured based on recent test reports & inspection of manufacturing units along with some of TAC members;

- i. Quick build panels
- ii. Precast Construction Technology
- iii. Structural Stay in place formwork system
- iv. Modular Tunnel Form
- v. Factory assembled insulated sandwich panel using PUF
- vi. Factory assembled insulated sandwich panel using Mineral wool
- vii. Bamboo wood Products
- viii. Strand Woven Bamboo Wood Flooring, Wall Panels & Door/Window Frames

# Applications under process for issuance of PACs

The assessment work for following new systems/ products have been carried out, including assessment of required credentials submitted by the agency & inspection of the most of these manufacturing Units. The preparation of draft Performance Appraisal Certificates for these systems/ products are in final stage for circulation of the same to TAC Members for issuance of new PACs:

- i. Concrete 3-D Printing Technology
- ii. Ferron Panels (Ferrobuild Design System)
- iii. Geopolymer coarse aggregate (GPCA)

- iv. Artificial geopolymer flyash fine aggregate (GPFA)
- v. Nano Concrete Aggregate (NACA)
- vi. AC- Crystacrete- Durability Enhancing Admixture
- vii. Lotus uPVC Doors & Windows
- viii. Kinzok Aluminium Alloy Cladding for Wall & Ceiling

Preliminary Applications (PA) for the following new products/systems have been received from the manufacturers on the basis of which Detailed Application Forms (DAF) are being issued for submitting information along with other documents for processing the applications:

- i. Agrocrete Blocks
- ii. Corrosion Inhibitor
- iii. Magic Pod & Magicrete precast
- iv. Hollow Interlocking Masonry Blocks

The above applications are being processed on the basis of data furnished by the firms, information available on their web sites, inspection of manufacturing plants at site of works and testing of samples of the products/systems etc. before preparation of Performance Appraisal Certificates (PACs). So far, the Council has issued 77 PACs on various innovative materials, products and systems.

## Technical Inputs to Sectional Committees of BIS

Apart from PACS, the Council is providing technical inputs to various Sectional Committees of Bureau of Indian Standards for formulation of Indian Standards on various subjects related to Civil Engineering such as Cement and Concrete; Flooring, Wall Furnishing and Roofing Materials; Earthquake Engineering; Housing Prefabricated Construction; Hill Area Development; National Building Code; etc.

# 6. Information Dissemination through Website of the Council

The Website of the Council (www.bmtpc.org) is being visited by professionals and others globally. It is being used as a reference resource in the area of innovative building materials and construction technologies. The website of the Council acts as a repository on alternate and emerging building materials and construction technologies in line with its mandate to create enabling environment of affordable housing for all. The Council's website has also been developed in Hindi (hindi.bmtpc.org) as per the directions of the Rajbhasha Nideshalaya. In addition, BMTPC has developed a dedicated standalone website https://vai.bmtpc.org for easy access to Vulnerability Atlas of India prepared by BMTPC.

There has always been good response to BMT-PC's website in the form of general enquiry about product and services. The website of the Council is regularly updated with latest technical information besides hire and purchase requirements, tender notices, training programmes, Right to Information Act and others as required from time to time.

The Council is also using social media platform (Twitter : @bmtpcdelhi; Facebook: @bmtpc. mhua; YouTube: BMTPC) to disseminate the information about the innovative building materials and disaster resistant technologies including other activities.

The YouTube Channel "BMTPC" is gaining popularity amongst the viewers mainly engineers, architects and other stakeholders day by day. The YouTube Channel attracted more than 21,63,000 views of around 157 videos available on this youtube channel. Some of the videos which are being viewed by most of the visitors are (1) Light Gauge Steel Structure System (79,724 nos.), (2) EPS Based Panel System (66,974 nos.), (3) Monolithic Concrete Construction (10,862 nos.), (4) Stay in Place Formwork System (5,756 nos.), etc. The BMTPC youtube channel has got 2800 subscribers till now.

# VI. TECHNOLOGY IDENTIFICATION, TRANSFER AND PROMO-TIONAL ACTIVITIES

## I. Identification and Evaluation of Emerging Housing Technologies

The Council has been evaluating alternative construction systems adopted world over to identify, adapt and promote such suitable technologies suiting to Indian geo-climatic conditions on regular basis. In the process, following technologies have been assessed and certified through PACS, which have potential to be used for mass housing in the country:

## PRECAST CONCRETE CONSTRUCTION SYSTEM – 3D PRECAST VOLUMETRIC

I Volumetric (3D) Concrete Printing Technology (VCPT)

## PRECAST CONCRETE CONSTRUCTION SYSTEM – PRECAST COMPONENTS AS-SEMBLED AT SITE

- 2 SRPL Building System (Waffle-Crete)
- 3 Walltec Hollowcore Concrete Panel
- 4 Precast Large Concrete Panel System
- 5 Industrialized 3-S system using RCC precast with or without shear walls, columns, beams, Cellular Light Weight Concrete Slabs/Semi-Precast Solid Slab
- 6 Robomatic Hollowcore Concrete Wall Panels
- 7 K-Wall Panels
- 8 Urbanaac Precast Construction Technology
- 9 Integrated Hybrid Solution One
- 10 Kon\_Crete Reinforced Autoclaved Aerated Concrete Panels

## LIGHT GAUGE STEEL STRUCTURAL SYS-TEM & PRE-ENGINEERED STEEL STRUC-TURAL SYSTEM

- II Factory Made Fast Track Modular Building System
- 12 Speed Floor System

- 13 Light Gauge Steel Framed Structure (LGSF)
- 14 Light Gauge Steel Framed Structure with Infill Concrete Panel Technology
- 15 Continuous Sandwich (PUF) Panels With Steel Structure
- 16 PUF Sandwich Panel with Pre Engineered Building Structure

## PREFABRICATED SANDWICH PANEL SYS-TEM

- 17 Advanced Building System Emmedue
- 18 QuickBuild 3D Panels
- 19 Reinforced EPS Core Panel System
- 20 Rapid Panels
- 21 Prefabricated Fibre Reinforced Sandwich Panels
- 22 Concrewall Panel System
- 23 Rising EPS (Beads) Cement Panels
- 24 PIR Dry Wall Pre-Fab Panel System
- 25 Baupanel system
- 26 Flyash EPS (Beads) Cement Sandwich Panels
- 27 V-Infill Wall (Light Weight EPS Wall)
- 28 Nano Living System Technology
- 29 Factory Assembled Insulated Sandwich Panels using Mineral Wool
- 30 Factory Assembled Insulated Sandwich Panels using PUF
- 31 Everest Rapicon Panel / Solid Wall Panel

## MONOLITHIC CONCRETE CONSTRUC-TION

- 32 Monolithic Concrete Construction System
- 33 Modular Tunnel Form

## STAY IN PLACE FORMWORK SYSTEM

- 34 Glass Fibre Reinforced Gypsum Panel System
- 35 Sismo Building Technology
- 36 Insulating Concrete Forms

- 37 Lost-in-place formwork system- Plasmolite Wall Panels
- 38 Lost-in-place formwork system- Plaswall Panel system
- 39 Structural Stay-in-place formwork system
- 40 Monolithic Insulated Concrete System
- 41 Stay-In-Place PVC Wall Forms
- 42 Permanent Wall Form (PVC)

# 2. Pilot Survey for Assessing Adoption of Innovative Technologies by Private Builders, Developers and Other Agencies

During the recent years, there has been rapid developments in terms of introduction of new technologies in the construction sector and construction of more projects including residential, commercial, institutional using these new technologies. Although, BMTPC has been aware of the latest developments in the field, however it has been realized at times that adequate compilation of data about use of these new innovative technologies is required to understand which technologies are used more by the private agencies, applicability of technology in type of buildings, acceptability by user etc.

With the above background in mind, it was decided to study the requirement of innovative technologies in the market, market trends, what are the innovative materials, technologies & products being adopted by the companies so that BMTPC align its activities for effective dissemination and mainstreaming of innovative technologies. It is also required to create a database on innovative technologies being adopted Pan India by private builders, developers, agencies as these agencies might be implementing innovative technologies. .

In view of the above, a pilot study was decided to be undertaken for preparation of database of new technologies being used by private builders, developers, agencies in their projects in association with Indian Institute of Architects, Northern Chapter. In this pilot survey, those cities were identified on all India level where maximum construction is going on.

Projects having been completed recently / ongoing were identified for listing out a city wise list for the Builders / Developers for reaching out to them for more specific information. Secondary Sources such as popular websites were identified for creating the base data for Project identification. The data collected was analyzed with respect to the proposed number of units in each project along with the use type of the Project. The identified Projects were listed in the three categories namely Residential Projects having dwelling units, Commercial Projects having saleable units as Shops & Mixed Use Projects having Residential and Commercial.

19 cities including Tier I and Tier II cities with majority of population across all zones (North, East, South, West and Central) of the country supporting large scale of private/real estate development were identified for conducting the pilot study.

495 Projects identified out of which the required information of 387 Projects has been compiled in the Report. Out of the 387 Projects identified, the Projects using innovative technologies were segregated which were found to be 146. The list of Projects using innovative Technology, the zone wise list with information regarding the Units using Innovative Technologies was then segregated based on the use types i.e. residential, commercial and mix use.

The major finding from the pilot survey shows that out of 5,91,327 units (387 projects) in identified 19 Tier I and Tier II cities, 3,81,249 units (146 projects) have been identified to be using innovative technologies. Further, Tier I cities (8 No.) contribute 3,60,543 units and rest 20,706 units are being constructed in Tier II cities (11 no.), using innovative technologies.

# 3. NAVARITIH : Certificate Course on Innovative Construction Technologies

In order to build capacities amongst building professionals about the new and emerging building materials and technologies for housing and building construction, the Ministry of Housing & Urban Affairs in collaboration with BMT-PC and School of Planning & Architecture (SPA), New Delhi has started a Certificate Course on emerging housing technologies namely NA-VARITIH (New, Affordable, Validated, Research Innovation Technologies for Indian Housing). This Course was started as part of "Construction Technology Year 2019-20" by BMTPC in collaboration with School of Planning & Architecture, New Delhi.

The NAVARITIH Certificate Course was launched by Hon'ble Prime Minister on January I, 2021 during the foundation stone laying ceremony of six Light House Projects through video conferencing. The resource material in form of a Book for NAVARITIH was also released by Hon'ble Prime Minister.

The objective of the Certificate Course is to (a) Familiarise the professionals with the latest materials and technologies being used worldwide for housing, (b) Provide an awareness of the state of art of materials and technologies in terms of properties, specifications, performance, design and construction methodologies so that professionals can successfully employ these in their day to day practice and (c) Provide exposure to executed projects where such materials and technologies have been implemented. The first batch of NAVARITIH was inaugurated by Secretary (HUA) on 11.02.2021.

The Course has received very good response so far. The following batches were conducted during the year:



Resource Faculty of NAVARITIH : Certificate Course on Innovative Construction Technologies

S. No.	Batch	Dates
I	10 <sup>th</sup> Batch	May 27 to June 3, 2022
2	II <sup>th</sup> Batch	July 29 to August 5, 2022
3	12 <sup>th</sup> Batch	October 28 to November 4, 2022
4	13 <sup>th</sup> Batch	January 20 to 27, 2023
5	14 <sup>th</sup> Batch	March 31 to April 7, 2023

In fourteen batches, 1013 participants, mainly civil engineers & architects, faculty & students from various engineering and architectural colleges, participated. It is first of its kind course and the curriculum covers alternate & innovative materials and construction technologies. The resource faculty for the Course are from SPA, BMTPC, IITs, CBRI & Industry.

At the end of the course, there is an online examination based on Multiple Choice Questions (MCQ). On successful completion of the course, an online certificate is awarded to the applicant by SPA, New Delhi and BMTPC.

# 4. Course on Materials & Technology for Post Graduate Students of "Master of Planning (Housing)" of School of Planning & Architecture, New Delhi

The Council was invited by the School of Planning & Architecture, New Delhi to take up the Course on Materials & Technology for Post Graduate students of "Master of Planning (Housing)" during their second semester.

The curriculum of Materials and Technology course for second semester of Post Graduate Students includes Building materials traditional and conventional, low cost materials, significance of technology for housing development, conventional technologies and modern technologies, appropriate technology, technology for housing in the context of housing development in India and the third world, concept of system building, various open and closed systems, choice of various systems of building, concept of intelligent building; Organization of the construction industry in India-Significance of Housing construction industry, its characteristics and role of various actors involved; Small scale enterprises in the housing construction industry-building material manufacturers, sellers and small contractors; Significance of resources and manpower in housing construction, need for imparting in housing building, concept of Nrimithi Kendras; Cost reducing techniques, environmental friendly technologies, role of technology in housing projects formulation-cost time and other implications, Emerging technological perspectives for house construction, infrastructure and housing area planning, 'green' housing; Role of BMTPC and other organizations in promotion of new and alternative technologies.

Therefore, as requested by SPA, New Delhi, the Executive Director, BMTPC took up the Course on Materials & Technology for Post Graduate Students of Master of Planning (Housing) during their second semester. The lectures were given during April-May 2022 session. The following lectures were imparted during these two semesters:

Lecture I	Sustainable Building materials and
to 3	construction technologies
Lecture 4	Building materials and products
	from agriculture, mineral and
	industrial wastes
Lecture 5	C&D Waste Management
Lecture 6	Energy in Buildings
Lecture 7	Green Buildings - GRIHA for
	Affordable Housing
Lecture	Disaster resistant design and
8 – 11	construction practices
Lecture	Emerging Construction Systems for
12 – 13	Mass Housing
Lecture	Intelligent Buildings
14	

## 5. Webinars on Use of Emerging Construction Systems in Light House Projects (LHPs)

The Ministry of Housing and Urban Affairs, Government of India in collaboration with BMTPC and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is organizing a series of Webinars on Use of Emerging Construction Systems in Light House Projects (LHPs). The objective of these webinar is to educate the participants about the new construction systems being used in the project, build capacities within India & make all aware about the initiatives taken by Govt. of India to introduce innovative construction systems which are resource-efficient, climate responsive, disaster-resilient, energy-efficient and rapid. So far, 17 webinars have been organized. During the year, webinars at following LHP sites were conducted:

S.	Name of Project site	Held on	
No.			
Ι	LHP at Ranchi, Jharkhand	April 6, 2022	
2	LHP at Chennai, Tamil	April 13, 2022	
	Nadu		
3	LHP at Agartala, Tripura	April 22, 2022	
4	LHP at Rajkot, Gujarat	May 4, 2022	
5	LHP at Indore, Madhya	May 18, 2022	
	Pradesh		
6	LHP at Lucknow, Uttar	June 3, 2022	
	Pradesh		
7	LHP at Ranchi, Jharkhand	June 30, 2022	
8	LHP at Chennai, Tamil	July 14, 2022	
	Nadu		
9	LHP at Agartala, Tripura	July 29, 2022	
10	LHP at Rajkot, Gujarat	August 18,	
		2022	
11	LHP at Chennai, Tamil	August 28,	
	Nadu	2022	
12	LHP at Indore, Madhya	Sept.4, 2022	
	Pradesh		
13	LHP at Lucknow, Uttar	Sept. 18, 2022	
	Pradesh		
14	LHP at Ranchi, Jharkhand	Oct.4, 2022	



Webinars on Use of Emerging Construction Systems in Light House Projects (LHPs) through Video Conferencing organised jointly with MoHUA & GIZ

The participants not only include Technograhis who registered through online enrolment drive initiated by HFA Directorate of MoHUA but also engineers, architects, planners, professionals, faculty members, developers, technology providers & students from the engineering & architectural colleges of the States besides officials from SLNA, SLTC/CLTC. During the webinar, virtual tour of LHP sites were also conducted to give the participants hands-on experience on the construction technologies being used in the projects.

# 6. RACHNA (Resilient, Affordable and Comfortable Housing through National Action)

'RACHNA-Resilient, Affordable and Comfortable Housing Through National Action' is an initiative of Ministry of Housing & Urban Affairs in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Building Material and Technology promotion Council (BMTPC). In RACHNA 1.0 and RACHNA 2.0, 150 trainings and events were hosted on innovative construction technologies and thermal comfort for Affordable Housing to acquaint various stakeholders from the building construction industry with the nuances of thermal comfort. The training programs delivered in-depth knowledge on Thermal Comfort, material influences, and its relationship with building physics. Moreover, it familiarized participants with design strategies, construction techniques, low-cost solutions, policy documents, building codes, international practices, and other aspects relevant to thermal comfort in affordable housing. It also covered topics like thermal comfort study of LHPs and life cycle cost for LHPs along with no cost design solutions to make a building thermally comfortable and reduce carbon footprint.

The focus of these trainings was on creating awareness among stakeholders on thermal comfort, its necessity in the affordable housing sector and ways to achieve it. The outcome of the training is to make the stakeholders in the affordable housing sector understand the need for thermal comfort & urge them to include no



A 2-day Training Programme on Innovative Construction Technologies and Thermal Comfort in Affordable Housing organised from 20 - 21 April 2022 at New Delhi under RACHNA jointly with MoHUA & GIZ

cost or low-cost strategies in their future endeavours. Participants of the training program were equipped with advanced knowledge and skillset to ensure provision of thermal comfort in India's affordable housing sector.

# 7. World Habitat Day 2022 Celebrations

The Ministry of Housing & Urban Affairs celebrated the World Habitat Day 2022 on 3<sup>rd</sup> October, 2022 at New Delhi.The Council participated in the World Habitat Day 2022 celebrations and organized a Painting Competition for Differently Abled Children on the theme "Mind the Gap. Leave No One and No Place Behind".The exhibition of the winning entries was also organised on the occasion. The winners of the Painting Competition were felicitated by Shri Hardeep S Puri, Hon'ble Minister of Housing & Urban Affairs during the event. To commemorate the World Habitat Day, brought two publications namely, (i) Special Issue of Newsletter "Nirman Sarika" on the theme "Mind the Gap. Leave No One and No Place Behind", and (ii) Booklet on Piloting Innovative Technologies through Demonstration Construction. These were released by Hon'ble Minister of Housing & Urban Affairs in the presence of Hon'ble Minister of State for Housing & Urban Affairs on 3<sup>rd</sup> October, 2022 at New Delhi.



Shri Hardeep S Puri, Hon'ble Minister of Housing & Urban Affairs at the exhibition of the winning entries and felicitating the winners of Painting Competition organised for Differently Abled Children on the theme of World Habitat Day on 3<sup>rd</sup> October, 2022

# **VII. ORGANISATION**

The organogram of BMTPC is shown at next page.As on 31<sup>st</sup> March, 2023, BMTPC had a staff strength 34 comprising 15 officers and 19 supporting staff.Also suitable technical/ professional/ supporting manpower is hired on contract basis on project to project and need basis.

The Council has continued following administrative and financial measures for bringing transparency, accountability and discipline within the system:

- Implementation of extant MOA, Byelaws and other rules & regulations of Council.
- Internal Committee for smooth and harmonious functioning of the Council:
  - o Investment Committee
  - o Advertisement Committee
  - o Construction Committee
  - o Printing Committee

- o GeM Committee
- o Local Purchase Committee
- o Store Purchase Committee
- o Transport Committee
- o Contractual Payment Committee
- To redress citizen grievances, online handling of the public grievances through centralized public grievances redress and monitoring system has been initiated.
- Nominated an officer as the Director of grievances and an officer as Welfare Officer for smooth functioning of the organization and to find out the solution of the grievances of the staff members.
- SCs, STs & OBCs Cell for welfare and development of Scheduled Casts & Scheduled Tribes
- Implementation of RTI Act, 2005
- Committee for Prevention of Sexual Harassment of women at workplace.

Dy.Chief – Management Information Systems Building Materials & Product Development Engineering Design & Performance Evaluation Demonstration, Construction & Exhibitions Exhibitions & Extension Demonstration Construction Systems Manager Cost Analysis & Estimation Building Materials & Product Evaluation BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL Dy.Chief - Financial Chief - Finance Planning Abbreviations: CA&E : Cos BM.PE : Bui BM.PD : Bui ED.PE : En DC&E : Ex E&E : Ex Vice Presidents : Minister of State and Secretary, Ministry of HUA **ORGANISATION CHART** Dy.Chief – Standardisation & Product Chief – Project Monitoring & Training Sr.Field Officer -Development Development Officer –ED-PE President : Minister of Housing & Urban Affairs ö Chairman : Secretary, Ministry of HUA EXECUTIVE COMMITTEE **BOARD OF MANAGEMENT Executive Director** Chief – Building Development Officer -BM-PD Information & Documentation Sr.Field Officer Dy.Chief – Materials – E&E Development Officer –BM-PE Dy.Chief – Technology Demonstration, Extension & International Chief – Technology Sr.Field Officer - DC&E Cooperation Marketing Development Officer – CA&E Chief – Human Settlements & Building Design Dy.Chief – Human Sr.Field Officer -Architect Settlements & Building Design

# VIII. STAFF STRENGTH (as on 31.3.2023)

S.No.	Name & Designation	Date of Joining
Ι.	Dr. Shailesh Kr. Agrawal	17.01.08
	Executive Director	
2.	M. Ramesh Kumar	01.04.93
	Chief- Human Settlements &	
	Building Design	
3.	S.K.Gupta	26.10.93
	Deputy Chief-Technology, Demonstration	
	Extension & International Cooperation	
4.	Arvind Kumar	15.04.99
	Deputy Chief- Management Information Systems	
5.	Chandi Nath Jha	09.09.99
	Deputy Chief- Standardization &	
	Product Development	
6.	Pankaj Gupta	14.10.99
_	Deputy Chief-Information & Documentation	
7.	Dalip Kumar	04.03.91
	Senior Field Officer- Demonstration	
•	Construction & Exhibition	
8.	Alok Bhatnagar	05.10.98
•	Senior Field Officer- Exhibition & Extension	01 01 02
9.	Akash Mathur	01.01.02
10	Senior Field Officer-Architect	02 10 94
10.	Anita Numar Sr. Programmer	03.10.76
	M Ramakrishna Roddy	29 10 03
11.	Ligison Officer	27.10.05
12	Pankai Gunta	01 03 94
12.	Finance Officer	01.05.71
13	Praveen Suri	01 09 94
10.	Systems Analyst	01.07.71
14.	S.S.Rana	01.04.98
	Library Officer	
15.	D.Prabhakar	29.01.04
	Field Officer	

# **IX. ACCOUNTS**

- The Council received grants of Rs 6.50 Crore towards salaries from the Ministry of Housing & Urban Affairs, Government of India during the FY 2022-23. The receipts from other sources e.g. Fees, Consultancy, Training, GHTC, DHP, LHP, DRMC, Publications, interest etc. were Rs. 215.20 Crore.
- In addition, an amount of Rs.2159.05 crores (approx.) was credited by MoHUA towards interest payment on EBR loan. An amount of Rs.2159.05 crores (approx.) has been disbursed as per sanction order of MoHUA as interest payment to NSSF and HUDCO.
- The total expenditure incurred was Rs. 25,09,04, 16,683.00 during the year, as per Receipt & Payment Account Statement summery of expenditure is given below:

Major Heads	Amount (in Rs.)
Construction of Demonstration Housing Projects in different parts of India & Expenditure on technical activities including identification/ evaluation/ assessment development/ application of emerging material & construction technologies	18,05,16,206
• Organization and participation in various seminars, Conference workshops, Housing for All (handholding, Documentation, Sensation and capacity Building), Mainstream Emerging Technologies through Dissemination, Knowledge Transfer with State Govt.	53,60,323
• Expenses towards activities relating to DRMC, GHTC, LHP, ARHCs and others	3,20,70,74,393
• Expenditure on salary, Establishment & Administration expenses including office equipment's, computer peripherals, etc.	8,25,92,979
Interest payment on EBR loan and refund of security     Deposits	21,61,48,72,782
Total	25,09,04,16,683

The Account have been auditing by M/s M.S. SEKHON & CO. Chartered Accountants. The balance sheet and the statement of accounts of the year 2022-23 is placed in the report.

#### M. S. SEKHON & CO. CHARTERED ACCOUNTANTS 170, MADHUVAN DELHI-110092

#### INDEPENDENT AUDITOR'S REPORT

То

The Members Building Materials & Technology Promotion Council New Delhi

#### Report on the Audit of Financial Statements

#### Opinion

We have audited the financial statements of **Building Materials & Technology Promotion Council (BMTPC)**, a Society registered under the Societies Registration Act, 1860, which comprise the Balance Sheet at March 31<sup>st</sup> 2023, the Statement of Income & Expenditure Account and Receipts & Payment Account for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion and to the best of our information and according to explanation given to us, the financial statements give the information required in the manner so required and give true and fair view in accordance with the Accounting Standards issued by the Institute of Chartered Accountants of India (ICAI):

- (a) In case of Balance Sheet, of the state of affairs of the Society as at March 31, 2023.
- (b) In case Statement of Income and Expenditure Account, of the Deficit for the year ended on that date; and
- (c) In case of Receipts and Payment Account of Receipts and Payments for the year ended on that date.

#### **Basis for Opinion**

We conducted our audit in accordance with the Standards on Auditing (SAs) issued by ICAI. Our responsibilities under those standards are further described in the Auditor's *Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the entity in accordance with the ethical requirements that are relevant to our audit of the financial statements, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements



Management is responsible for the preparation and fair presentation of the financial statements in accordance with the aforesaid Accounting Standards, and for such internal

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control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the entity's financial reporting process.

#### Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.

Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



#### Report on Other Regulatory Requirements

Further, we report that :

- a) We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit.
- b) In our opinion, proper books of account have been kept by the Society so far as appears from our examination of those books.
- c) The Society's Balance Sheet, Statement of Income and Expenditure and Receipts and Payments Account dealt with by this report are in agreement with the books of accounts.



FOR M.S. Sekhon & Co. CHARTERED ACCOUNTANTS FRN: 003671N

on

Rajiv Tandon Partner Membership No. 087343 UDIN: 23087343BGVLWM2719

Place: DELHI Date : 22.09.2023



#### Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

# **BALANCE SHEET AS ON 31 MARCH 2023**

			Amount(₹)
	Schedule	2022-23	2021-22
CORPUS/CAPITAL FUND AND LIABILITIES			
CORPUS/CAPITAL FUND	1	1,000,000	1,000,000
RESERVES AND SURPLUS	2	183,188,753	191,453,728
LONG TERM LIABILITY	3	200,000,000,000	200,000,000,000
EARMARKED FUNDS	4	1,323,436,629	2,717,059,760
CURRENT LIABILITIES AND PROVISIONS	5	3,081,089,182	6,841,201,470
TOTAL		204,588,714,564	209,750,714,958
ASSETS			영상 전에 관심하는 것이 없다.
PROPERTY, PLANT & EQUIPMENT	6	20,520,417	21,748,902
NON-CURRENT ASSETS	7	200,000,000,000	200,000,000,000
CURRENT ASSETS, LOANS & ADVANCES ETC.	8	4,568,194,147	9,728,966,056
TOTAL		204,588,714,564	209,750,714,958
SIGNIFICANT ACCOUNTING BOLICIES AND			

SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS

As per our report of even date attached.

FRN: 003671N

Rajiv Tandon

M.No.87343

Partner

For M S SEKHON & CO. Chartered Accountants

KHON

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For Building Materials & Technology Promotion Council

Pankaj Gupta Finance Officer

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Sharad Kumar Gupta Chief - Finance (I/C)

Dr. Shailesh Kr. Agrawal Executive Director

Place: New Delhi Date: 22.09.2023 bmlec

Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

# INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 MARCH 2023

			Amount(₹)
	Schedule	2022-23	2021-22
INCOME			
Grants / Subsidies	9	65,000,000	55,000,000
Fees/Subscriptions	10	1,946,596	15,583,891
Income from PAC's Fee Publications etc.	11	1,212,435	1,518,695
Interest Earned	12	13,054,604	16,595,323
TOTAL (A)		81,213,635	88,697,909
EXPENDITURE			
Expenditure on Salary, Establishment & Administration	13	80,929,829	75,265,533
Expenditure on Dissemination / Seminars/Workshops, Training Programmes,Housing For All etc.	14	5,427,948	4,529,846
Depreciation	6	3,120,833	2,945,491
TOTAL (B)		89,478,610	82,740,870
Surplus(Deficit) for the year(A-B)		(8,264,975)	5,957,039
BALANCE BEING SURPLUS/(DEFECIT) CARRIED TO BALANCE SHE	ET	(8,264,975)	5,957,039

SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS

As per our report of even date attached.

For M S SEKHON & CO. Chartered Accountag HON FRN: 003671N Rajiv Tandon Partner DACC M.No.87343

Pankaj Gupta Finance Officer

- Unteram

a Sharad Kumar Gupta cer Chief -Finance (I/C) Dr. Shailesh Kr. Agrawal Executive Director

For Building Materials & Technology

**Promotion Council** 

Place: New Delhi Date: 22.09.2023

# bmlpc

#### Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

#### RECEIPTS & PAYMENT ACCOUNT FOR THE YEAR ENDED 31 MARCH 2023

				Amount ( ₹ )
	2022	2-23	2021	-22
RECEIPTS				
1 Opening Balance				
Bank Balances				
With Scheduled Banks:				
- Deposit with Canara Bank	248,801,413		219,630,069	
- Sweep with State Bank of India-LHP A/c	2,355,212,358		2,164,810,068	
- On Savings Accounts:				
- Canara Bank	15,387,764		81,440,596	
- State Bank Of India	12,466,960		7,431,549	
- State Bank Of India(NUHF)	223,622,943		215,102,942	
- State Bank of India-LHP Agartala	1,005,868		1,007,416	
- State Bank of India-LHP Chennai	10,000		1,000,322	
- State Bank of India-LHP Indore	250,753,574		830,226	
- State Bank of India-LHP Lucknow	1,008,796		1,007,413	
- State Bank of India-LHP Rajkot	1,000,758		1,006,316	
- State Bank of India-LHP Ranchi	10,000		-	
- State Bank of India (ARHC)	101,801		-	
- State Bank of India (DHP)	154,110,001	3,263,492,236	1,007,416	2,694,274,333
2 Grants-in-aid from Central Government (Ministry of Housing & Urban Affairs)		65,000,000		55,000,000
3 Receipts towards Fees, I raining Programme, seminar receipts and other receipts		10,591,227		9,209,563
<ul> <li>4 Receipts towards sale of publications, PACS etc</li> <li>5 Loan and advances &amp; other Liabilities (Net)</li> </ul>		1,182,435		1,518,695 491,843
6 Security Received		97,096,726		91,625,532
7 Interest received from MoHUA on NUHF Fund		3,873,616,439		26,870,000,000
8 Interest received MoHUA on HUDCO loan		17,716,922,000		17,716,922,000
9 Received towards Bullet repayment of EBR loan taken from NSSF		•		330,000,000,000
10 Receipts from Ministry towards Demonstration Housing Projects		53,663,500		237,494,000
11 Receipts towards Light House, TPQA & DRMC Projects		1,920,398,329		2,701,528,644
12 Interest Earned		11,479,520		14,019,717
		27 071 043 144		380 476 197 292
PAYMENTS		27,071,040,144		000,410,101,202
1 Purchase of Fixed Assets	2 142 348		798 253	
2 Expenditure on Salary, Establishment & Administration	80 450 631		77 173 410	
3 Expenditure on Training Programmes, Seminars/Workshops,				
etc.	5,360,323	87,953,302	2,621,969	80,593,632
4 Refund of Security		21,715,992		
5 Interest paid to HUDCO		17,716,922,000		17,716,922,000
6 Interest paid to NSSF		3,873,616,439		26,870,000,000
7 Bullet repayment of EBR loan taken from NSSF		-		330,000,000,000
8 Loan & Advances (Net)		2,618,351		7,529,925
9 Earmarked funds				
- Light House Projects	2,995,755,023		2,412,438,377	
- Affordable Rental Housing Complex (ARHCs) Scheme	187,269,543		16 762 701	
- Demonstration Housing Project at Antheoabao, Gujarat	5,833,461		42,898,635	
- Demonstration Housing Project at Panchkula, Haryana	41,690		17,837,142	
- Demonstration Housing Project at Ayodhya, U.P.	21,649,896		780,172	
- Demonstration Housing Project at Bhopal, M.P.	29,607,110		16,940,839	
			A	





Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

#### RECEIPTS & PAYMENT ACCOUNT FOR THE YEAR ENDED 31 MARCH 2023

				Amount (₹ )
	2022-2	23	2021-	22
<ul> <li>Demonstration Housing Project at Guwahati, Assam</li> <li>Demonstration Housing Project at (J &amp; K)</li> <li>Demonstration Housing Project at Tiruppur, Tailnadu</li> <li>Demonstration Housing Project at Nagaland</li> <li>Demonstration Housing Project at Goa</li> <li>Global Housing Technology Challenge</li> <li>Data Pasource Monitoring Cell</li> </ul>	16,762,476 21,511,669 31,027,090 24,043,618 1,600,873 6,702,494 17,347,333	3 387 590 599	5,140,779 - - - 6,408,120 18,451,734	2,537,659,499
10 Closing Bank Balances				
- Deposit with Canara Bank	226,538,883		248,801,413	
- Sweep with State Bank of India-LHP A/c	283,445,505		2,355,212,358	
- Savings/Current Accounts:				
- Canara Bank	1,132,105		15,387,764	
- State Bank of India	14,340,711		12,466,960	
- State Bank of India-LHP Agartala	176,864,194		1,005,868	
- State Bank of India-LHP Chennai	19,630,962		10,000	
- State Bank of India-LHP Indore	178,314,012		250,753,574	
- State Bank of India-LHP Lucknow	115,401,170		1,008,796	
- State Bank of India-LHP Rajkot	5,087,496		1,000,758	
- State Bank of India-LHP Ranchi	23,273,133		10,000	
- State Bank of India (NUHF)	254,832,731		223,622,943	
- State Bank of India (ARHC)	646,085,799		101,801	
- State Bank of India (DHP)	35,679,760	1,980,626,461	154,110,001	3,263,492,236
TOTAL		27,071,043,144		380,476,197,292

SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS



For Building Materials & Technology

Promotion Council

Pankaj Gupta Finance Officer Sharad Kumar Gupta Chief -Finance (I/C) Dr. Shailesh Kr. Agrawal Executive Director



## **Building Materials & Technology Promotion Council**

Ministry of Housing & Urban Affairs, Government of India

#### SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2023

		Amount (₹)
SCHEDULE 1- CORPUS/CAPITAL FUND	2022-23	2021-22
Balance as at the beginning of the year	1,000,000	1,000,000
TOTAL	1,000,000	1,000,000

SCHEDULE 2- RESERVES AND SURPLUS	2022-2	3	2021-2	22
1. <u>Capital Reserve</u> Opening Balance	92,756,261	04 040 000	91,958,008	00 756 064
Addition during the year	1,892,348	94,648,609	796,253	92,750,201
2. Excess of Income over Expenditure				
Opening Balance	98,697,467		93,538,681	
Add : Surplus(Deficit) transferred from Income & Expenditure A/c	(8,264,975)		5,957,039	
	90,432,492		99,495,720	
Less: Transferred to Capital Reserve	1,892,348	88,540,144	798,253	98,697,467
TOTAL		183,188,753		191,453,728

SCHEDULE 3- LONG TERM LIABILITY	2022-23	2021-22
National Urban Housing Fund		
Loan from HUDCO for disbursement as Central Assistance to States/UTs under PMAY(U) Mission	200,000,000,000	200,000,000,000
TOTAL	200,000,000,000	200,000,000,000





# **Building Materials & Technology Promotion Council**

Ministry of Housing & Urban Affairs, Government of India

#### SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2023

SCHEDULE 4- EARMARKED FUNDS	2022-2	3	2021-	22
SONEDOLE 4- LANMANCED I ONDO				
Data Resource Cum Monitoring Centre				
Opening Balance	(11,534,172)		47,562	
Received during the year	21,932,000		6,870,000	
Less : Utilization/Expenditure during the year	(21,646,047)	(11,248,219)	18,451,734	(11,534,172
Nethers I list an Investor Fund				
Opening Balance	21 040		21.040	
Received during the year	-		-	
Less: Disbursement during the year	· · · · · ·	21,040		21,040
Received towards TPQA				
Opening Balance	4,789,400		9,966,906	
Received during the year	9,966,906	E 622 022	-	4 789 400
Less: Amount Utilized during the year	9,133,204	5,623,022	5,177,500	4,709,400
Demonstration Housing Project at Bhopal,Madhya Pradesh	11.001.000		22 560 000	
Opening Balance	14,691,292		33,569,000	
Less: Salary & Administration Expenses Apportioned	-		1,936,869	
Less: Amount Utilized during the year	29,526,486	2,446,806	16,940,839	14,691,292
Demonstration Housing Project at Associate Tripura				
Opening Balance	(1.418.245)		44,944,171	
Received during the year	-		-	
Less: Salary & Administration Expenses Apportioned	-		3,463,781	
Less: Amount Utilized during the year	5,903,268	(7,321,513)	42,898,635	(1,418,245
Design of the large state of Design of the large state of the large st				
Opening Polence	(3,167,550)		14 669 592	
Received during the year	-		-	
Less: Amount Utilized during the year		(3,167,550)	17,837,142	(3,167,550
Demonstration Housing Project at Chimbel,Goa	04 400 700		24 402 700	
Opening balance Received during the year	31,193,766		31,193,700	
Less: Amount Utilized during the year	1,600,873	29,592,893	-	31,193,766
Demonstration Housing Project at Ahmedabad, Gujarat				
Opening Balance	7,669,726		24,775,184	
Received during the year	9,745,000		341 757	
Less: Amount Utilized during the year	28 428 049	(11 013 323)	16 763 701	7 669 720
2000. Announe official daming the year	20,420,043	(11,010,020)	10,100,101	1,000,120
Demonstration Housing Project at Ayodhya (UP)				
Opening Balance	38,192,328		-	
Received during the year (From Centre)	•		38,972,500	
Less: Amount Utilized during the year	21,710,736	16,481,592	780,172	38,192,328
Demonstration Housing Project at Guwahati				
Opening Balance	48,442,300		· · · ·	
Received during the year (From Centre)	-		54,215,000	
Less: Salary & Administration Expenses Apportioned	-		631,921	
Less: Amount Utilized during the year	16,746,321	31,695,979	5,140,779	48,442,30
Demonstration Housing Project at Jammu & Kashmir	46 279 500			
Opening balance Received during the vear (From Centre)	40,270,300		46,278,500	
Less: Amount Utilized during the year	21,581,477	24,697,023		46,278,50
		-		
2 Demonstration Housing Project at Tiruppur				
Opening Balance	35,242,500		-	
Received during the year	26,636,500	00 700 110	33,242,300	05 040 50
Less: Amount Utilized during the year	31,098,881	30,780,119	-	35,242,500





# Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

#### SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2023

				Amount (₹)
SCHEDULE 4- EARMARKED FUNDS	2022-2	23	2021-	22
13 Demonstration Housing Project at Nagaland				
Opening Balance	62,785,500			
Received during the year			62,785,500	
Less: Amount Utilized during the year	24,113,426	38,672,074		62,785,500
14 Global Housing Technology Challenge				
Opening Balance	(2,376,713)		4,031,407	
Received during the year	-		-	
Less: Amount Utilized during the year	(7,318,097)	(9,694,810)	6,408,120	(2,376,713)
15 Received towards ARHCS				
Opening Balance	832,620,000			
Received during the year			832,620,000	
Less: Amount Utilized during the year	187,269,543	645,350,457		832,620,000
16 Light House Project-Agartala, Tripura				
Opening Balance	566,637,500		428,750,000	
Received during the year (From Centre)			260,000,000	
Received during the year (From State)	106,700,000		•	
Less: Amount Utilized during the year	369,716,386	303,621,114	122,112,500	566,637,500
17 Light House Project-Chennai,Tamilnadu				
Opening Balance	(44,418,834)		268,061,986	
Received during the year (From Centre)	126,720,000		253,440,000	
Received during the year (From State)	105,819,323		280,758,644	
Less: Amount Utilized during the year	190,301,340	(2,180,851)	846,679,464	(44,418,834)
18 Light House Project-Indore,Madhya Pradesh				
Opening Balance	151,218,649		264,811,429	
Received during the year (From Centre)	112,640,000		225,280,000	
Received during the year (From State)	382,480,000		100,000,000	
Less: Amount Utilized during the year	568,744,138	77,594,511	438,872,780	151,218,649
19 Light House Project-Lucknow,Uttar Pradesh				
Opening Balance	425,749,338		510,510,000	
Received during the year (From Centre)	114,400,000		228,800,000	
Received during the year (From State)	294,800,000		-	
Less: Amount Utilized during the year	700,260,695	134,688,643 _	313,560,662	425,749,338
20 Light House Project-Rajkot, Gujarat				
Opening Balance	180,566,000		464,958,900	
Received during the year (From Centre)	125,840,000		251,680,000	
Received during the year (From State)	335,841,600			
Less: Amount Utilized during the year	658,615,627	(16,368,027)	536,072,900	180,566,000
21 Light House Project-Ranchi, Jharkhand				
Opening Balance	333.877.435		221,760,000	
Received during the year (From Centre)	110,880,000		221,760,000	
Received during the year (From State)	72,378,500.00		40,320,000	
Less: Amount Utilized during the year	473,970,286.00	43,165,649	149,962,565	333,877,435
TOTAL		1,323,436,629		2,717,059,760
SCHEDULE 5- CURRENT LIABILITIES AND PROVISIONS	2022-	23	2021	-22

6,918,053	491,843
233,871	11,278,425
14,696,859	25,194,791
6,113,313	2,050,014
131,806,281	49,990,914
113,484,183	87,213,979
	3,873,600,000
2,552,587,958	2,552,587,958
254,932,431	223,601,903
316,233	15,191,643
	6,918,053 233,871 14,696,859 6,113,313 131,806,281 113,484,183 - 2,552,587,958 254,932,431 316,233

TOTAL



3,081,089,182

**Building Materials & Technology Promotion Council** Ministry of Housing & Urban Affairs, Government of India

# SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2023

Amount ( ₹ )

SCHEDULE 6- PROPERTY, P	PLANT & EQU	IPMENT						2022-23	2021-22
		GROSS	BLOCK			DEPRECIATION		NET BLOCK	NET BLOCK
	Cost as on 01.4.2022	Additions (upto 30.09.2022)	Additions (after 30.09.2022)	Total	Upto 01.04.2022	Current year	Upto 31.03.2023	As on 31.03.2023	As on 31.03.2022
Office Building including Land	34,319,817		•	34,319,817	15,932,825	1,838,699	17,771,524	16,548,293	18,386,992
Furniture and Fixtures	3,793,415			3,793,415	3,217,479	57,594	3,275,073	518,342	575,936
Office Equipments	20,541,225	10,899	37,977	20,590,101	19,165,428	210,853	19,376,281	1,213,820	1,375,797
Computers/ Peripherals	20,062,059	1,003,491	817,314	21,882,864	19,451,254	809,181	20,260,435	1,622,429	610,805
Software	458,000	-	-	458,000	133,200	129,920	263,120	194,880	324,800
Air conditioners	1,035,166		-	1,035,166	907,827	19,101	926,928	108,238	127,339
Fan & Coolers	81,224		-	81,224	69,834	1,709	71,543	9,681	11,390
TV and VCR	380,450	22,667	-	403,117	359,062	6,608	365,670	37,447	21,388
Exhibits, Panels, Display Models	12,084,905			12,084,905	11,770,450	47,168	11,817,618	267,287	314,455
	92,756,261	1,037,057	855,291	94,648,609	71,007,359	3,120,833	74,128,192	20,520,417	21,748,902
Previous Year (2021 -22)	91,958,008	446,400	351,853	92,756,261	68,061,868	2,945,491	71,007,359	21,748,902	23,896,140

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# Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

# SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2023

		Amount (₹_)	
SCHEDULE 7- NON CURRENT ASSETS	2022-23	2021-22	
Amount Recoverable from MoHUA for repayment of loan taken from HUDCO for National Urban Housing Fund under PMAY(U) Mission	200,000,000,000	200,000,000,000	
TOTAL	200.000.000.000	200,000,000,000	

S A	CHEDULE 8 - CURRENT ASSETS, LOANS, DVANCES ETC.	2022	-23	20	21-22
A.	CURRENT ASSETS:				
	1. Bank Balances				
	- Deposit with Canara Bank	226.538.883		248,801,413	
	-Sweep/ Deposit A/c with SBI	283,445,505		2,355,212,358	
	-Savings Accounts:				
	- Canara Bank	1,132,105		15,387,764	
	- State Bank of India	14,340,711		12,466,960	
	- State Bank of India(NUHF)	254,832,731		223,622,943	
	- State Bank of India(LHP)-Agartala	176,864,194		1,005,868	
	-State bank of india (ARHC)	646,085,799		101,801	
	-State bank of india (DHP)	35,679,760		154,110,001	
	- State Bank of India(LHP)-Chennai	19,630,962		10,000	
	- State Bank of India(LHP)-Indore	178,314,012		250,753,574	
	- State Bank of India(LHP)-Lucknow	115,401,170		1,008,796	
	- State Bank of India(LHP)-Rajkot	5,087,496		1,000,758	
	- State Bank of India(LHP)-Ranchi	23,273,133	1,980,626,461	10,000	3,263,492,236
в					
в.	1. Advances to staff		282,266		263,365
	2 Amount Recoverable from MoHUA under NUHF-Central Assistance from EBR under PMAY(U)		2,552,587,958		6,426,187,958
	3. Advances and other amounts recoverable in cash or in kind or value to be received				
	a. Amount Recoverable & other Advances	320,132		609,204	
	b. Amount Receivable from Ministry (Fee for site Scrutiny under PMAY (U) Mission			8,644,631	
	c. Amount Recoverable - Others	18,605,407		16,041,792	
	d. Security Deposit (Office Space)	420,000	26 488 961	420,000 6 673 453	32 389 080
	4. Interest Accrued on Sweep/ FDR's with Banks	1,110,122	8,208,501		6,633,417
	TOTAL (A + B)		4,568,194,147		9,728,966,056



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# Building Materials & Technology Promotion Council Ministry of Housing & Urban Affairs, Government of India

# SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON 31 MARCH 2023

		A	mount (₹)
SCHE	DULE 9- GRANTS/SUBSIDIES (Irrevocable Grants & Subsidies Received)	2022-23	2021-22
1	Central Government (Ministry of Housing & Urban Affairs, Government of India)	65,000,000	55,000,000
	TOTAL	65,000,000	55,000,000
SCHE	DULE 10 - FEES/SUBSCRIPTIONS	2022-23	2021-22
1	Training Programmes/Seminar Receipts/Demonstration Housing Projects/Navaritih	306,367	1,178,563
2	Fee for Site Scrutiny Under PMAY (U) Mission	1.640.229	8.031.000
3	Salary & Administration Expenses Apportioned (DHP's)	-	6,374,328
	TOTAL	1,946,596	15,583,891
SCHE	DULE 11- INCOME FROM PACS FEE, PUBLICATION ETC.	2022-23	2021-22
1	Receipts towards sale of publications, PACS etc	1,212,435	1,518,695
	TOTAL	1,212,435	1,518,695
SCHE	DULE 12- INTEREST EARNED	2022-23	2021-22
1	On Term Deposits With Scheduled Banks	12,578,740	16,200,253
2	On savings Accounts With Scheduled Banks	336,513	371,955
3	On Staff Advance	67,600	6,600
4	On Income Tax Refund	71,751	16,515
	TOTAL	13,054,604	16,595,323
SCHE	DULE 13- EXPENDITURE ON SALARY, ESTABLISHMENT & ADMINISTRATION	2022-23	2021-22
1	Pay and Allowances	66,450,530	56,565,254
2	Gratuity	350,000	3,650,000
3	Leave Travel Concession	1,185,627	2,148,822
4	Medical Expenses	2,775,490	3,673,701
5	Administration Expenses	10,168,182	9,227,757
	TOTAL	80,929,829	75,265,533
SCHE	DULE 14 - EXPENDITURE ON DISSEMINATION / SEMINARS/WORKSHOPS, TRAINING GRAMMES, HOUSING FOR ALL, ETC.	2022-23	2021-22
1	Exhibition and publicity	551,234	218,541
2	Seminar and Conference Expenses	435,894	317,019
3	Printing, Publication & Advertisement	556,850	660,731
4	Navaritih E-Course Expenses	218,141	295,122
5	Documentation, Sensitization & Capacity Building, Disaster Mitigation under Housing for All	1,732,591	1,130,556
6	Performance appraisal certification scheme	738,014	776,634
7	Building Materials & Construction Technologies/Disaster Mitigation & Manegment Activities	1,195,224	1,131,243
	TOTAL	5,427,948	4,529,846





**Building Materials & Technology Promotion Council** 

Ministry of Housing & Urban Affairs, Government of India

#### SCHEDULE 15: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS

#### Overview

Building Materials & Technology Promotion Council (BMTPC), established in 1990, is an autonomous grantin-aid organization of the Ministry of Housing & Urban Affairs, Govt. of India. BMTPC is mandated to promote and transfer cost-effective, environment-friendly, energy-efficient and emerging building materials and housing technologies including disaster resistant construction practices for large scale field application.

#### 1 Significant Accounting Policies-

- a) System of Accounting: The accounts have been prepared to comply with all material aspects with applicable principles in India and notified Accounting Standards.
- b) Property, Plant & Equipment: Fixed assets are stated at cost of acquisition less accumulated depreciation provided as per Income Tax Act 1961. All the fixed assets are recognized as per the rules and regulations as provided in the General Financial Rules, 1963, amended upto date.
- c) **Depreciation:** Depreciation is provided at written down values rates and in the manner as specified in the Income Tax Act 1961.

#### d) Government Grants:

(i) Government Grants received during the year are accounted in accordance with Accounting Standard 12 on 'Accounting for Government Grants' issued by ICAI.

(ii) Earmarked funds received for specific purpose are utilized for the purpose for which funds are received and the unspent balance of such funds are carried forward until fully utilized or refunded.

#### e) Retirement Benefits-

(i) The Council contributes to its own Provident Fund Trust which is recognized by the Income Tax authorities and the contributions paid during the year to Provident Fund Trust are charged to revenue.

(ii) The Council has taken Group Gratuity Cash Accumulation Policy and Group Leave Encashment Policy with Life Insurance Corporation of India for payment of Gratuity and Leave Encashment to employees on retirement. The premium paid to LIC is charged to revenue in the year of payment.

- f) **General:** Accounting policies not specifically mentioned are otherwise in consonance with generally accepted accounting practices.
- 2 Contingent Liabilities: Claims against the Council not acknowledged as debts NIL.
- 3 In opinion of the Management, the amount on realization of current assets, loans and advances in the ordinary course of business would not be less than the amount at which they are stated in the Balance Sheet. Further, provision for all known liabilities has been made in the accounts.
- 4 The Council is registered under sub clause (i) of clause (ac) of sub (1) of section 12A of the Income Tax Act
- 5 **Income and Expenditure:** Since there are large number of income and expenditure accounting heads, expenses and revenue of similar nature and falling under different Heads are clubbed together wherever required for better presentation of financial statements.
- 6 The Council has not paid any premium during the year in respect of Group Gratuity Cash Accumulation(GGCA) Policy and Group Leave Encashment Scheme(GLES) Policy.



- 7 a) Ministry of Housing & Urban Affairs vide letter no. N-11022/1/2018-HFA-III-UD (C. No. 9035628) dated 14.03.2018 conveyed to BMTPC the following: The Cabinet in its meeting held on 20.02.2018 has approved, inter-alia, the proposal of our Ministry as under:
  - Raising of funds through Extra Budgetary Resources (EBR) to the extent of Rs. 60,000 Crore through a lending agency or financial institution, over four years, for PMAY (Urban) projects, in consultation with the Ministry of Finance;
  - BMTPC to take loan on behalf of Government of India and disburse to the States / UTs and Central Nodal Agencies (CNAs), on the advice of the Ministry of Housing and Urban Affairs, for PMAY (Urban);
  - Government of India will amortize the loan and fulfill the repayment obligations at the agreed terms and conditions as decided by the Ministry of Finance.
  - b) In view of the above, the amount of principal and interest is to be met out of the funds allocated by the Ministry of Housing & Urban Affairs and there is the virtual certainty of the amount, the expected amount recoverable is shown as a separate asset i.e. Non-Current Asset and the loan received from NSSF/HUDCO is shown as Long-Term Liability in the Balance Sheet.
  - c) The principal and interest payable to the lenders on loans taken under National Urban Housing Fund (NUHF) for PMAY (Urban) program will be provided to the Council by the Ministry of Housing & Urban Affairs. The Interest on the loan borrowed on behalf of the Ministry will be paid from the receipts to be provided for this purpose by the Ministry on the due dates of Interest payment. Accordingly, the interest expenditure / income is not routed through Income & Expenditure Account but is shown as a current liability / current asset in the Financial Statements.
  - d) Interest earned on funds received from Ministry of Housing and Urban Affairs for various Light House Projects and National Urban Housing Fund is refundable to the Ministry. Accordingly the interest earned on these funds has been shown as a Liability due to Ministry of Housing and Urban Affairs(refer schedule 5current Liabilities and provisions)
- 8 Previous year figures have been rearranged & regrouped wherever required and all the above said information has been given by the management and relied upon by the auditors.
- <sup>9</sup> Schedules 1 to 15 annexed to form an integral part of financial statements for the year ended 31<sup>st</sup> March, 2023

As per our report of even date attached. For M S SEKHON & CO. **Chartered Accountants** FRN: 003671N HOA Rajiv Tandor Pankàj Gupta DAC **Finance Officer** Partner M.No.87343

Place: New Delhi Date: 22.09.2023 For Building Materials & Technology Promotion Council

Sharad Kumar Gupta Chief-Finance (I/C)

Dr. Shailesh Kr. Agrawal Executive Director
## **ANNEXURE I**

## PARTICIPATION IN PROMOTIONAL EVENTS

### I. EXHIBITION

- The Council participated in the "Indian Urban Housing Conclave" (IUHC) by putting up display of various activities of BMTPC in the exhibition. The "Indian Urban Housing Conclave" (IUHC) was organized by Ministry of Housing & Urban Affairs from October 19-21, 2022 at Rajkot, Gujarat. The IUHC was inaugurated by Hon'ble Prime Minister.

### II. WEBINARS/VIDEO CONFERENCES/TRAINING PROGRAMMES etc.

- A series of presentations for Post Graduate Students of Master of Planning (Housing) on the subject 'Materials & Technology' of SPA, New Delhi during April-May, 2022.
- Conference cum Training Programme on "Disaster Risks, Climate Change and Resilient Development" organised jointly by National Institute of Disaster Management and Delhi Technological University at New Delhi on April 5, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Ranchi, Jharkhand on April 6, 2022
- Technical Session on Emerging Technologies for Housing and Infrastructure for engineers, architects and planners of Engineers India Limited (EIL) through virtual mode on April 6, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Chennai, Tamil Nadu on April 13, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Agartala, Tripura on April 22, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Rajkot, Gujarat on May 4, 2022
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Ahmedabad on May 11, 2022

- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Indore, Madhya Pradesh on May 18, 2022
- Inauguration of Light House Project at Chennai and Handing of the key to beneficiaries by Hon'ble Prime Minister at Chennai on May 26, 2022
- 10<sup>th</sup> Batch of NAVARITIH: Certificate Course on Innovative Construction Technologies from May 27 to June 3, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Lucknow, Uttar Pradesh on June 3, 2022
- National Capacity Building Workshop for Architectural Students organised by NICEE (virtual) on June 23, 2022.
- National Workshop on Building Envelope for Thermally Comfortable Housing organised by CDRF, GIZ, Shakti, Greentech at New Delhi on June 24, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Ranchi, Jharkhand on June 30, 2022
- CSIR-CBRI i-Connect Programme on Emerging technologies through virtual mode on July 7, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Chennai, Tamil Nadu on July 14, 2022
- Architects Meet organised by Indian Institute of Architects at New Delhi on July 17, 2022
- One day online training programme on 'Thermal Comfort in Affordable Housing 'RACHNA' on 21<sup>st</sup> July, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Agartala, Tripura on July 29, 2022
- II<sup>th</sup> Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from July 29 to August 5, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Rajkot, Gujarat on August 18, 2022

- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Chennai, Tamil Nadu on August 28, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Indore, Madhya Pradesh on September 4, 2022
- One Day National Seminar organised by NDMA for consultation to develop a "Comprehensive National Seismic Risk Mitigation Programme" (CNERMP) held on September 16, 2022
- 2<sup>nd</sup> International Conference and Exhibition Augmenting Nature by Green Affordable New Habitat at New Delhi from September 14 to 16, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Lucknow, Uttar Pradesh on September 18, 2022
- World Habitat Day 2022 celebrations organized by the Ministry of Housing & Urban Affairs at Vigyan Bhawan, New Delhi on October 3, 2022
- Webinar on Use of Emerging Construction Systems in Light House Project (LHP) at Ranchi, Jharkhand on October 4, 2022
- Indian Urban Housing Conclave (IUHC) organised by Ministry of Housing & Urban Affairs in Rajkot, Gujarat from October 19-21, 2022
- I2<sup>th</sup> Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from October 28 to November 4, 2022
- Training Programme on "Project Formulation & Appraisal for Green, Affordable Housing" by ADB, CRDF & IIFL under the aegis of CEPT university at New Delhi on November 9, 2022
- 5 day Training Programme on Disaster Risk Reduction organised by NIDM and Kirori Mal College, North Campus, New Delhi on November 15, 2022
- I7<sup>th</sup> Symposium on Earthquake Engineering during the I75<sup>th</sup> year celebration of erstwhile University of Roorkee (now IIT, Roorkee) at Roorkee on November 18, 2022

- National Convention on "People Centric Urban Governance in India" organised by Indian Institute of Public Administration (IIPA), New Delhi on December 8, 2022
- International Conference on Cement, Concrete & Building Materials on "Moving Towards Net Zero Carbon Mission" organised by NCCBM at Manekshaw Centre, New Delhi, on December 9, 2022
- 14<sup>th</sup> GRIHA Summit 2022 :Towards Net Positive Habitats organised by TERI GRIHA on December 15, 2022
- On-site training to artisans, masons, bar benders, steel erectors & assemblers at LHP site, Agartala, Tripura on December 19, 2022
- Stakeholder Consultation on Implementation of ASHA India initiative under GHTC-India organised by MoHUA, GIZ and BMTPC on December 19, 2022 at New Delhi
- CSIR One Week One Lab Initiative by CSIR-CBRI, Roorkee, January 2023
- Hands-on training during Session on implementation of sandwich panel system & hybrid construction organised at LHP Indore site on January 4, 2023
- CSIR-CBRI Exhibition & Technical Session on Emerging Technologies on January 6, 2023
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Dimapur, Nagaland on January 10, 2023
- Regional & Sectoral Approaches towards DRR during Resilience & Sustainability Summit : Vision 2047 organised by National Institute of Disaster Management (NIDM) and Deptt. of Science & Technology from January 17-19, 2023
- Round Table discussion on Role of Thermal Comfort in India's Development Transition", at World Bank Office, New Delhi on January 23, 2023.
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Guwahati, Assam on January 24, 2023

- International Training Programme (MEA-ITEC) on 'Realizing the Right to Adequate Housing', organized by HUDCO's HSMI held on January 25, 2023
- 13<sup>th</sup> Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from January 20 to 27, 2023
- National Workshop on 'Development of a framework for Linking Corporates to strengthen SHG-led-Entrepreneurship Development' organised by NIRD-PR and M/o of Rural Development at New Delhi on February 8-9, 2023
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Jammu, J&K on February 9, 2023
- Role of Construction Technologies in achieving Housing for All during Post budget webinar on PMAY Urban & Rural organised by Ministry of Rural Development & MoHUA on February 27, 2023
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Tiruppur, Tamil Nadu on March 2, 2023
- 4<sup>th</sup> Stakeholder Meeting on Replicable Designs for Thermally Comfortable Affordable Housing organised by GIZ on March 16, 2023
- Capacity building programme for supervisors and artisans on the innovative technologies being used at Demonstration Housing Project (DHP) at Ayodhya, Uttar Pradesh on March 28, 2023
- 14<sup>th</sup> Batch of NAVARITHI: Certificate Course on Innovative Construction Technologies from March 30 to April 7, 2023
- I 50 training programmes under series of RACHNA I.0 & 2.0 (Resilient, Affordable, Comfortable Housing through National Action) programme organised by GIZ in association with MoHUA & BMTPC.

#### III. TECHNICAL COMMITTEE/ WORKING GROUPS / MEETINGS ETC.

32<sup>nd</sup> Annual General Meeting of IHC at New Delhi on May 11, 2022

- 15<sup>th</sup> Civil Service Day programme on 'Bringing Citizens & Govt. Closer' at New Delhi on April 20-21, 2022
- 61<sup>st</sup> meeting of the Central Sanctioning and Monitoring Committee (CSMC) for Pradhan Mantri Awas Yojana (Urban) chaired by Secretary, HUA on May 5, 2022
- 62<sup>nd</sup> Executive Committee meeting of BMTPC under the Chairmanship of Secretary, HUA at New Delhi on May 6, 2022
- Meeting under the Chairmanship of Addl. Secretary, DPIIT and Chairman, Committee on Circular Economy in Gypsum through VC on May 9, 2022
- 62<sup>nd</sup> meeting of the Central Sanctioning and Monitoring Committee (CSMC) for Pradhan Mantri Awas Yojana (Urban) chaired by Secretary, HUA on June 24, 2022
- 168<sup>th</sup> CPWD Day at New Delhi on July 12, 2022
- Review meeting of live progress of work of LHPs through Live Streaming by Hon'ble Prime Minister on July 20, 2022
- Meeting of NCRMP under the Chairmanship of AS(NI&A) reg.
  'Formulation of seismicity complaint Master Plans for the urban areas at New Delhi on August 18, 2022
- TERI Foundation Day celebration at New Delhi on August 23, 2022
- Meeting of Hindi Language Committee on BMTPC at New Delhi on August 26, 2022
- Leadership Development Programme for the Chairmen/Directors of Housing Cooperatives organized by National Cooperative Housing Federation at New Delhi on September 5-7, 2022
- 63<sup>rd</sup> meeting of the Central Sanctioning and Monitoring Committee (CSMC) for Pradhan Mantri Awas Yojana (Urban) chaired by Secretary, HUA on September 14, 2022
- Meeting of Standing Committee on GeM (SCoGeM- under the Chairmanship of Secretary (HUA) at New Delhi on September 27, 2022

- eITEC Program 'Housing for Sustainable Habitats- Policy, Planning, Design & Construction technologies' organized by HUDCO at new Delhi on October 10-12, 2022
- Coordination meeting for Resilience & Sustainability Summit, Vision 2047 organised by UNDP at New Delhi on October 31, 2022
- 64<sup>th</sup> meeting of the Central Sanctioning and Monitoring Committee (CSMC) for Pradhan Mantri Awas Yojana (Urban) chaired by Secretary, HUA on November 18, 2022
- Trainer's Development Strategy meeting organised by NIDM through VC on November 28, 2022
- Buyer seller meet organised by NAREDCO, Gurugram on November 29, 2022
- Meeting of the Standing Committee of Parliament of Urban Development on November 30, 2022
- 63<sup>rd</sup> Meeting of Executive Committee of BMTPC under the Chairmanship of Secretary (HUA) at Nirman Bhawan, New Delhi on December 5, 2022
- Meeting on Urban Services & Climate Change at IIPA, New Delhi on December 6, 2022
- Panel discussion on National Mission for Sustainable Habitat by NCCBM at New Delhi on December 9, 2022
- National Energy Conversation Day organised by Bureau of Energy Efficiency at New Delhi on December 14, 2022
- Review meeting taken by JS (Coord. & PG) to review the Public Grievance (PG) at New Delhi on December 26, 2022
- LHP review meeting Chaired by Secretary, HUA at New Delhi on January 20, 2023
- 65<sup>th</sup> meeting of the Central Sanctioning and Monitoring Committee (CSMC) for Pradhan Mantri Awas Yojana (Urban) chaired by Secretary, HUA on February 27, 2023

- 3<sup>rd</sup> session of the NPDRP with the theme 'Building Local Resilience in a Changing Climate at New Delhi on March 10-11, 2023

#### IV. OTHERS

- Providing guidance to students from SPA, Delhi, IIT Delhi & students from other colleges, professionals, Entrepreneurs on New & environmental friendly building materials/ technologies, and sustainability parameters (embodied energy, thermal comfort, resource conservation & efficiency) of the buildings using different technologies.
- Representing in "High Powered Expert Committee (HPEC) on Gainful Utilization of Overburden in Coal Sector held under the Chairmanship of JS (BPP), Ministry of Coal.
- A Study on "Housing: Challenges and Way Forward" by Indian National Academy of Engineers (INAE) was completed and published. Prepared chapters on 'Housing Scenario in India' and 'Concepts and Technologies for Housing'.
- Prepared inputs on Joint Action Plan (JAP) between India and EU on Partnership for Smart & Sustainable Urbanization which included Technical Cooperation and sharing of scalable new green building materials and construction technologies, Facilitation for technology transfer, Information exchange, common expertise development, Organization of Webinars/ Seminar/ Exhibition etc.
- Entered into a MoU between BMTPC and Indian Institute of Architects – Northern Chapter to work jointly for promotion and dissemination of new and emerging technologies amongst practicing architects and other professionals through training programmes/ interactive sessions/ field visits/ studies etc.

### **ANNEXURE II**

### PAPERS PRESENTED/PUBLISHED INCLUDING PRESENTATIONS MADE

- Presentation on Emerging Construction Systems for Mass Housing during 10<sup>th</sup> Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from May 27 to June 3, 2022
- Presentation on Emerging Construction Systems for Mass Housing during Seminar on "Contribution of Construction Industry in Building of Independent India" organised by Indian Building Congress at New Delhi on March 30, 2022
- Presentation on Emerging Construction Systems for Mass Housing during National Capacity Building Workshop for Architectural Students organised by NICEE (virtual) on June 23, 2022
- Presentation on Emerging Construction Systems for Mass Housing during National Workshop on Building Envelope for Thermally Comfortable Housing organised by CDRF, GIZ, Shakti, Greentech at New Delhi on June 24, 2022
- Presentation on Emerging Construction Systems for Mass Housing during Architects Meet organised by Indian Institute of Architects at New Delhi on July 17, 2022
- Presentation on Emerging Construction Systems for Mass Housing during 11<sup>th</sup> Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from July 29 to August 5, 2022
- Presentation on Emerging Construction Systems for Mass Housing during Series of RACHNA (Resilient, Affordable, Comfortable Housing through National Action) programme organised by GIZ in association with MoHUA & BMTPC
- Paper on Next Generation Construction Technologies published in the special issue of Newsletter of NCHF, October, 2022.

- Presentation on Emerging Construction Systems for Mass
  Housing during 12th Batch of NAVARITIH : Certificate Course
  on Innovative Construction Technology organised from October
  28 to November 4, 2022
- Presentation on Emerging Construction Systems for Mass Housing during Training Programme on "Project Formulation & Appraisal for Green, Affordable Housing" by ADB, CRDF & IIFL under the aegis of CEPT university at New Delhi on November 9, 2022
- Presentation on Vulnerability Atlas of India during 5 day Training Programme on Disaster Risk Reduction organised by NIDM and Kirori Mal College, North Campus, New Delhi on November 15, 2022
- Presentation onVulnerabilityAtlas of India during 17th symposium on Earthquake Engineering during the 175th year celebration of erstwhile University of Roorkee (now IIT, Roorkee) at Roorkee on November 18, 2022
- Presentation on Emerging Construction Systems for Mass Housing during National Convention on "People Centric Urban Governance in India" organised by Indian Institute of Public Administration (IIPA), New Delhi on December 8, 2022
- Presentation on Emerging Construction Systems for Mass Housing during International Conference on Cement, Concrete & Building Materials on "Moving Towards Net Zero Carbon Mission" organised by NCCBM at Manekshaw Centre, New Delhi, on December 9, 2022
- Presentation on Emerging Construction Systems for Mass Housing during 14th GRIHA Summit 2022 :Towards Net Positive Habitats organised by TERI GRIHA on December 15, 2022
- Presentation on Overview of Govt's Initiatives under GHTC-India during Stakeholder Consultation organised by GIZ and BMTPC on December 19, 2022 at New Delhi
- Paper on NewAge Construction Systems published in Proceeding on Innovative and Sustainable Materials & Technologies – A CSIR One Week One Lab Initiative by CSIR-CBRI, Roorkee, January 2023

- Presentation on Disaster Mitigation and Management Vulnerability Atlas of India Regional & Sectoral Approaches towards DRR during Resilience & Sustainability Summit :Vision 2047 organised by National Institute of Disaster Management (NIDM) and Deptt. of Science & Technology from January 17-19, 2023
- Presentation on Emerging Construction Systems for Mass Housing during 13th Batch of NAVARITIH : Certificate Course on Innovative Construction Technology organised from January 20 to 27, 2023
- Presentation on Emerging Construction Systems for Mass Housing and Role of Construction Technologies in achieving Housing for All during Post budget webinar on PMAY Urban & Rural organised by Ministry of Rural Development & MoHUA on February 27, 2023
- Presentation on Emerging Construction Systems for Mass Housing during Online Training Programme on "New & Emerging Technologies in Construction Industry" organised by National CPWD Academy Ghaziabad on February 8, 2023
- Presentation on Emerging Construction Systems for Mass Housing during 4th Stakeholder Meeting on Replicable Designs for Thermally Comfortable Affordable Housing organised by GIZ on March 16, 2023
- A series of presentations for Post Graduate Students of Master of Planning (Housing) on the subject 'Materials & Technology' of SPA, New Delhi during April 2022

# **ANNEXURE III**

# PUBLICATIONS BROUGHT OUT DURING THE YEAR

- Special Issue of Newsletter "Nirman Sarika" on the theme of World Habitat Day 2022 "Mind the Gap. Leave No One and No Place Behind"
- Booklet on Piloting Innovative Technologies through Demonstration Construction
- Compendium of Light House Project Chennai, Tamil Nadu
- Compendium of Light House Project Rajkot, Gujarat



#### **Building Materials and Technology Promotion Council**

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