

2018-2019



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

BLOCK-A

# Annual Report 2018-2019



#### **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

I have great pleasure in presenting the Twenty-ninth Annual Report of the Building Materials & Technology Promotion Council for the year 2018-2019, an autonomous organization under Ministry of Housing & Urban Affairs, Govt. of India.

BMTPC is in its 29<sup>th</sup> year of service to nation with a commitment to promote sustainable building materials and construction systems. In this journey of promotion of innovative systems other than conventional brick & mortar/RCC framed construction, BMTPC has to align with the aspirations of the nation with rejuvenated efforts several times so as to bring paradigm shift in use of innovations in the construction sector. Also, during the implementation of Pradhan Mantri Awas Yojana-Urban (PMAY(U)) since June 2015, the quest to bring alternate and emerging construction systems from around the globe which can not only fast track delivery of quality sustainable houses but also comply with structural, functional and safety norms stipulated in Indian Standards gained importance. Further, in order to accomplish the ardent task of providing affordable housing, the best construction practices which are time tested and proven elsewhere need to be identified, studied, evaluated & certified so that they can be straightway be transplanted to suit Indian geo-climatic conditions. In the process, BMTPC has identified, evaluated and certified a number of emerging construction systems for mass housing. There has been good response from public and private agencies and State Governments and these new systems are being now slowly picked up and used in construction projects.

In order to transfer technical know-how for field level application, BMTPC is constructing 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. The construction work of Demonstration Housing Project at Nellore, Andhra Pradesh; Bhubaneswer, Odisha; Biharshariff, Bihar; Aurangaband Jagir, Lucknow, Uttar Pradesh; and Hyderabad, Telangana has been completed. NHB and DFID have also become partners with BMTPC in demonstration housing projects being implemented in three States namely Odisha, Bihar & Uttar Pradesh and providing major financial support. During implementation, the state level sensitization programmes & workshops were also organized along with hand-holding of State engineers so that emerging technologies can be mainstreamed.

Through Gazette Notification (No. I-16011/5/99 H-II in the Gazette of India No. 49 dated December 4, 1999), to promote innovation in the construction sector, BMTPC has been evaluating and certifying prospective construction systems & new materials and products. During the year, emerging technologies namely, Continuous Sandwich (PUF) Panels with Steel Structure, Nano Living System Technology, PIR Dry Wall Pre-fab Panel System, Robomatic Hollowcore Concrete Wall Panels, BauPanel System, Flyash EPS (Beads) Cement Sandwich Panels, Stay-in place PVC Wall Forms, K-Wall Panel, Precast Construction Technology and V-Infill Walls have been awarded certificate under the Performance Appraisal Certification Scheme (PACS) of BMTPC and a number of products/systems are being evaluated. The Council has prepared 3<sup>rd</sup> edition of Compendium of Prospective Emerging Technologies covering 24 emerging technologies. Till date, BMTPC has issued Performance Appraisal Certificates (PAC) to 62 products/systems covering various items. With the efforts of the Ministry and BMTPC, CPWD has issued specifications and schedules of rates of number of emerging technologies.

BMTPC has been proactively supporting and working as a technical resource institution for Ministry of Housing & Urban Affairs Mission schemes and extending its technical support for appraising, monitoring, review of Third Party Inspection & Monitoring (TPIM) and handholding of ULBs under PMAY(U), etc. The Ministry of Housing & Urban Affairs has set up a Technology Sub-Mission under Pradhan Mantri Awas Yojana (Urban) - Housing for All Mission which is working on promotion and large scale adaption of new construction technologies and alternate building materials by the State Govts. in collaboration with IITs and NITs. BMTPC is working as secretariat of the Technology Sub-Mission.The Council has been designated as one of the agencies for scrutiny of the projects received under Housing for All (Urban) from various States. BMTPC has also been entrusted with the task of educating ULBs & beneficiaries regarding earthquake resistant design and construction specifically for States and regions falling in high seismic zone i.e. IV &V under PMAY(U). BMTPC also provided technical support in organization of Global Housing Technology Challenge – India (GHTC-India). Under GHTC-India proven innovative and alternate construction technologies along with future potential sustainable technologies have been shortlisted. BMTPC, as convenor of the Technical Evaluation Committee, pursued and prepared technical details of Proven Technology Providers. The proven technologies will be showcased through execution of Light House Projects (LHPs) across six States. These LHPs will act as live laboratories to establish innovative and green construction practices across India and will help in sustainable construction.

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 are being 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 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. BMTPC is committed to promote the proactive approach towards it and has been in the forefront in educating professionals and creating mass awareness amongst various stakeholders including common man. BMTPC brought out the digital version of the third edition of Vulnerability Atlas of India which was released by Hon'ble Prime Minister of India, on the occasion of Global Housing Technology Challenge - India (GHTC-India), Construction Technology India 2019 Expo-cum-Conference on March 2, 2019 at New Delhi. Hon'ble Prime Minister, while releasing the Atlas, emphasized the need to formulate & implement various schemes of the Central & State Governments keeping in view the vulnerability of the region & indicative risk assessment as given in Vulnerability Atlas of India and suitable provisions should also be included in the tender documents. E-Course on Vulnerability Atlas of India has also been conceptualized jointly with School of Planning & Architecture, New Delhi and will be launched shortly.

Like preceding years, on the occasion of World Habitat Day 2018, the Council brought out the Special Issue of "Nirman Sarika" on the theme "Municipal Solid Waste Management" chosen by the UN-Habitat for the year and organized a painting competition for Differently Abled Children and the winners were felicitated during the World Habitat Day celebrations.

In order to strengthen the knowledge base in the construction sector, the Council has brought out a number of publications during the year namely, Ready Reckoner for Utilization of Recycled Produce of C&D Waste, Third Edition of Compendium of Prospective Emerging Technologies for Mass Housing, Guidebook for Concreting Artisans (in Hindi), Manual on Waterproofing of GFRG / RAPIDWALL Buildings, Book on "Sustainable Building Technologies", Revised Pocket book on Emerging Construction Systems and GFRG/Rapidwall Construction Manual. 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.

It is my privilege to acknowledge the valuable guidance, support and encouragement received from the President (Hon'ble Minister of Housing & Urban Affairs) and Members of the Board of Management, the Chairman (Secretary, Ministry of Housing & Urban Affairs) and Members of the Executive Committee, 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, MOS&PI, DST, CSIR, IITs, CEPT, IPIRTI, CBRI, SERC, ICI, IIHRD, SEP, SPA, HUDCO, BIS, NHB, NCHF, HPL, CGEWHO, CPWD, NSIC, CIDC 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 of the Ministry of Housing & Urban Affairs, Govt. of India. BMTPC with a mandate to promote cost-effective, environment-friendly, energy-efficient and emerging building materials and construction technologies including disaster resistant construction practices for field application. BMTPC also provides S&T support to the Ministry in the area of building materials & construction technologies and disaster mitigation & management.

In order to meet its objectives, BMTPC initiated several multi-faceted activities enshrined in the mandate of the Council so as to create enabling environment for sustainable building construction. Over the years, the Council has been striving to promote innovative, cost-effective, environment-friendly and energy-efficient alternate building materials and technologies at grass-root level. The Council has also embarked upon the field level application of these materials and technologies through demonstration construction of model demonstration houses including other structures in different parts of India. In its technology development, promotion and dissemination efforts, the Council has promoted various technologies for use in housing and building construction including bamboo based housing solutions. The Council also constructed demonstration structures in the North Eastern Region and helped in setting up Bamboo Mat Production Centres to make available the bamboo mats for the production of bamboo mat related products such as corrugated sheets, bamboo boards, etc. helping in skill development and employment generation.

The Council in recent years has reoriented its approach towards promotion of not only sustainable technologies through identification, evaluation & dissemination but also propagating emerging industrialised housing systems from within the country and abroad for affordable mass housing. The Council is working towards bringing various emerging technologies, which are successful elsewhere in the world, to bring resource efficiency, economy, quality, environmental protection and speed in housing construction.

BMTPC is actively involved in disaster mitigation activities and working in close liaison with NDMA, NIDM and other 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 based on 2011 census data in 2019. Besides, the Council regularly publishes valuable guidelines/ manuals on disaster resistant construction. In order to create awareness regarding earthquake resistant design and seismic retrofitting, the Council has undertaken retrofitting of few buildings and organised training programmes for professionals.

Housing for All (Urban) Mission is being implemented by the Ministry of Housing & Urban Affairs. BMTPC is working as Secretariat of the Technology Sub-Mission under Pradhan Mantri Awas Yojana (Urban) Mission set up by the Ministry. 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. The Council is providing technical support to various State Govts. and other agencies in promotion and adoption of emerging technologies for mass housing. BMTPC is also extending its technical support in the Global Housing Technology Challenge - India (GHTC-India), launched by the Ministry of Housing & Urban Affairs, Government of India. The GHTC-India has three components: (i) Conduct of biennial Expo-cum-Conference namely Construction Technology India (CTI), (ii) Identifying Proven Demonstrable Technologies from across the globe to construct Light House Projects (LHPs), and (iii) Promoting potential technologies through establishment of Affordable Sustainable Housing Accelerators (ASHA-India) for providing incubation and accelerator support.

A National Urban Housing Fund (NUHF) has been created in BMTPC which is aggregating loans from lending agencies / financial institutions. Funds raised through Extra Budgetary Resources (EBR) for NUHF are being 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) is also being operationalised by BMTPC under PMAY(U) for monitoring, data analysis, compilation & dissemination, generation of periodic reports in electronic form, and other related ICT activities.

### **Objectives**

- 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**

- 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 mass application 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, exhibitions nationally as well as internationally.
- Promoting disaster resistant construction technologies.
- 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 Hous-

ing 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

BMTPC has a three-tier system for discharging its administrative and technical duties with fol-

#### Board of Management (as on 31.3.2019)

lowing verticals:

- i. Board of Management headed by Hon'ble Minister of Housing & Urban Affairs
- ii. Executive Committee headed by Secretary, HUA
- iii. Executive Director

The Board of Management of the Council consists of 16 Members from various Ministries and related organizations. The Executive Committee consists of 9 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 given hereunder:

S. No.	Members	
1	Shri Hardeep S Puri	
	Hon'ble Minister of State (I/C) for Housing & Urban Affairs, Government of India	President
2	Shri Durga Shanker Mishra	
	Secretary	Vice-President
	Ministry of Housing & Urban Affairs, Government of India	
3	Shri Ashok Kr. Jain	Member
	Senior Advisor (RD & HUA)	
	NITI Aayog, Government of India	
4	Dr. M. Ravi Kanth	Member
	Chairman & Managing Director	
	Housing & Urban Development Corporation	
5	Dr.Arun Kumar Panda	Member
	Secretary, Ministry of Micro, Small & Medium Enterprises, Government of India	
6.	Prof.Ashutosh Sharma	Member
	Secretary, Ministry of Science & Technology, Government of India	
7	Dr. Inderjeet Singh	Member
	Secretary, Ministry for the Development of North Eastern Region, Government of	
	India Di Kata	
8	Shri R.K. Jain	Member
	Secretary	
-	National Disaster Management Authority, Government of India	
9	Dr. Shekhar C. Mande	Member
	Director General	
10	Council of Scientific & Industrial Research Government of India	
10	Shri Prabhakar Singh	Member
	Director General	
	Central Public vvorks Department	
11	Government of India	Manahan
11	Prot. N.IN. Satyanarayana	Member
	Director	
	Indian insulute of rechnology (IIT) Trupati	

S. No.	Members			
12	Prof. Sudhir K. Jain	Member		
	Director			
	Indian Institute of Technology (IIT) Gandhinagar			
13	Shri Shiv Das Meena	Member		
	Addl. Secretary (Housing)			
	Ministry of Housing & Urban Affairs, Government of India			
14	Ms. Jhanja Tripathy	Member		
	Joint Secretary & FA,			
Ministry of Housing & Urban Affairs, Government of India				
15	Shri Amrit Abhijat	Member		
	Joint Secretary & Mission Director (HFA)			
	Ministry of Housing & Urban Affairs, Government of India			
16	Dr. Shailesh Kr. Agrawal	Member Secretary		
	Executive Director,			
	Building Materials & Technology Promotion Council			

### **Executive Committee**

### (as on 31.3.2019)

S. No.	Members	
I	Shri Durga Shanker Mishra	Chairman
	Secretary	
	Ministry of Housing & Urban Affairs, Government of India	
2	Shri Shiv Das Meena	Member
	Addl. Secretary (Housing)	
	Ministry of Housing & Urban Affairs, Government of India	
3	Ms. Jhanja Tripathy	Member
	Joint Secretary & FA,	
	Ministry of Housing & Urban Affairs, Government of India	
4	Shri. Amrit Abhijat	Member
	Joint Secretary (HFA)	
	Ministry of Housing & Urban Affairs, Government of India	
5.	Dr. M. Ravi Kanth	Member
	Chairman & Managing Director,	
	Housing & Urban Development Corporation	
6.	Dr. N. Gopalakrishnan	Member
	Director	
	Central Building Research Institute, Roorkee	
7.	Prof. Pradipta Banerji	Member
	Head, Centre for Urban Science & Engineering	
	Deptt. of Civil Engineering, IIT Bombay	
8.	Shri J.S. Gopinath	Member
	Director & Chief Architect	
	JSKM Architecture, Hyderabad	
9.	Dr. Shailesh Kr. Agrawal	Member - Secretary
	Executive Director,	
	Building Materials & Technology Promotion Council	

### MAJOR INITIATIVES AND ACTIVITIES DURING THE YEAR 2018-2019

### I. MODEL DEMONSTRATION CONSTRUCTION USING EMERG-ING TECHNOLOGIES

### I. Demonstration Housing Projects using Emerging Technologies in different parts of the country

The Council has been disseminating proven and emerging building materials & technologies in different regions of the country through identification, evaluation, standardization, certification, capacity building and field level application of such technologies. The council, during recent past, has constructed a number of demonstration houses in various parts of the country. The efforts of the Council have helped in building up confidence and acceptability of proven and emerging technologies in public & private construction agencies, professionals etc.

BMTPC is also constructing Demonstration Housing Projects in different parts of India using emerging technologies with the objective of spreading awareness about new technologies and disseminate technical know-how in the states under the Pradhan Mantri Awas Yojana (Urban) – Housing for All Mission. The Council last year completed two Demonstration Housing Projects (DHPs) at Nellore, Andhra Pradesh and Bhubaneswar, Odisha comprising of 36 DUs and 32 DUs in August, 2016 and December 2017 respectively. The status of the other projects in various States are given below:

## (a) Demonstration Housing Project at Biharshariff, Bihar

BMTPC completed construction of 36 Demonstration Houses (G+2) using emerging technology i.e. Monolithic Construction with Structural Stay-in-Place CR Steel Specially Designed Formwork System (Coffor). In response to proposal of the Ministry of Housing & Urban Affairs, Govt. of India to partner the Demonstration Housing Project in the State, the Govt. of Bihar designated Biharsharif Nagar Nigam as nodal agency for the demonstration project. The land measuring 1350 sqm. was allotted for the demonstration project in Biharsharif by local administration. The technology, plan, sections, layout plan of Demonstration Housing Project was finalised in discussion with Biharsharif Nagar Nigam.

Besides Pradhan Mantri Awas Yojana (Urban), the other Partnering & Funding agencies for the project are Department For International Development (DFID) & National Housing Bank (NHB). DFID and NHB is working on "Making affordable housing market work for faster & sustained economic growth" in eight identified low income States in India and one of the strategies is to test innovative technologies and approaches for Green construction. Under this strategy, NHB and DFID have become partners with BMTPC in demonstration housing project implemented in Biharsharif and provided partial financial support.

The project also includes on-site infrastructure work such as internal road, pathways, boundary wall, septic tank, external electrification and water supply work, horticulture work, drainage & disposal, etc.

The details of the project are as follows:

#### **Project Profile**

- Number of Houses 36 (G+2)
- Carpet area of each unit : 29.67 sqm.



Demonstration Houses (36 DUs) constructed using Coffer Structural Stay in Place Formwork System at Bihar Shariff, Bihar



- Built area of each unit including common area : 45.54 sqm.
- Each residential unit consists of a multipurpose room, a bedroom, kitchen, separate bathroom and W.C.
- Includes Earthquake Resistant Features.

### Technologies/Specifications for Demonstration Houses

Foundation

 RCC column foundation (isolated footings)

Wall/Slab/Roof

- Structural Stay-in-Place CR Steel Specially Designed Formwork System (Coffor) for walls (load bearing) with plaster on both sides
- RCC Slab

Door frames

- Pressed Steel Door Frame instead of wood
- Flush door shutters as wood substitute

- PVC door frame & shutter in toilet Window frames
- MS Section window frame with guard rail and glazed shutter
- Flooring
- Ceramic tile flooring in rooms
- Ceramic tile flooring in WC & Bath
- Kota stone in passage

#### Kitchen Counter

- RCC cooking counter top with marble *Staircase*
- RCC staircase with kota stone flooring Wall finishes
- Acrylic distemper on internal wall surface
- Weather resistant paint on external wall surface

#### Others

Pathways with concrete pavers

The project has been completed and is ready to

be handed over to the State Government. The project has evinced interests amongst construction fraternity and the project has already been visited by number of professionals, entrepreneurs and developers.

### (b) Demonstration Housing Project at Aurangabad Jagir, Lucknow

State Urban Development Agency (SUDA), Lucknow had allotted 0.385 hectare of land at Aurangabad Jagir, Tehsil Sarojini Nagar, Lucknow for undertaking the Demonstration Housing Project. Based on the discussions held with SUDA, the emerging technology and the Plan, Sections and Layout Plan of Demonstration Housing Project was finalised. The demonstration housing project consisting of 40 Demonstration Houses (G+1) has been constructed using emerging technology Stay in Place EPS based Double Walled Panel System (Sismo).



Demonstration Houses (40 DUs) constructed using Stay in Place EPS based double walled panel System at Aurangabad Jagir, Lucknow, Uttar Pradesh



Demonstration Housing Project at Aurangabad Jagir, Lucknow, Uttar Pradesh

The DHP has been undertaken as part of PMAY(U). The are other Partnering & Funding agencies i.e. Department For International Development (DFID) & National Housing Bank (NHB).

The onsite infrastructure development works include landscaping, pavements with interlocking tiles, Boundary Wall, Septic Tank, water supply, sewerage, external electrification, Drainage, Tube well, etc.

The details of the project are as follows:

### **Project Profile**

- No. of houses : 40 (G+1)
- Carpet area of each unit : 26.40 sqm.
- Built up area of each unit including common area : 42.98 sqm.
- Each Unit consists of One living room, one bedroom, kitchen, Bath and WC.
- Includes Earthquake Resistant Features.

### Technologies/Specifications for Demonstration Houses

#### Foundation

 RCC column foundation (isolated footings)

#### Wall/Slab/Roof

 Stay in Place EPS based Double Walled Panel System (Sismo) for wall(load bearing)/slab/roof

Door frames

- Pressed Steel Door Frame instead of wood
- Flush door shutters as wood substitute
- PVC door frame & shutter in toilet Window frames
- MS Section window frame with guard rail and glazed shutter

Flooring

- Ceramic tile flooring in rooms
- Ceramic tile flooring in WC & Bath
- Kota stone in passage
- Kitchen Counter
- RCC cooking counter top with marble *Staircase*
- RCC staircase with kota stone flooring Wall finishes
- Acrylic distemper on internal wall surface

• Weather resistant paint on external wall surface

The project has been completed and is ready to be handed over to the State Government.

### (c) Demonstration Housing Project at Hyderabad, Telangana

Telengana State Housing Corporation Limited (TSHCL), Hyderabad had allotted 1085 sq.mts. of land at Nirmithi Kendra, Gachibowli, Hyderabad for the Demonstration Housing Project. Based on the discussions held with the officials of TSHCL the Plan, Sections and Layout Plan of Demonstration Housing Project was finalised.

In order to demonstrate different emerging technologies, the Council constructed, two blocks for 32 Demonstration Houses (G+3)

using two different technologies i.e (i) Monolithic construction with structural stay in place CR steel specially designed formwork system (16 houses) and (ii) Light Gauge Steel Framed Structure (16 houses) under this project as part of PMAY(U).

The project also includes on-site infrastructure work like internal road, pathways, Septic tank, external electrification and water supply work, horticulture work, drainage & disposal, etc.

The details of the project are as follows:

#### **Project Profile**

- No. of houses : 32 (G+3)
- Carpet area of each unit : 38.74 sqm. and 39.50 sqm.
- Built up area of each unit including common area : 53.18 sqm. and 53.10 sqm.



Demonstration Houses constructed using Coffer Structural Stay in Place Formwork System (16 houses) and Light Gauge Steel Frame System (16 houses) at Gachibowli, Hyderabad, Telangana

- Each Unit consists of One living room, two bedroom, kitchen and two Bath with WC.
- Includes Earthquake Resistant Features.

### Technologies/Specifications for Demonstration Houses

Foundation

- RCC column / Coffor wall foundation Wall/Slab/Roof
- Structural stay in place CR steel specially designed formwork system
- Light Gauge Steel Framed Structure (LGSFS)
- RCC Beam / LGSFS slab
- Door frames
- Pressed Steel Door Frame instead of wood
- Flush door shutters as wood substitute
- PVC door frame & shutter in toilet Window frames
- MS Section window frame with guard rail and glazed shutter

#### Flooring

- Ceramic tile flooring in rooms
- Ceramic tile flooring in WC & Bath
- Kota stone in passage

#### Kitchen Counter

- RCC cooking counter top with marble *Staircase*
- RCC staircase with kota stone flooring Wall finishes
- Acrylic distemper on internal wall surface
- Weather resistant paint on external wall surface

The project has been completed and is ready to be handed over to the State Government.

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

A Technical Group, comprising of State Representatives, Engineers from local bodies and academicians has been constituted to monitor the progress of Demonstration Housing Proj-

ects (DHP) and also to propagate the emerging technologies used in the projects. During the year, Technical Group meetings were conducted at following DHP sites being implemented by BMTPC:

- a) Lucknow, Uttar Pradesh held on May 9, 2018
- b) Biharshariff, Bihar held on May 4, 2018 and January 1, 2019
- c) Hyderabad, Telangana held on May 15, 2018 and November 20, 2018.

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

Following Institutions were involved for evaluation and documentation of Demonstration Housing Projects and submitted their reports of the respective DHPs:

- a) IIT Kanpur for Lucknow
- b) IIT Hyderabad for Hyderabad
- c) IIT Roorkee for Biharshariff

As per the evaluation reports submitted by the above Institutions, 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.

### 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 appraisal and monitoring agency under Pradhan Mantri Awas Yojana (Urban) for projects in various States/UTs falling in Earthquake Zone IV and Zone V and undertake TPIM review and capacity building of functionaries of state 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. DPR for construction of 1794 New DUs under beneficiary led Construction at Tuensang Town, Nagaland on April 26, 2018.
- DPR for Construction of 1146 Enhancement DUs under Beneficiary Led Construction at Wokha Town Nagaland on April 26, 2018.
- 3. DPR for 270 DUs under Beneficiary led Construction at Chinyalisaur, Uttarakhand on June 22-23, 2018.
- 4. DPR for 1093DUs under Beneficiary led Construction at Srinagar, Jammu & Kashmir on August 18-19, 2018.
- 5. DPR for 92 DUs under Beneficiary led Construction at Jammu, Jammu & Kashmir on August 20-21, 2018
- DPR for construction of New DUs under beneficiary led Construction at 64 Town, Arunachal Pradesh on 18-19 September, 2018.

- Site Scrutiny along with DPR Desk Scrutiny of project of 64 DUs in Longding city, Arunachal Pradesh under BLC vertical of PMAY (U) 31 August - 2 September, 2018
- DPR for construction of 4224 New DUs under beneficiary led Construction at Agartala Town, Tripura on 24 & 25 September, 2018.
- Site Scrutiny along with DPR Desk Scrutiny of project of 2203 DUs in Lilong (Thoubal) Municipal Council, Imphal city Manipur under BLC vertical of PMAY (U) October 10-12, 2018
- Site Scrutiny along with DPR Desk Scrutiny of project of 291 DUs in Bokolia Town, Assam under BLC vertical of PMAY (U) 26 -27 November, 2018.
- DPR Desk Scrutiny of project of 402 DUs New Construction in Tura Town, Meghalaya under BLC vertical of PMAY (U), November 26-27, 2018
- DPR for construction of Enhancement (121 DUs) under beneficiary led Construction (Enhancement) at Jammu Town, J&K, 18-19 December, 2018
- DPR-IX of Srinagar City for 2566 beneficiaries under BLC-New House Construction", Jammu & Kashmir, 15 to 17 December, 2018
- 14. DPR for construction of 13,715 New Houses under Beneficiary led Construction vertical of PMAY-HFA(U) for Imphal Municipal Corporation, Imphal, Manipur, 22 to 23 February, 2019

### Random Quality check/ Monitoring of project under Rajiv Awas Yojana (RAY)

I. In-situ redevelopment of Sakharnagar slum for construction of 1448 DUs in

Akoda Tandaja area,Vadodara (Gujarat) on 14 June 2018.

- In-situ redevelopment, construction of 1776 DUs near Mansarover lake area, north Palanpur (Gujarat) on 13 June 2018.
- Construction of 960 DUs in Surendranagar City Mansarover lake area, north Palanpur (Gujarat) on 12 June 2018.
- Affordable Housing in Partnership (AHP) for EWS (1652 DUs) & LIG (812 DUs) at 4 locations in AUDA area, Ahmedabad (Gujarat) on 15 June 2018.
- 5. Construction of 256 Houses & Infrastructure at Palin, Arunachal Pradesh on 28 August, 2018.

### **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 assist States/Cities in deploying disaster resistant and environment friendly technologies in collaboration with IITs/ NITs/SPAs. BMTPC is working as 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, BIS and state departments to come out with notifications, circulars, SORs, specifications etc. which will authorize State Governments to use these new construction technologies in housing projects.

In consultation with BMTPC, CPWD has approved 16 new and emerging technologies for adoption in CPWD works for the benefit of all users vide OM No. 133/SE(TAS)/DSR/2019/115-H dated 12.03.2019 (See Table-1). CPWD has also included the above technologies in their Schedule of Rates 2018. At the time of reporting in the Annual Report, CPWD has come out with another OM approving 29 new technologies for housing adding 13 to the previous list.

#### Global Housing Technology Challenge – India (GHTC-India)

BMTPC provided technical support in organization of Global Housing Technology Challenge – India, an initiative of the Ministry of Housing & Urban Affairs, Government of India which seeks to identify alternate and speedy construction technologies. In this connection, the Council provided technical and logistic support to the Ministry in organization of the following event:

- Interactive session for Local Construction and Logistics Support Partners under "Global Housing Technology Challenge-India (GHTC-India)" on August 21, 2018 at New Delhi.
- "GHTC-India Launch" on January 14,2019 at National Media Centre, New Delhi
- Interactive session with Heads of the Foreign Missions on GHTC-India on January 21, 2019 at New Delhi.
- Global Housing Technology Challenge -India (GHTC-India), Construction Technology India 2019 Expo-cum-Conference on 2-3 March, 2019 at New Delhi inaugurated by Hon'ble Prime Minister of India.

During "Construction Technology India 2019" - Global Housing Technology Challenge – India (GHTC-India) organized on 2-3 March 2019 by Ministry of Housing & Urban Affairs, the Prime

### Table I :Adoption of New & Emerging Technologies in Construction by CPWD

S. No.	Name of Technology	No. of Storied Allowed	Suitability
I	Monolithic concrete construction system using Aluminium Formwork	Multistoryed	In all seismic zone for all heights
2	Monolithic concrete construction system using Plastic-Aluminium Formwork	Multistoryed	In all seismic zone for all heights
3	Expanded Polystyrene Core Panel System	G+3	In RCC framework else as per BMTPC recommendations
4	Light Gauge Sheet Framed Structures (LGSF)	G+3	As per BMTPC recommendations else with hybrid structures with steel
5	Industrailized 3-S system using RCC precast with or without shear walls, columns, beams, cellular light weight concrete slabs/semi-precast solid slab	G+24	For multistoryed but only upto zone-IV
6	Speed floor system	Multistoryed residential/ office complex	As per BMTPC recommendations for suspended concrete flooring system
7	Glass Fibre Reinforced Gypsum (GFRG) Panel Building System	(G+10)	For panels
8	Factory made Fast Track Modular Building System	G+7	Upto seismic zone IV only
9	Non Asbestos fibre Reinforced aerated sandwich wall/roof/floor light weight solid core panel (Prefabricated Fibre Reinforced sandwich panels)		Sandwich panel system for frame structure may be used in all height and in all seismic zone. For load bearing not to be used for more than G+3 building
10	EPS Cement sandwich wall/roof/ floor light weight solid core panel (Advanced Building System- EMMEDUE)	G+4	Sandwich panel system for frame structure may be used in all height and in all seismic zone. For load bearing not to be used for more than G+3 building
11	Block Masonry using AAC blocks		OM has already been issued vide no.133/SE(TAS)/DSR/2018-19/16-H dated 07.01.2019
12	Block Masonry using Fly as bricks		OM has already been issued vide no.133/SE(TAS)/DSR/2018-19/16-H dated 07.01.2019
13	Reinforced Soil Technology using Technical Textiles		Retaining walls, roads, embankment and drainage/filter as per design requirements
14	Use of self-compacting Concrete		Wherever HPC is required
15	Use of Confined Masonry		All heights and in all seismic zones
16	Use of C&D waste Products in Construction		OM has already been issued vide no.133/SE(TAS)/DSR/2018-19/519-H dated 16.11.2018

Minister declared the year April 2019 – March 2020 as "Construction Technology Year".

Under GHTC-India proven innovative and alternate construction technologies along with future potential sustainable technologies were shortlisted. As convener of the Technical Evaluation Committee, BMTPC pursued and prepared technical details of Proven Technology Providers. The proven technologies will now be showcased through execution of Light House Projects (LHPs) across six States. These LHPs will act as live laboratories to establish innovative and green construction practices across India and will help in sustainable construction. Under GHTC-India, it has also been planned to incubate and accelerate identified potential future technologies through Affordable Sustainable Housing Accelerator (ASHA) - India.

## Signing of MoU to initiate Certificate Courses with SPA, New Delhi

An MoU has been signed with School of Planning & Architectural (SPA), New Delhi in order to start Certificate Course on New Innovative Construction Technologies and E-Course on Vulnerability Atlas of India. These Courses will be developed jointly with SPA and the matter for preparation of course modules will be provided by BMTPC.

## Data Resource Cum Monitoring Centre (DRMC)

The Ministry of Housing & Urban Affairs (MoHUA) through BMTPC, has set up a Data Resource Cum Monitoring Centre (DRMC) under PMAY(U) for monitoring, data analysis, data compilation, data dissemination, generation of periodic reports in electronic form, undertake field visits/physical verification in a friendly manner and has also established a separate Monitoring Cell under the Mission Directorate in Nirman Bhawan for ease of data collection, analysis and generation of various housing and infrastructure reports, progress of construction etc. on day to day basis.



MoU signed with School of Planning & Architectural (SPA), New Delhi start Certificate Course on New Innovative Construction Technologies and E-Course on Vulnerability Atlas of India on March 7, 2019

### III. IMPLEMENTATION OF NATIONAL URBAN HOUSING FUND (NUHF)

As reported earlier, the Cabinet in its meeting held on February 20, 2018 has approved, interalia, the proposal of the Ministry of Housing and Urban Affairs as under:

- a) 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;
- b) 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);
- c) Government of India will amortize the loan and fulfill the repayment obligations at the agreed upon terms and conditions as decided by the Ministry of Finance.

In terms of the proposal approved by the Cabinet, a National Urban Housing Fund (NUHF) has been created in BMTPC which would aggregate the loans from lending agencies or financial institutions. Funds raised through EBR for NUHF will be 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.

In this regard, during the year Rs.20,000 crore has been borrowed from HUDCO on behalf of Ministry and the same has been released to State/UTs Govts. as per sanction letters issued by the Ministry of Housing and Urban Affairs. The details of such releases are part of audited statement of account attached in the Annual Report.



Signing of MoU with HUDCO on March 9, 2019

### IV. DISASTER MITIGATION AND MANAGEMENT

### I. Release of Third Edition of Vulnerability Atlas of India

The Council brought out the first ever Vulnerability Atlas of India in 1997 comprising of hazard maps w.r.t. earthquakes, wind/cyclones and floods and district wise vulnerability/risk tables of housing stock based on the types of wall/roof materials as per census 1991 data. The second edition of the Vulnerability Atlas of India was brought out in 2006. The Vulnerability Atlas of India is often referred and used by disaster management authority of States and Central for disaster management and planning and has been recognized as useful resource for prevention and mitigation of natural hazards.

BMTPC has brought out the third edition of the Vulnerability Atlas of India, which is collation of the existing hazard scenario for the entire country and presents the digitized State/UTwise Hazard Maps with respect to Earthquakes, Winds & Floods for district-wise identification of vulnerable areas. This edition contains additional digitized maps for Thunderstorms, Cyclones and Landslides. The Atlas also presents the districtwise Housing Vulnerability Risk Tables based on wall types and roof types as per 2011 Census Housing data. The Atlas is a useful tool not only for public but also for urban managers, State & National Authorities dealing with disaster mitigation and management.

Hon'ble Prime Minister of India, released the digital version of Third Edition of Vulnerability Atlas of India on the occasion of Global Housing Technology Challenge - India (GHTC-India), Construction Technology India 2019 Expo-cum-Conference on 2<sup>nd</sup> March, 2019 at New Delhi organized by Ministry of Housing & Urban Affairs. The Hon'ble Prime Minister, while releasing the Atlas, emphasized the need to formulate & implement various schemes of the Central & State Governments keeping in view the vulnerability of the region & indicative risk assessment as given in Vulnerability Atlas of India and suitable provisions should also be included in the tender documents.

The digital version of Third Edition of the Vulnerability Atlas of India is available at http://www. bmtpc.org with links on websites of Ministry of Housing & Urban Affairs i.e. http://mohua.gov.in and https://ghtc-india.gov.in/ for wider access by various stakeholders.





Hon'ble Prime Minister, Shri Narendra Modi, releasing the digital version of Third Edition of Vulnerability Atlas of India during GHTC-India, Construction Technology India 2019 Expo-cum-Conference on 2<sup>nd</sup> March, 2019 at New Delhi

# 2. Conceptualization of E-Learning Course on Vulnerability Atlas of India

During GHTC-India, The Ministry of Housing & Urban Affairs desired to start e-Course on Vulnerability Atlas of India for better preparedness of stakeholders against disasters. E-Learning courses provide an enabling platform by virtue of which the professionals can upgrade their knowledge without going for regular courses.

In view of the above, E - Learning course on Vulnerability Atlas of India jointly with the School of Planning & Architecture (SPA), New Delhi is being conceptualized. An MoU in this regard has been signed with the School of Planning & Architecture (SPA), New Delhi on March 7, 2019.

It is proposed that BMTPC and SPA may jointly start the e-Course on Vulnerability Atlas of India in order to create awareness amongst professionals working in the area of housing and infrastructure sector, students of Urban and Regional Planning, Civil Engineering, Architecture Colleges or any other allied disciplines and also individual who wants to keep themselves abreast with the latest and correct knowledge.

This course will be a basic e-learning course which offers awareness and understanding about natural hazards, helps identify regions with high vulnerability against various hazards (earthquakes, cyclones, landslides, floods etc.) and specifies district-wise level of damage risks to the existing housing stock. The e-course will be an effective tool for disaster mitigation & management in the field of architecture, civil engineering, construction engineering & management, building & materials research, urban & regional planning and housing & infrastructure planning.

Easy tools embedded in the E-Learning courses will help the individuals to learn and move at their own pace.While a continuous MCQ based self-evaluation shall be conducted at the end of every unit of the e-course, an end of course examination shall be held online in order to test the understanding of the candidates on the subject matter. On successful completion of the course, a self-generated digital Certificate of Training will be awarded to the participant.

### 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 2018. To mark the occasion, BMTPC brought out a Special Issue of its Newsletter "Nirman Sarika" on the theme "Municipal Solid Waste Management", 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 the Hon'ble Minister of State (I/C) for Housing & Urban Affairs during the celebration ceremony of World Habitat Day 2017 held on 5<sup>th</sup> October, 2018 at New Delhi.

### 2. Publication of Third Edition of "Compendium of Prospective Emerging Technologies for Mass Housing"

With the launch of Pradhan Mantri Awas Yojna (Urban), which envisions to provide pucca house to each household of India by 2022, it is incumbent on part of academic, research & other organizations involved in construction to bring innovation & thus paradigm shift in the prevailing construction practices so as to fast-track delivery of houses without compromising structural & functional performance. With this objective in mind, BMTPC initiated identifying, evaluating & certifying new emerging construction systems from all across the globe which can help in replacing the conventional cast-in-situ RCC construction. The first edition of Compendium of eight such emerging technologies brought out at the time of launching of the Mission on 25 June 2015. The second edition of Compendium comprising of 16 technologies was published in

March 2017. The compendium containing technologies as identified, evaluated & certified by BMTPC, has primarily facilitated the States/UTs in adoption of new technologies.

BMTPC brought out the Third Edition of Compendium of Prospective Emerging Technologies for Mass Housing under the guidance of Technology Sub Mission and Mission Directorate of Pradhan Mantri Awas Yojana. This Compendium containing 24 emerging technologies will be a useful resource for State Governments and related Housing Agencies for construction of and faster delivery of affordable urban housing:

The publication was released by Shri Hardeep S. Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs during the celebration of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

### 3. Publication of Ready Reckoner for Utilization of Recycled Produce of C&D Waste

The urban population of India has grown from 109 million in 1971 to 377 million in 2011 & 419 million in 2014. It is expected to grow to almost 600 million by 2030. Actual Housing shortage as per the demand survey by states for urban areas is around 10 million. Pradhan Mantri Awas Yojana (Urban) - Housing for All Mission launched in June, 2015 envisages construction of these dwelling units by 2022. The re-development of housing and infrastructure as well as new construction to meet the increasing demand is generating large volume of C&D wastes. Indiscriminate dumping and non-utilization of generated debris results in fugitive air pollution and other hazards of solid waste dumping in nallas, water bodies, empty plots and mixing up with



Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs releasing the "Ready Reckoner for Utilization of Recycled Produce of C&D Waste" during the World Habitat Day on October 5, 2018 at New Delhi

municipal solid waste. The Swachh Bharat Mission (SBM) of Govt. of India under MoHUA has targeted processing of 100% solid waste including C&D waste in major cities/towns.

This would not only provide the clean environment but would also make available valuable construction materials that are in short supply and would in turn facilitate and expedite construction of mass housing under PMAY(U).

Erstwhile MoUD vide its circular dated 28<sup>th</sup> June, 2012 has desired all states to set up C&D waste recycling facilities in all the cities/towns with population over I million. It would also reduce the pressure on natural resources that are being otherwise exploited for building and road construction materials resulting in adverse impact on the environment. Proper management, processing and reuse of C&D waste has been the focus of various bodies of Govt. of India. C&D Waste Management Rules, 2016 have been issued by MoEF&CC vide notification no. GSR 317(E) dated 29<sup>th</sup> March, 2016.

BMTPC also brought out "Guidelines for Utilization of Construction & Demolition Waste in Construction of Dwelling Units and Related Infrastructure in Housing Schemes of the Government". Central Pollution Control Board issued "Guidelines on Environment Management of Construction & Demolition Waste" during March, 2017. "Guidelines for Sustainable Habitat" issued by Central Public Works Department (CPWD) in March, 2014 have a dedicated chapter "Guidelines on re-use of recycled of C&D waste". Bureau of Indian Standards (BIS) has issued 3rd amendment to IS-383:2016 "Coarse and fine aggregate for concrete" to include fine and coarse aggregate produced by processing of C&D waste. India Road Congress (IRC) has issued IRC-121: 2017 Guidelines for use of C&D waste in road sector.

BMTPC brought out the "Ready Reckoner for Utilization of Recycled Produce of C&D Waste" to guide and facilitate the stakeholders for easy understanding and implementation of "C&D Waste Management Rules, 2016" towards 100% utilization of this waste material as envisaged under SBM. In-situ processing of C&D Waste for large size redevelopment projects has been focused to minimize the impact on the environment as well as on the cost of produce. Deconstruction of buildings and structures has been recommended to be practiced instead of demolition to minimize the generation of debris and maximize salvage of components and materials that can be for re-used. Application of new technologies of deconstruction has been advised.

It is hoped that the Ready Reckoner providing the salient features of all the prevailing related documents/ notifications in simple language including duties of all & monitoring & marketing plan would be handy and helpful for all the stakeholders. The Ready Reckoner was released by Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India during the celebration of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

### 4. Publication of "Manual on Waterproofing of GFRG / RAPIDWALL Buildings"

Glass Fibre Reinforced Gypsum (GFRG) Panel System is an alternate construction system and has potential to be a viable solution for affordable mass housing. BMTPC along with IIT Madras has been promoting the technology for affordable housing projects. In order to mainstream GFRG technology, it is essential that suitable manuals may be created which will help the construction agencies to make use of the technology. In the process, BMTPC has published Design manual & Construction manual for GFRG panel system prepared by IIT Madras. Recently, CPWD has also included the GFRG panel system in its DSR



Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs releasing the "Manual on Waterproofing of GFRG / RAPIDWALL Buildings" during the World Habitat Day on October 5, 2018 at New Delhi

2016 through Correction Slip No. 13 vide DG/ DSR/25 dated 13.8.2018 as items no. from 26.51 to 26.61 of Sub Head 26 (New Technologies & Materials). Also, Ministry of Housing & Urban Affairs has issued an OM dated 20.03.2018 instructing use of GFRG panel building system as one of the technologies in the projects by CPWD, DDA & NBCC.

Being gypsum-based product, there are lot of queries regarding water proofing treatment of the panel system despite of the fact that GFRG panels absorb less than 2 percent of water after immersing in water for 24 hours. Further, GFRG building with large building panels for walling and floor/roof require water proofing treatment to be carried out at the time of construction and prior to pouring of concrete, as part of construction. Therefore, it was felt apt that a publication on water proofing solution for GFRG construction may be brought out. BMTPC published first edition of water proofing manual earlier which was prepared by IIT Madras, however, a need was felt to update the publication with more alternative waterproofing solutions. Accordingly, IIT Madras prepared this latest publication which is being published by BMTPC and can be readily used by construction agencies while implementing the technology in the field.

The water proofing solution provided in the earlier publication was based on indigenously produced nano technology by Zydex Industries which is tailor mode for GFRG buildings in consultation with IIT Madras. The solution proves to be a viable proposition for effective water proofing of GFRG buildings, however, the application need to be done under strict supervision of trained and skilled manpower. Further, the polyurethane water proofing products developed by Alchimica are found to be suitable for waterproofing and added in this edition. Various materials and applications mentioned in the document have been developed and recommended by IIT Madras after extensive R&D and testing. Products from any other industry may also be used after establishing their efficacy on the GFRG panel system through testing. The publication has been produced by Prof. Meher Prasad and Prof. Devdas Menon of IIT Madras who has been putting R&D efforts to make the GFRG panel system as viable alternate system for housing.

The Manual of Waterproofing of Glass Fibre Reinforced Gypsum (GFRG) /RAPIDWALL Buildings was released by Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India during the celebration of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

# 5. Publication of "Guidebook for Concreting Artisans" – in Hindi

Capacity building and nation building go hand in hand. Nation cannot progress without human power. Today, in our country, building and housing technologies has progressed fast, especially during the last few decades. But the capacity building and skill development could not keep pace with it. It is visible during the life time of our buildings, especially when the natural disaster struck. This not only involves inappropriate hardship to the occupants and owners of these buildings, but as a result, there is a waste of rare resources of our country which can otherwise be used for development.

The root cause of the poor performance of buildings is low level of skill and technical knowledge in the millions of artisans working on different aspects of traditional construction. Except rare exceptions, none of them have received formal training or formal recognition. An artisan is trained in pieces on the site from those people who have insufficient information on their own. Unfortunately, today, artisans rarely get the opportunity to interact with engineers, and many construction contractors do not even have enough technical information.

Therefore, today's demand is to build the skills and knowledge of these artisans to the desired level, so that they do well, and when they teach other upcoming semi-skilled people on the site, then they teach the right skills and give accurate information. It is also important that the artisans be recognized by certification, which indicates their level of expertise. It requires a certification system which is suited to these working craftsmen, who can provide a ladder to move forward and contribute to nation building. BMTPC has evolved a building artisan certification system.

Based on the certification system, these guidebooks, in Hindi, have been prepared for Concreting Artisans engaged in the building construction work using RCC framed structures. According to the course of this certification, the information needed by concreting artisans to create a safe, strong and accurate structure for the construction of buildings of good quality has been included in these guidebooks.

The "Guidebook for Concreting Artisans" brought out in Hindi, was released by Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India during the celebration of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

### 6. Publication of "Pocket book on Emerging Construction Systems"

BMTPC has been promoting alternate costeffective, environment-friendly, energy-efficient and disaster resistant technologies. BMTPC took an initiative to study/select emerging and alternate cost effective technologies suitable to In-



Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India releasing the "Guidebook for Concreting Artisans" during the celebration of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

dian geo-climatic conditions and advocate these technologies to the State Govt. for implementation in housing projects under various housing schemes of government in different parts of the country.

In order to mainstream the new emerging technologies, BMTPC have brought out the revised edition of Pocket Book on Emerging Construction Systems with a view to sensitize professionals including common man. The revised Pocket Book presents general information on the 24 emerging technologies in pictorial form.

The Pocket Book on Emerging Construction Systems was released by Hon'ble Minister, Department of Employment & Urban Poverty Alleviation Programme, Govt. of Uttar Pradesh during Sensitization Programme on Good Construction Practices & Emerging Technologies for housing for PMAY (U) organized by BMTPC on 2<sup>nd</sup> June 2018 in Lucknow.

## 7. Publication of "GFRG/Rapidwall Construction Manual"

BMTPC in its quest to bring sustainable construction systems replacing conventional castin-place RCC frame/brick & mortar systems has been promoting Glass Fibre Reinforced Gypsum (GFRG) panel system in collaboration with IIT, Madras. GFRG panel system is a load bearing panel with cavities which are filled with reinforced concrete as per design requirements. The technology is originally developed as Rapid Wall system in Australia and later researched, modified & adapted to suit Indian conditions by IIT, Madras. The panels are made from phosphogypsum which is a by-product of a fertilizer plant after calcining the gypsum.

Construction using GFRG (Glass Fibre Reinforced Gypsum) panels has been identified as a potential solution addressing the problem of housing shortage. BMTPC with the support of IIT Madras, has already published 'GFRG / Rapidwall Building Structural Design Manual', 'Manual on Waterproofing of GFRG / Rapidwall Buildings' and 'Schedule of Items & Rate Analysis for GFRG construction' to aid architects, structural engineers, construction engineers and builders in the structural design, planning and estimation of GFRG buildings. A need felt for a manuscript explaining the sequence and good practices to be followed at the construction site. Therefore, the Council brought out the GFRG/Rapidwall Construction Manual jointly with IIT Madras.

GFRG building system and method of construction have been adapted to suit the Indian conditions, with compatible structural design. The method of construction of GFRG buildings is explained in detail with illustrations and photographs of construction, equipment, tools and tackles, waterproofing treatment (as per GFRG water proofing manual) and finishing works.

The manual can also be used for training professionals (site engineers / technical supervisors) in the construction industry on the know-how of GFRG building construction.Also, the manual can be used for labourers involved in construction, providing hands-on training in actual construction sites to make them skilled and proficient in all aspects of construction, from the erection of wall panels to the final finishing works.

### 8. Publication of Book on "Sustainable Building Technologies"

BMTPC, since its inception, has been promoting alternate building materials and housing technologies leading to sustainable development. There is enough literature available on the subject of sustainability but there is no book dealing with sustainability issues in building technologies and construction. Further, a textbook on sustainability can help students of Civil Engineering & Architecture dealing with building construction, as India is committed to climate change mitiga-



Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India releasing the Book on Sustainable Building Technologies during the GHTC-India Launch function on January 14, 2019 at National Media Centre, New Delhi.

tion and is one of the signatories to Paris agreement.

It was felt that the students of Engineering and Architecture should have adequate exposure to current ideas on sustainable building technologies so that they can apply the concepts while dealing with real-time projects. Hence, after a couple of brainstorming sessions, it was decided to entrust the responsibility of editing a monograph on Sustainable Building Technologies to Prof. K. S. Jagadish, Retired Professor, Indian Institute of Science, Bangalore who is pioneer in promotion of cost-effective, eco-friendly and energy-efficient building materials and technologies. The entire effort of bringing up this monograph took almost three years by Prof. Jagadish. The chapters in the book have been written by various researchers and professionals which have been suitably edited to produce this monograph. This should be of immense value to students and practitioners of sustainable buildings.

The monograph includes a whole gamut of issues starting from global warming and energy in buildings to sustainable use of materials and energy efficient construction. There is also an emphasis on the concept of green buildings, use of renewable materials like bamboo/ timber and demolished building materials. A special chapter is contributed by BMTPC in the monograph on new building technologies for affordable housing for sustainable development.

The Book on Sustainable Building Technologies was released by Shri Hardeep S. Puri, Hon'ble Minister of State (Independent Charge), Ministry of Housing & Urban Affairs, Government of India during the GHTC-India Launch function on January 14, 2019 at National Media Centre, New Delhi.

## 9. 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 building materials and construction 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.

There is good response on 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.

## IO. 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 states, their Housing Boards and other 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 emerging technologies in mass housing.

#### Approval of PACs

Technical Assessment Committee (TAC) constituted for the purpose of approval of Performance Appraisal Certificate (PAC) in its 14<sup>th</sup> and 15<sup>th</sup> meetings held on August 10, 2018 and March 29, 2019 respectively approved issuance of PACs for the following new products/systems:

- i. Continuous Sandwich (PUF) Panels with Steel Structure
- ii. Nano Living System Technology
- iii. PIR Dry Wall Pre-fab Panel System
- iv. Robomatic Hollowcore Concrete Wall Panels
- v. BauPanel System
- vi. Flyash EPS (Beads) Cement Sandwich Panels
- vii. Stay-in place PVC Wall Forms
- viii. K-Wall Panel
- ix. Precast Construction Technology
- x. V-Infill Walls



14<sup>th</sup> Meeting of Technical Assessment Committee (TAC) of Performance Appraisal Certificate Scheme (PACS) on August 10, 2018

### Approval of Renewal of PACs

Technical Assessment Committee (TAC) constituted for the purpose of approval of Performance Appraisal Certificate (PAC) in its 14<sup>th</sup> meeting held on August 10, 2018 has also approved renewal of PACs for the following products/systems:

- i. Polyethylene Underground Septic Tank
- ii. Continuous Sandwich Panel
- iii. Marshal Door
- iv. FRP Manhole
- v. Bamboowood Flooring and Decking
- vi. QuikBuild 3D Panels
- vii. Precast Large Concrete Panel System
- viii. Light Gauge Steel Framed Structure with Infill Concrete Panel Technology
- ix. Rising EPS (beads) Cement Panels

## Applications under process for issuance of PACs

Applications for the following new products/ systems have been received from the manufacturers for processing further for issue of PACs:

- I. PVC Wall forms
- 2. Conecc Precast Wall Panels
- 3. Bamboo Flooring
- 4. Exterior Drywall System
- 5. Integrated Hybrid Solution: ONE
- 6. Insulated Sandwich Panel (Glamet)
- 7. Insulated Sandwich Panel (Monowall)
- 8. Insulated Sandwich Panel (Super Wall)
- 9. Insulated Sandwich Panel (Hipertec Roof)
- 10. Insulated Sandwich Panel (Hipertec Wall))
- II. Strand Woven Bamboo Wood Floor Tiles & Wall panels
- 12. Hybrid Building Bodyguard (Ready to use)
- 13. Rapicon Wall Panels & Prefabricated Steel Structures
- 14. LGSF Building Components & Erection

- 15. Bamboo Flooring and Wall Cladding
- 16. Magic XP- Elastomeric Paintable Plaster

# Applications under process for Renewal of PACs

Applications for the following products/systems have been received from the manufacturers for renewal of PACs:

- I. Sound Proof Drainage Piping System
- 2. Rising EPS (Beads) Cement Panels
- Underground Water Storage Tank ((Sump)
- 4. PVC Profile Door.
- 5. PIR Dry Wall Prefab Panel System
- 6. Continuous Sandwich (PUF) Panel with Steel Structure.
- 7. Prefabricated Fibre Reinforced Sandwich Panels

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).

### 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.

### VI. PROMOTIONAL AND CAPACITY BUILDING ACTIVITIES AT NATIONAL AND INTERNATIONAL LEVEL

I. Organization of Sensitization Programmes on "Good Construction Practices including Emerging Technologies for Housing" under PMAY(U) at Lucknow

A Sensitization Programme on Good Construction Practices including Emerging Technologies for Housing under PMAY (U) was organized on 2<sup>nd</sup> June 2018 in Lucknow. The programme was organized by BMTPC, MoHUA jointly with SUDA Uttar Pradesh which is the State Level Nodal Agency (SLNA) of Pradhan Mantri Awas Yojana (Urban). More than 150 Participants from various ULBs and engineers working in city level technical cell of various cities of Uttar Pradesh attended the Programme.

During the inaugural session, Hon'ble Minister, Department of Employment & Urban Poverty Alleviation Programme, Vice Chairman, Lucknow Development Authority, Director, SUDA, Govt. of Uttar Pradesh, Addl. Director SUDA were present. The Hon'ble Minister released a Pocket Book on Emerging Building and Technologies and Pen Drive containing the Films on technologies and other documents related to PMAY(U).

A number of Technology providers made presentations on emerging technologies such as Precast concrete Industrialized 3S System; Plaswall System for walling; Precast concrete Technology & Monolithic concrete construction Technology; EPS, Fly ash, Cement Sandwich Wall Panels Continuous Sandwich (PUF) Panels; Precast Concrete technology; EPS Based Panel System; presentation on Monolithic Concrete Construction; Stay in place Formwork System, etc.

A site visit to the Demonstration Housing Project at Aurangabad Jagir, Lucknow being implemented by BMTPC using Double Walled



Sensitization Programme on Good Construction Practices including Emerging Technologies for Housing under PMAY (U) organized on 2<sup>nd</sup> June 2018 in Lucknow.
EPS Panel based System was organized for the participants of the programme to make them understand the new technology through live project and explain about the advantages of the technology.

#### 2. Organization of Sensitization Programme on Emerging Technologies for Mass Housing at Bhopal, Madhya Pradesh

A Sensitization Programme on Emerging Technologies for Mass Housing under PMAY (U) in Bhopal, Madhya Pradesh was held on 27<sup>th</sup> June 2018. The programme was organized by BMT-PC, MoHUA jointly with Urban Admn. & Development Department, Govt. of Madhya Pradesh which is the State Level Nodal Agency (SLNA) of Pradhan Mantri Awas Yojana (Urban). More than 150 Participants from various ULBs of Madhya Pradesh attended the workshop.

During the inaugural session, Principal Secretary (UADD), Govt. of Madhya Pradesh, Commissioner (UADD), Commissioner M.P. Housing Board, Engineer-in Chief (UADD), Chief Engineer (UADD), GoMP were present. The State is interested in adopting new technologies for PMAY projects, however, the cost of local raw materials and labour is reasonable in the state which makes conventional construction quite competitive. The State is ready to explore the possibilities of adopting new technologies.

During the programme, presentation from the State Govt. was made on current progress of AHP projects. Technology providers from various companies interacted with the participants and made presentations on Precast concrete Industrialized 3S System; Reinforced EPS Core Panel System; Plaswall System for walling; Precast concrete Technology & Monolithic concrete construction Technology; Light Gauge Steel Framing System; Stay in place Formwork System; Sandwich PUF Panel Technology, etc. BMT-PC made presentation highlighting the need of new technologies, overview of all certified technologies.

Field visit was organized in Ujjain to see the ongoing projects of AHP and BLC under PMAY. Some houses constructed under BLC were also visited at two locations i.e. Bapu Nagar and Shankar Pur Jagipura.



Sensitization Programme on Emerging Technologies for Mass Housing under PMAY (U), organised on 27<sup>th</sup> June 2018 in Bhopal, Madhya Pradesh

# 3. Organization of Workshop on Official Language at New Delhi

BMTPC organized Workshop on Official Language on June 30, 2018 at New Delhi. The Hindi Language Workshop was also addressed by Shri Suresh Chandra Chaturvedi, Assistant. Director, Official Language, Ministry of Housing and urban Affairs, Govt. of India.

The Assistant Director, Official Language, appreciated the successful organization of Hindi Sangoshthi organized by BMTPC on 11 December 2017 and termed Rajbhasha Hindi Sangoshthi as a successful attempt to promote Hindi. During the Workshop, the problems being faced by all the officers / employees of the Council in the working of Hindi Language were deliberated and simple ways were suggested to encourage the use of Hindi in the official work.

#### 4. Organization of Capacity Building Programme on "Good Construction Practices including Emerging Technologies for Housing" at Jodhpur

The Council organized Capacity Building Programme on "Good Construction Practices including Emerging Technologies for Housing" on August 30-31, 2018 at Jodhpur, Rajasthan jointly with Rajasthan State Real Estate Development Council (RAJREDCO).

The programme was organized to enhance the capacity of engineers & architects at ULB & State level in the area of "Quality Control and Good Construction Practices" in housing projects and also to introduce emerging technologies for construction of houses for mass housing projects in the state particularly under Pradhan Mantri Awas Yojana (Urban). During the two days programme, besides open-house discussions, the topics covered were Pradhan Mantri Awas Yojana (Urban), Third Party Quality Monitoring under Pradhan Mantri Awas Yojana (Urban).

ban), Cement Sandwich Wall Panels, Monolithic Concrete Construction, Concrete wall System, Bison Panels, Precast Concrete Construction, Stay in Place Formwork System, Plaswall System, Rising EPS (Beads) Cement Panels, etc.

The programme was attended by more than 100 participants from ULB/State level engineers, architects, planners and officials.

#### 5. Organization of Seminar on "Emerging Technologies for Affordable Housing: Opportunities and Challenges" at Noida

A Seminar on "Emerging Technologies for Affordable Housing: Opportunities and Challenges", was organized on December 17, 2018 at Amity University, Noida by BMTPC in association with RICS School of Built Environment, Amity University.

The seminar was organised to disseminate the information related to emerging technologies in the area of affordable housing as emerging technologies have an edge over conventional systems with regard to speed, cost, quality and sustainability.

The seminar also deliberated on the challenges associated with the adoption of emerging technologies along with the available opportunities for adoption. More than 70 participants participated in the seminar.

#### 6. Organization of National Seminar on Emerging Building Materials and Sustainable Construction Technology at Greater Noida

A National Seminar on Emerging Building Materials and Sustainable Construction Technology (NSEBMSCT- 2019) was organized from 14-15 March 2019 in association with Department of Architecture and Planning, Gautam Buddha University at Greater Noida.



Seminar on "Emerging Technologies for Affordable Housing: Opportunities and Challenges", was organized on December 17, 2018 at Amity University, Noida

The Seminar was organized to provide a disciplinary platform for professionals, academy, research scholars and entrepreneurs to share and discuss the emerging and innovative trends, ideas, practical challenges and experiences that will shape the future of housing and building. The various Technical Sessions covered emerging building materials and sustainable construction related subjects such as Fast Track Construction systems for Affordable Housing, environmentfriendly building technologies, innovative precast technology, light gauge steel frame technology, steel structural system, EPS technology, use of agro-industrial wastes, energy efficient buildings, etc.

The Seminar was inaugurated by Vice Chancellor Gautam Buddha University in the presence of Registrar, Dean School of Engineering and various Technology Providers. The two-days event provided a platform for more than 100 participants from academic and research organization, students and industries for reaching Governments Goals of - "Housing for All" with environment safe and affordable building construction. The program was one of the first event of this kind in the region.

#### 7. Organization of Workshop on Use of Bamboo in Housing & Building Construction

BMTPC in association with Government Arunachal Pradesh, A.P. Bamboo Resources & Development Agency (APBRDA), Department of Environment & Forests and South Asia Bamboo Foundation organized a 10 days Workshop on Use of Bamboo in Housing & Building Construction from October 24 to November 2, 2018 at Namsai, Arunachal Pradesh. The objectives of the workshop were:

- To create awareness about Bamboo and its importance for sustainable development particularly in Eco Tourism.
- Creating human resources in the field of construction.
- Providing exposure of the trainees to the practical application sites and the various techniques of the construction involved.
- Promoting of Bamboo Entrepreneurs throughout the region.

The Workshop was inaugurated by Shri Chowna Mein, Hon'ble Deputy Chief Minister, Govt.



Workshop on Use of Bamboo in Housing & Building Construction from October 24 to November 2, 2018 at Namsai, Arunachal Pradesh

of Arunachal Pradesh. Apart from International Experts on Bamboo Structures from Colombia, United Kingdom and Bhutan, 28 participants including 12 architects from other States namely Nagaland, Assam, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu and Manipur and about 25 participants from Arunachal Pradesh participated in the workshop.

The methodology of the workshop included both "Theory and Practical Demonstration" covering all the techniques involve in the basic construction process such as:

- The basic physical properties of bamboo and its structural behaviour
- Appropriate techniques for selecting a bamboo in the construction
- Harvesting and Preservative techniques of Bamboo
- Different types of jointing systems
- Joinery elements
- Basic plinth preparation techniques
- Topics related to the construction activities etc.
- The above programme will be adminis-

tered through:

- Audio-visual demonstrations and lectures
- Practical demonstrations
- Field visits etc.

#### 8. World Habitat Day 2018 Celebrations

On the occasion of World Habitat Day 2018, the Council conducted the following activities:

# Painting Competition for Differently Abled Children

As a part of the World Habitat Day Celebrations, BMTPC organised Painting Competition for Differently Abled Children on the theme "Municipal Solid Waste Management" in the categories viz. (i) Mentally Challenged, (ii) Hearing Impaired and (iii) Visually Impaired children.

BMTPC received 167 selected entries from 12 schools. The Jury in BMTPC selected 16 best entries for prizes. The prizes were awarded to winning entries by Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Af-



Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs giving away the Prizes to the winners of Painting Competition of Differently Abled Children organized by BMTPC during the World Habitat Day on October 5, 2018 at New Delhi.



Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs at the exhibition of paintings of by Differently Abled Children during the World Habitat Day

fairs during the celebration ceremony of World Habitat Day 2018 held on 5<sup>th</sup> October, 2018 at New Delhi.

#### **Release of Publications**

To mark the occasion, following publications were brought out by BMTPC:

- Special Issue of Newsletter "Nirman Sarika" on the theme of the World Habitat Day 2018
- Compendium of Prospective Emerging

Technologies for Mass Housing - Third Edition

- Ready Reckoner for Utilization of Recycled Produce of C&D Waste
- Margdarshika for Concreting Artisans
- Manual on Waterproofing of GFRG / RAPIDWALL Buildings

These publications were released by Shri Hardeep S Puri, Hon'ble Minister of State (I/C) for Housing & Urban Affairs during the World Habitat Day 2018 function.

#### VII. TECHNOLOGY DEVELOPMENT, DIFFUSION AND TRANSFER

#### 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, during the year, following technologies were assessed and certified, which have potential to be used for mass housing in the country:

# Continuous Sandwich (PUF) Panels with Steel Structure

Continuous sandwich panels are single piece, prefabricated, modular, factory made units which consist of an insulating layer of rigid polyurethane foam between two layers of metal sheets. The panels comprise of PUF bonded between two sheets of Pre-coated GI sheets of 0.5 mm thick to produce straight-to-finish panels. Insulation core provides effective insulation and strong bonding for better structural stability to facilitate higher loading and wider spans. These panels are available for both wall and roof.

#### Nano Living System Technology

This Technology comprise of an inner and outer skin of magnesium oxide board, with an injected core of closed cell, polyurethane foam, free of Chlorofluorocarbon (CFC) blowing agent. Cold formed metal studs are incorporated within the foam and between the magnesium oxide board skins at nominal 600mm centres. The panels are manufactured in 150mm thickness having 80 mm cold formed steel studs, 10mm magnesium oxide board on each side and 50mm thermal packer between the internal stud and exterior magnesium oxide board with core insulation of 130mm closed cell and polyurethane foam.

#### PIR Dry Wall Pre-fab Panel System

PIR Dry Wall Pre-Fab Panel is a system where two fibre cement boards (FCB) of 10 mm thickness are filled with insulation material namely Poly Isocyanurate (PIR) in-situ and erected to produce straight to finish walls. The system shall be integrated with conventional column and beam for pre-engineered buildings. Insulation core provides effective insulation and strong bonding for better structural stability to facilitate higher loading and wider spans. This system can incorporate all types of services viz. electrical, gas and plumbing etc.

# Robomatic Hollowcore Concrete Wall Panels

Robomatic wall panels are extruded non-load bearing concrete hollowcore wall panels manufactured in fully automated machines. These wall panels are factory produced using light weight concrete made of manufactured sand, crushed stone aggregate and Ordinary Portland cement. Wall panels have cylindrical hollow cores incorporated with 8 No. 44 mm dia voids in the 75mm thick, 6 No. 62 mm dia. voids for the 92 mm thick and 6 No. 74 mm dia. voids for the 120 mm thick panels. Hollowcores are incorporated in the walls to reduce dead weight, facilitate mechanical, electrical and plumbing services through hollows, thereby increasing sound and thermal insulate properties. The sides of all panels are tongued and grooved to facilitate positive jointing.

#### **BauPanel System**

This system consists of panels of expanded polystyrene (EPS) and steel wire mesh which are applied with concrete at site. The system comprises of a layer of steel mesh on either side of EPS core welded together by steel trusses (orthogonal) which penetrate through EPS core. The panels are joined together in a configuration on site and sprayed on both sides with shotcrete to form a sandwich panel type construction. The exterior of the panels shall be finished with weather proof coating or lined with conventional lining material while interior surfaces (walls) and ceilings shall be finished with water/ solvent based coating or lined with conventional lining material.

# Flyash EPS (Beads) Cement Sandwich Panels

Fly ash EPS Cement Sandwich Panels 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. The panels do not require plastering and water curing. These panels are joined with tongue & groove jointing system.

#### Stay-in place PVC Wall Forms

System consists of rigid poly-vinyl chloride (PVC) based polymer components that serve

as a permanent stay-in-place durable finished form-work for concrete walls. The extruded components slide and interlock together to create continuous formwork with the two faces of the wall connected together by continuous web members forming hollow rectangular components. The hollow components are erected and filled with concrete, in situ, to provide a monolithic concrete wall with enhanced curing capacity. The polymer encasement provides crack control vertically and horizontally for the concrete, and provides vertical tension reinforcement thus increasing the structural strength of the wall. The resulting system is unique and provides substantial advantages in terms of structural strength, durability enhancement, weather resistance, and seismic resistance.

#### K-Wall Panel

Wall panels are factory produced hollow core using light weight concrete made of ordinary Portland cement, fly ash, perlite, foam, fevicol DDL, fiber-glass mesh, river sand and water. Panels have cylindrical hollow cores. The corresponding nominal weight shall be 35 kg/m<sup>2</sup>, 61 kg/m<sup>2</sup> and 102 kg/m<sup>2</sup> for 65mm, 80mm, and and100mm thick panels respectively. Hollow cores are incorporated in panels to reduce weight, facilitate mechanical, electrical and plumbing services through hollow core, thereby increasing sound and thermal insulation properties. The sides of the panels are tongued and grooved to facilitate jointing.



Stay-in place PVC Wall Forms



K-Wall Panels

#### Precast Construction Technology

This 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. This technology is suitable for construction of high rise buildings resisting seismic and wind induced lateral loads along with gravity loads.

#### V-Infill Walls

V-Infill Wall is 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 may be integrated with conventional column and beam for pre-engineered buildings. The walls may be used as partition walls for external and internal applications. The GI studs are "C" cross-section with built in notch, slots, service holes etc. fixed with floor and ceiling channels using anchor fasteners. Electrical and plumbing pipes/conduits shall be provided in the service holes of studs before concreting is done.



V-Infill Walls

#### 2. Preparation of Third Edition of Compendium of Prospective Emerging Technologies for Mass Housing

As an ongoing activity, the Council has so far under PACS certified 24 new construction systems covering Formwork Systems, Precast Sandwich Panel Systems, Light Gauge Steel Structural Systems, Steel Structural Systems, Precast Concrete Construction Systems, etc. Being regular activity intensive efforts are being taken to identify more technologies. Earlier Compendium of Prospective Emerging Technologies containing 16 Emerging Technologies was brought out by BMTPC. Now the same has been updated with additional 8 technologies. The third Edition of Compendium of Prospective Emerging Technologies for Mass Housing contains technology details of following 24 emerging technologies:

#### Formwork Systems - Engineered Formwork Systems

- I Monolithic Concrete Construction System
  - using Plastic Aluminium Formwork
  - using Aluminium Formwork
- 2. Modular Tunnel Form

#### Formwork Systems - Stay-in-Place Formwork Systems

- 3. Insulating Concrete Forms
- 4. Monolithic Insulated Concrete System
- 5. Structural Stay-in-place formwork system
- 6. Lost-in-place formwork system- Plaswall Panel system
- 7. Lost-in-place formwork system- Plasmolite Wall Panels
- 8. Sismo Building Technology

#### Precast Sandwich Panel Systems - EPS based Systems

- 9. Advanced Building System Emmedue
- 10. Rapid Panels
- 11. Reinforced EPS Core Panel System
- 12. QuickBuild 3D Panels

#### 13. Concrewall Panel System

# Precast Sandwich Panel Systems - Other Systems

- 14. Glass Fibre Reinforced Gypsum Panel System
- 15. Prefabricated Fibre Reinforced Sandwich Panels
- 16. Rising EPS (Beads) Cement Panels

#### Light Gauge Steel Structural Systems

- Light Gauge Steel Framed Structure (LGSF)
- Light Gauge Steel Framed Structure with Infill Concrete Panel Technology

#### Steel Structural Systems

- 19. Factory Made Fast Track Modular Building System
- 20. Speed Floor System

#### **Precast Concrete Construction Systems**

- 21. SRPL Building System (Waffle-Crete)
- 22. Precast Large Concrete Panel System
- 23. Industrialized 3-S system using RCC precast with or without shear walls, columns, beams, Cellular Light Weight Concrete Slabs/Semi-Precast Solid Slab
- 24. Walltec Hollowcore Concrete Panel

#### 3. Study to assess State-wise total brick requirement and number of clay bricks being manufactured by clay brick kilns to assess the total quantity of fly ash that can be put to use in this sector

The Council has undertaken a project to assess State wise total brick requirement and number of clay bricks being manufactured by clay brick kilns to assess the total quantity of fly ash that can be put to use in this sector and propose an Action Plan to increase utilization of fly ash jointly with Centre for Flyash Research and Management (C-Farm), New Delhi. The objective of the project was to enhance availability of bricks for housing projects as well as utilization of fly ash.

All India study of brick industry has been undertaken to assess the total quantity of fly ash that can be put to use in this sector within next 2-4 years. Interactions were held with major stakeholder groups including clay brick manufacturers, fly ash brick manufacturers, their associations, fly ash producers & suppliers, builders & construction agencies, relevant Government Departments/Agencies, R&D and technology institutes of clay bricks as well as fly ash brick, etc.

The study reveals that annual clay brick production in the country is at a level of 221 billion (2017) while it was 250 billion during 2011 and 240 billion during 2014. The fly ash brick production figures for the corresponding years are 15.9 billion, 14.8 billion and 20.2 billion respectively. The industry is affected by the heavy unsold stocks in the real estate sector. Autoclaved Aerated Concrete (AAC) blocks and New Construction Technologies (NCTs) have made a dent in the brick industry. The share of AAC blocks and new construction technologies would increase with time.

Clay brick industry, in general, is facing the issues of scarce availability of clay/ good top soil and environmental issues in addition to increasing costs of coal, labour & clay. This industry is open to consider use of fly ash in clay brick manufacturing but apprehends problems in availability of fly ash, required technology (mix design, mixing technology, moulding & firing) as well as training of labour and availability of finance for investments that may be required in plant & machinery. Mechanized system would require un-interrupted power supply. Technology demonstrations for use of fly ash in clay brick manufacturing have been held in some of the states. Estimates show that annually III MnT fly ash (pond ash) can be used in clay brick manufacturing in the country. It is based on the type of clay/ top soil in different parts of the country, the lead distance of the kilns from the thermal power plants (TPPs), availability of fly ash, output of R&D, available technologies as well as the views of clay brick kiln owners & workers, etc.

Fly ash brick industry holds the potential to increase fly ash utilization from the current level of about 23.32 MnT a year to about 55.73 MnT a year during the said period of 2-4 years by increasing the ash content in the fly ash bricks as well as increasing the share of fly ash bricks in the brick industry. This takes in account the availability of fly ash, required technologies and other affecting parameters.

To achieve higher quantum of fly ash utilization in brick industry, technology interventions are required for clay brick industry and fly ash brick industry. The main technology interventions required for both the sectors are as given below:

#### Clay bricks

The major technology interventions required as emerged from the study are:

- Optimization of clay-fly ash mix design for different types of soils/ clays and available fly ashes for different brick moulding practices/ processes in use.
- Demonstration of developed mix designs and production process at kiln level to the brick manufacturers for proving the reproducibility of mix designs.
- (iii) Training and hand holding of brick manufacturers, supervisors and workers to implement the new technology.
- (iv) Setting up of testing facilities for clay-fly ash mix and clay-fly ash bricks along with a technical counsellor to address to the technical problems of clay brick manufacturers. This is required to be established for each cluster of clay brick kilns.

- (v) Support and facilitation for required clay & fly ash mixing machinery and availability of un-interrupted power supply.
- (vi) Hassle free availability of fly ash from TPPs and transportation & handling of fly ash through appropriate means is to be included in the training programs.

#### Fly ash bricks

The major technology interventions required are:

- To develop and update scientific understanding and appreciation by fly ash brick manufacturers about the fly ash brick manufacturing process and importance of each of the raw material including water.
- (ii) To develop high ash content mix designs for fly ashes available at different places with local ingredients of fly ash brick manufacture.
- (iii) Demonstration of the developed mix designs to the fly ash brick manufacturers to build their confidence.
- (iv) To impart training to the fly ash brick manufacturer supervisors and workers.
- To ensure availability of adequate quantity of fly ash of required quality.

#### 4. Project on "Documentation of Housing Projects involving New Construction Technologies in the State of Delhi-NCR, Maharashtra, Karnataka and West Bengal"

The Council has undertaken a project on "Documentation of Housing Projects involving New Construction Technologies in the State of Delhi-NCR, Maharashtra, Karnataka and West Bengal" jointly with Centre for Flyash Research and Management (C-Farm), New Delhi.

Detailed study including field visits has been undertaken in the States of Delhi- NCR, Maharashtra, Karnataka and West Bengal with focus on three select cities in each of the States, namely: Delhi, Noida/ Greater Noida and Sonepat for Delhi- NCR; Mumbai, Pune and Nashik for Maharashtra; Bangalore, Mysore and Mangalore for Karnataka and Kolkata, Burdwan and Siliguri for West Bengal.

New Construction Technologies (NCTs) of six broad categories namely: (i) Precast concrete system: (a) Precast concrete element system and (b) 3D precast system, (ii) Formwork system: (a) Re-usable formwork system viz. aluminium formwork, jump/climbing formwork and tunnel formwork, (b) stay-in-place formwork system, viz. coffer formwork and insulating double wall reinforced EPC formwork system, (iii) EPS core panel system (iv) light gauge steel frame structure, (v) Steel structure system and (vi) wall panels offered by more than 50 technology suppliers became the candidates for "lookout for replications" in the four states of study.

Precast and Formwork technologies have been found to be easily replicable, acceptable and have been used in sufficient large number in the housing construction sector. Precast concrete elements system technology has been used in large numbers. 3D Precast system has been used in 2 projects only but in good number and have achieved the acceptance. Under Formwork systems: Aluminium formwork has been used on a very large scale while Jump/Climbing formwork and Tunnel formwork have been used on sufficient large scale and have got the acceptance.

112 projects have been identified as using the above said NCTs in the studied cities across the four States. Maharashtra has maximum number of projects (60 nos.) followed by Karnataka with 25 projects. Delhi-NCR has 21 projects and West Bengal has only 6 projects out of the identified 112 NCT projects. As regards to the NCTs, Aluminium Formwork has maximum number of projects (48 nos.) followed by Pre-cast Technology (42 nos.). Jump Formwork and Tunnel Formwork have 10 projects each. 3D Monolithic Pre-cast and MODUCAST pre-cast technologies have just made the entry with one project each. The induction of NCTs in residential construction sector has started as early as during 1996-2000 and it was at peak during 2011-2015 with launch of 74 projects with NCTs. I I2 projects with NCTs are providing 2,36,100 dwelling units. 59% of dwelling units are with pre-cast technology and 32% with Aluminium formwork. With respect to time frame 1,36,141 dwelling units were commissioned with NCTs during the period 2011-2015.

It can be said that Indian housing construction industry is amenable to NCTs. The industry has entered the exponential growth phase with Government Policy of "Housing for All" supported by fund availability for affordable units. The circumstantial compulsions are offering no choice but to go for multi storey and high-rise residential projects. Indian developers and builders have realized that NCTs are the viable technologies. Technology and service providers from abroad are setting up their establishments in India to facilitate adaptation of NCTs. Manufacture of formworks as well as pre-cast concrete elements have started in India. Some of the Government Agencies have started specifying use of NCTs in the tender documents. Indian housing construction sector is poised for NCTs. It may be supported & facilitated through Policy & fiscal measures.

#### ORGANISATION

The organogram of BMTPC is shown at next page. As on 31<sup>st</sup> March, 2019, BMTPC had a staff strength 37 comprising 18 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, responsiveness and greater participation of the employees:

- Implementation of extent 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 Evaluation
 Building Materials & Product Development
 Engineering Design & Performance Evaluation
 Demonstration, Construction & Exhibitions
 Exhibitions & Extension
 Demonstration Construction Systems Manager Cost Analysis & Estimation **BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL** Dy.Chief – Financial Chief – Finance Planning Abbreviations: CA&E Cost BM-PE Built BM-PD Built BM-PD Built ED-PE Eng CC&E Den E&E Exh **ORGANISATION CHART** President : Minister of State (I/C) for Housing & Urban Affairs Dy.Chief – Standardisation & Product Development Monitoring & Training Chief – Project Sr.Field Officer Development Officer –ED-PE о -Vice President : Secretary, Ministry of HUA Chairman : Secretary, Ministry of HUA **BOARD OF MANAGEMENT** EXECUTIVE COMMITTEE **Executive Director** Dy.Chief – Information & Documentation Chief – Building Materials Sr.Field Officer – E&E Development Officer –BM-PD Development Officer –BM-PE Dy.Chief – Technology Demonstration, Extension & International Chief – Technology Sr.Field Officer - DC&E Cooperation Marketing Development Officer – CA&E Dy.Chief – Human Settlements & Building Design Chief – Human Settlements & Building Design Sr.Field Officer - Architect

# STAFF STRENGTH (as on 31.3.2019)

<b>S.No.</b> I.	Name & Designation Dr. Shailesh Kr. Agrawal	Date of Joining 17.01.08
2.	S.Balasrinivasan Chief-Finance	08.04.92
3.	M. Ramesh Kumar Chief- Human Settlements & Building Design	01.04.93
4.	Arun Kumar Tiwari Chief-Project Monitoring & Training and Administration	22.07.03
5.	S.K.Gupta Deputy Chief-Technology, Demonstration Extension & International Cooperation	26.10.93
6.	Arvind Kumar Debuty Chief- Management Information Systems	15.04.99
7.	Chandi Nath Jha Deputy Chief- Standardization & Product Development	09.09.99
8.	Pankaj Gupta Debuty Chief Information & Documentation	14.10.99
9.	D.P.Singh Development Officer-Engineering Design & Product Evaluation	05.10.98
10.	Dalip Kumar Senior Field Officer- Demonstration Construction & Exhibition	04.03.91
11.	Alok Bhatnagar Senior Field Officer- Exhibition & Extension	05.10.98
12.	Akash Mathur Senior Field Officer- Architect	01.01.02
13.	Anita Kumar Sr. Programmer	03.10.96
14.	M.Ramakrishna Reddy Liaison Officer	29.10.03
15.	Pankaj Gupta Personnel Officer	01.03.94
16.	Praveen Suri Systems Analyst	01.09.94
17.	S.S.Rana Library Officer	01.04.98
18.	D.Prabhakar Field Officer	29.01.04

#### ACCOUNTS

The Council received grants of Rs. 5 crore towards salaries from the Ministry of Housing & Urban Affairs, Government of India during the FY 2018-19. The receipts from other sources like Fees, Consultancy, Training, DHP, DRMC, Interest, Publications, etc. were Rs. 3.95 crore.

- In addition, an amount of Rs. 20,000 Crore was borrowed from HUDCO on behalf of MoHUA and the same has been disbursed to the States / UTs as per the sanction orders of the MoHUA. An amount of Rs. 3.60 crore was credited in the said NUHF bank account towards interest.
- The total expenditure incurred was Rs. 200, 16, 58, 95, 768 during the year, as per Receipts & Payments Account Statement. A summary 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 Financial Assistance for technology development/application and Sponsored Studies	6,12,15,411
	Organisation and participation in various Seminars, Conferences, Workshops Housing for All (Handholding, Documentation, Sensitization and Capacity Building), Mainstreaming Emerging Technologies through Dissemination, Knowledge Transfer with State Govt.	1,65,58,333
	Expenses towards Capacity Building and Training Programmes and other activities relating to DRMC, and others	1,08,33,250
	Expenditure on Salary, Establishment & Administration expenses including office equipments, computer peripherals, etc.	7,72,88,774
~	Central Assistance under Pradhan Mantri Awas Yojana (Urban ) {PMAY (U)} - Housing For All from National Urban Housing Fund (NUHF) raised through Extra Budgetary Resource (EBR) borrowed from HUDCO disbursed to the States/ UTs as per the sanction orders of the MoHUA	2,00,00,00,00,000
	TOTAL	2,00,16,58,95,768

The Accounts have been audited by M/s M.S SEKHON & CO., Chartered Accountants, the balance sheet and the statement of accounts of the year 2018-19 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> 2019, 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, 2019;
- (b) In case Statement of Income and Expenditure Account, of the Surplus 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 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.



Phones & Fax : 91-11-42445194, 42445294, 42445394 E-mail : sekhonms@rediffmail.com

#### 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.



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

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Rajiv Tandon (FCA, Partner) Membership No. 087343 UDIN: 19087343AAAABE7339

Place: DELHI Date: 21.10.2019



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

#### BALANCE SHEET AS ON 31 MARCH 2019

			Amount (₹)
	Schedule	2018-19	2017-18
CORPUS/CAPITAL FUND AND LIABILITIES			
CORPUS/CAPITAL FUND	1	1,000,000	1,000,000
RESERVES AND SURPLUS	2	189,339,142	181,220,677
LONG TERM LIABILITY	3	280,000,000,000	80,000,000,000
EARMARKED FUNDS	4	-	141,250
CURRENT LIABILITIES AND PROVISIONS	5	9,590,365,187	233,047,007
TOTAL		289,780,704,329	80,415,408,934
ASSETS			
PROPERTY, PLANT & EQUIPMENT	6	28,421,092	31,593,607
NON-CURRENT ASSETS	7	280,000,000,000	80,000,000,000
CURRENT ASSETS, LOANS & ADVANCES ETC.	8	9,752,283,237	383,815,327
TOTAL		289,780,704,329	80,415,408,934
SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS	17		

As per our report of even date attached. For M S SEKHON & CO. Chartered Accountants FRN: 0036711 Station (Construction) Rajiv Tandor

(Partner) M.No.87343

Place: New Delhi Date: 21.10.2019 For Building Materials & Technology Promotion Council

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S. Balasrinivasan (Chief - Finance)

Dr. Shailesh Kr. Agrawal (Executive Director)



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

#### INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 MARCH 2019

			Amount (₹)
	Schedule	2018-19	2017-18
INCOME			
Grants / Subsidies	9	50,000,000	30,000,000
Demonstration Housing Project/Training Programmes/Seminar Receipts	10	62,134,000	3,354,240
Income from Publications and PAC's Fee etc.	11	1,643,139	2,505,394
Interest Earned	12	5,942,406	11,031,932
TOTAL (A)		119,719,545	46,891,566
EXPENDITURE		•	
Expenditure on Salary, Establishment & Adminstration	13	65,174,701	67,475,253
Expenditure on Dissemination / Seminars/Workshops, Training Programmes, HFA, etc.	14	6,884,890	12,228,432
Expenditure on Scientific & Technical (S&T) activities including Demonstration Housing Projects	15	30,576,805	40,476,295
Depreciation	6	3,402,002	3,849,648
TOTAL (B)		106,038,398	124,029,628
Surplus/(Defecit) for the year(A-B)		13,681,147	(77,138,062)
Prior Period Items		5,562,682	2,300,818
BALANCE BEING SURPLUS/(DEFECIT) CARRIED TO BALANCE SHEE	T	8,118,465	(79,438,880)

As per our report of even date attached. For M S SEKHON & CO.



Place: New Delhi Date: 21.10.2019 For Building Materials & Technology Promotion Council

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S. Balasrinivasan (Chief - Finance)

Dr. Shailesh Kr. Agrawal (Executive Director)

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

#### RECEIPTS & PAYMENT ACCOUNT FOR THE YEAR ENDED 31 MARCH 2019

	201	8-19	201	7-18
RECEIPTS				
1 Opening Balance				
Cash Balances in hand				8 217
Bank Balances				0,211
With Scheduled Banks:				
- Deposit with Canara Bank	108 719 043		187 200 000	
- On Savings Accounts:	100,110,010		107,200,000	
- Canara Bank	9 578 823		10 213 390	
- State Bank Of India	3 196 974		4 568 089	
- State Bank Of India(NUHF)	52 602 740	174 097 580	-	201 981 479
2 Grants-in-aid from Central Government (Ministry of Housing & Urban Affairs)		50,000,000		30,000,000
3 Receipts towards Fees/DRMC/Training Programme & seminar receipts		8,757,754		5,972,910
4 Loan & Advances(Net)		(#7)		2,571,616
5 Security Deposit etc		446,585		4,253,680
6 EBR for NUHF Fund		200,000,000,000		80,000,000,000
7 Interest received on NUHF Fund payable to MoHUA		36,017,505		52,602,740
8 Receipts from NHB towards Demonstration Housing Project at Odisha		19,435,000		18,594,000
9 Receipts towards sale of publications, PACS etc		1,623,859		2,423,794
10 Interest Earned		9,336,567		17,471,261
TOTAL		200,299,714,850	North Contraction	80,335,879,697
PAYMENTS				
1 Purchase of Fixed Assets	229,487		179,090	
2 Expenditure on Salary, Establishment & Administration	73,505,776		64,235,397	
3 Expenditure on Training Programmes, Seminars/DRMC/Workshops, etc.	16,558,333		13,378,841	
4 Expenditure on Scientific & Technical (S&T) activities including Demonstration Housing Projects	28,714,466	119,008,062	40,476,295	118,269,623
5 Loan & advances(Net)		3,553,511		
6 Security Deposit etc		1,520,945		46,585
7 Earmarked funds				
National Urban Housing Fund	200,000,000,000		80,000,000,000	
UNDP/Rejuvenation and strengthening of Building Centers	141,250		612,325	
Demonstration Housing Project in various states	30,980,000		40,217,584	
Data Resource Monitoring Cell	10,692,000	200.041,813,250	2,636.000	80,043,465,909
8 Closing Bank Balances				
- Deposit with Canara Bank	39,600,000		108,719,043	
- On Savings Accounts:				
- Canara Bank	631,081		9,578,823	
- State Bank Of India	4,967,756		3,196,974	
- State Bank Of India(NUHF)	88,620,245	133,819,082	52,602,740	174,097,580
	71			6

As per our report of even date attached. For M S SEKHON & CO. Chartered Accountants

> Rajiv Tandon (Partner) M.No.87343

EDAC

For Building Materials & Technology

**Promotion Council** 

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S. Balasrinivasan (Chief - Finance)

Dr. Shailesh Kr. Agrawal Executive Director

Place: New Delhi Date: 21.10.2019



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

#### SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2019

				Amount ( ₹)
SCHEDULE 1- CORPUS/CAPITAL FUND	2018-	19	2017	-18
Balance as at the beginning of the year		1,000,000		1,000,000
IUIAL		1,000,000		1,000,000
SCHEDULE 2- RESERVES AND SURPLUS	2018-	19	2017	-18
1. Capital Reserve				
Opening Balance	90,104,849		89,925,759	
Addition during the year	229,487	90,334,336	179,090	90,104,849
2. Excess of Income over Expenditure				
Opening Balance	91,115,828		170,733,798	
Less : Amount transferred from Income & Expenditure A/c	8,118,465		(79,438,880)	
Less: Transferred to Capital Reserve	99,234,293 229,487	99.004.806	91,294,918 179.090	91.115.828
TOTAL		189 339 142		181 220 677
IUIAL		103,335,142		101,220,011
SCHEDULE 3- LONG TERM LIABILITY	2018-	19	2017	-18
National Urban Housing Fund				
1.Loan from National Small Savings Fund for disbursement as Central Assistance to States/UTs under PMAY(U) Mission		80,000,000,000		80,000,000,000
2.Loan from HUDCO for disbursement as Central Assistance to States/UTs under PMAY(U) Mission		200,000,000,000		
TOTAL		280,000,000,000		80,000,000,000
SCHEDULE 4- EARMARKED FUNDS	2018-	19	2017-	-18
1 UNDP-Developing Toolkit for Urban Managers Opening Balance Received during the year	141,250		141,250	
Less : Utilisation/Expediture during the year	141,250	• •		141,250
2 Data Resource Cum Monitoring Centre Received during the year	6,664,000		2,636,000	
Add:Amount Recoverable During the Year	4,028,000			
Less : Utilisation/Expenditure during the year	10,692,000	• •	2,636,000	-
3 National Urban Housing Fund	200,000,000,000		80.000.000.000	
Less: Disbursement during the year (Schedule 16)	200,000,000,000		80,000,000,000	
4 Demonstration Housing Project at Patoa Bibarshariff		-		
Received during the year			8,945,000	
Amount Recoverable during the year	14,900,000		5,963,000	
Less Amount ounzed during the year	14,900,000		14,900,000	-
5 Demonstration Housing Project at Lucknow Received during the year			9,649,000	
Amount Recoverable during the year	16,080,000		6,432,000	
Less:Amount Utilized during the year	16,080,000	· · ·	16,081,000	-
6 Demonstration Housing Project at Odisha			0 400 504	
Opening Balance Amount Recoverable during the year			2,188,584 7,040,000	
Less:Utilisation/Expenditure during the year	<u> </u>	· · .	9,228,584	-
7 Rejuvenation and strenthening of Building Centres				
Opening Balance	-		612,325	
Less:Utilisation/Expenditure during the year	·		612,325	-
TOTAL		•		141,250
SCHEDULE 5- CURRENT LIABILITIES AND PROVISIONS	2018-	19	2017-	18
CURRENT LIABILITIES				
- Outstanding Liabilities		2,515,160		5,196,280
<ul> <li>Interest accrued and due to NSSF(NUHF Fund)</li> </ul>		6,720,000,000		0,919,221
- Interest accrued but not due to NSSF(NUHF Fund)		220,931,506		220,931,506
<ul> <li>Interest accrued but not due to HUDCO(NUHF Fund)</li> <li>Amount Refundable to Ministry(NUHF saving bank Interest)</li> </ul>		2,552,500,000 88,620,245		-
TOTAL		9,590,365,187		233,047,007
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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 2019

							01 01 00	Amount ( ₹ )
SCHEDULE 6- PROPERTY, P	LANT & EQUI	PMENT					2018-19	2017-18
		<b>GROSS BLOCK</b>			DEPRECIATION		NET BLOCK	NET BLOCK
	<u>Cost as at</u> 01.4.18	Additions	Total	Upto 01.04.18	Current year	Upto 31.03.19	As at 31.03.19	As at 31.03.18
Land	749,317		749,317	1	1	-	749,317	749,317
Office Building	33,570,500		33,570,500	6,378,395	2,719,211	9,097,606	24,472,894	27,192,105
Furniture and Fixtures	3,662,007	108,008	3,770,015	2,926,330	79,710	3,006,040	763,975	735,677
Office Equipments	19,611,804	52,479	19,664,283	18,187,089	219,847	18,406,936	1,257,347	1,424,715
Computers/ Peripherals	18,929,476	69,000	18,998,476	18,346,813	246,865	18,593,678	404,798	582,663
Air conditioners	1,035,166	,	1,035,166	791,224	36,591	827,815	207,351	243,942
Fan & Coolers	81,224		81,224	59,404	3,273	62,677	18,547	21,820
TV and VCR	380,450	1	380,450	339,478	6,146	345,624	34,826	40,972
Exhibits, Panels, Display Models	12,084,905		12,084,905	11,482,509	90,359	11,572,868	512,037	602,396
	90,104,849	229,487	90,334,336	58,511,242	3,402,002	61,913,244	28,421,092	31,593,607
Previous Year (2017-18)	89,925,759	179,090	90,104,849	54,661,594	3,849,648	58,54,000	31,593,607	35,264,165

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Building Materials & Technology Promotion Council

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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 2019

				Amount (₹)
SCHEDULE 7- NON CURRENT ASSETS	201	8-19	2017	7-18
1.Amount Recoverable from MoHUA for repayment of loan taken from NSSF for National Urban Housing Fund under PMAY(U) Mission		80,000,000,000		80,000,000,000
2.Amount Recoverable from MoHUA for repayment of loan taken from HUDCO for National Urban Housing Fund under PMAY(U) Mission		200,000,000,000		-
TOTAL		280,000,000,000	and some set	80,000,000,000
SCHEDULE 8 - CURRENT ASSETS, LOANS, ADVANCES ETC.	2018	8-19	2017	7-18
A. <u>CURRENT ASSETS:</u>				
1. Bank Balances				
- Deposit with Canara Bank	39,600,000		108,719,043	
- On Savings Accounts:				
- Canara Bank	631,081		9,578,823	
- State Bank of India	4,967,756		3,196,974	
- State Bank of India(NUHF)	88,620,245	133,819,082	52,602,740	174,097,580
B. LOANS, ADVANCES AND OTHER ASSETS				
1. Advances to staff	1,305,542	1,305,542	1,790,963	1,790,963
2. Amount Recoverable from MoHUA under NUHF-Central Assistance from EBR under PMAY(U)	9,493,431,506	9,493,431,506	168,328,766	168,328,766
3. Advances and other amounts recoverable in cash or in kind or value to be received				
a.Amount Recoverable & other Advances	3,481,319		4,021,376	
b.Amount recoverable from NHB	30,980,000		19,435,000	
c.Amount Recoverable from Ministry against Various Demonstration Housing Project & GHTC Conference	75,432,443		-	
d.Security Deposit (Space)	420,000		466,585	
d.Tax Deducted at Source & GST Recoverable	12,341,302	122,655,064	11,136,807	35,059,768
3. Interest Accured on FDR's		1,072,043		4,538,250
TOTAL (A + B)		9,752,283,237		383,815,327



#### 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 2019

		A	mount (₹)
sci	HEDULE 9- GRANTS/SUBSIDIES (Irrevocable Grants & Subsidies Received)	2018-19	2017-18
1	Central Government (Ministry of Housing & Urban Affairs, Government of India)	50,000,000	30,000,000
	TOTAL	50,000,000	30,000,000
SC	HEDULE 10 - FEES/SUBSCRIPTIONS	2018-19	2017-18
1	Training Programmes/Seminar Receipts/Demonstration Housing Projects	62,134,000	3,354,240
	TOTAL	62,134,000	3,354,240
sci	HEDULE 11- INCOME FROM PACS FEE, PUBLICATION ETC.	2018-19	2017-18
1	Receipts towards sale of publications, PACS etc	1,643,139	2,505,394
	TOTAL	1,643,139	2,505,394
sci	HEDULE 12- INTEREST EARNED	2018-19	2017-18
1	On Term Deposits With Scheduled Banks	5,166,081	10,223,162
2	On savings Accounts With Scheduled Banks	704,279	523,461
3	On Advance to employees	72,046	285,309
	TOTAL	5,942,406	11,031,932
sci	HEDULE 13- EXPENDITURE ON SALARY, ESTABLISHMENT & ADMINISTRATION	2018-19	2017-18
1	Pay and Allowances	54,016,967	57,700,258
2	Leave Travel Concession	511,263	326,312
3	Reimbursement of Medical Expenses	1,164,561	968,027
4	Honorarium	219,259	332,500
5	Administration Expenses	9,262,651	8,148,156
	TOTAL	65,174,701	67,475,253
SC PR	HEDULE 14 - EXPENDITURE ON DISSEMINATION / SEMINARS/WORKSHOPS, TRAINING OGRAMMES, HFA, ETC.	2018-19	2017-18
1	Exhibition and publicity	1,147,056	1,535,190
2	Seminar and Conference Expenses	2,465,435	1,128,326
3	Printing, Publication & Advertisement	1,469,653	1,988,243
4	Books and Periodicals	50,838	74,417
5	Supervision and Monitoring of Demonstration Housing Project in various parts of India	699,558	666,619
6	Housing for All(Handholding,documentation,sensitization & Capacity Building)	710,304	4,062,961
/ 0	Disaster milligation & Management	342,040	390,971
9	Main streaming Emerging Technologies through Dissemination, Transfer and Exchange with		1,190,854
	TOTAL	6,884,890	12,228,432
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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 MARCH 2019

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Sub-Total (A)

_				Amount (₹)
SC IN		DULE 15 - EXPENDITURE ON SCIENTIFIC & TECHNICAL (S&T) ACTIVITIES DING DEMONSTRATION HOUSING PROJECTS	2018-19	2017-18
A	Bui	Iding Materials & Construction Technologies		
	1	Construction of demonstration housing project at Lucknow	7,643,927	1,484,705
	2	Construction of demonstration housing project at Bhubaneshwar	1,760,285	4,234,320
	3	Construction of demonstration housing project and community centre at Nellore	108,414	2,111,004
	4	Construction of demonstration housing project at Telangana, Hyderabad	14,221,491	22,246,254
	5	Construction of demonstration housing project at Bihar Sharif	2,506,203	2,303,617
	6	Performance appraisal certification scheme	562,071	981,349
	7	Assessment of statewise total brick requirement and number of clay brick being manufactured in India	100,000	24,680
	8	Documentation of Housing Projects Involving New Construction Technologies in the states of Delhi-NCR, Maharashtra, Karnataka and West Bengal	1,000,000	-
	9	Development of educational material in Pedagogic form on emerging technologies namely steel structural system by IIT Kharagpur	373,750	
	10	HUMotor: A Human way to utilize the human efforts at workplace		27,196
	11	Testing & validation of multi attributes evaluation framework for emerging technologies for housing	-	522,200
	12	Development of fly ash based advanced Ligno-Silico-Aluminious Geopolymeric Binder useful for making cement free green concrete	-	200,000
	13	Soil investigation & preparation of detailed survey plan for DHP at Guwahati,Assam		124,806
	14	Development of commercial process for utilisation of pond ash in manufacture of cold setting building brick and block		60,000
	15	Demonstration of bamboo based technology in New Delhi	-	10.400
	16	Development of knowledge network portal for sustainable habitat in India		408,250
	17	Estimation of embodied energy for low carbon building construction	-	169,200

28,276,141 34,907,981



#### 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 2019

				Amount (₹)
SC AS	HED SIS1	DULE 15 - EXPENDITURE ON SPONSORED STUDIES, FINANCIAL	2018-19	2017-18
в	Cap	pacity Building & Skill Development		
	1	Training Programme for fly ash brick manufacturers and potential Entrepreneurs at Delhi-NCR & Cuttack,Odisha	67,469	272,500
	2 3	Production of short films on Emerging Housing Technologies Preparation of Audio Visual Presentation on PMAY	620,933 174,400	360,000
	4	Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing at Bhopal	184,769	-
	5	Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing at Lucknow	235,087	-
	6	Capacity Building Programme on Emerging Technologie	250,000	
	7	Workshop on utilisation of construction & demolition c&d waste in construction of dwelling units & related infrastructure	100,000	
	8	Training Workshop on use of Bamboo for Housing & Building construction	400,000	
	9	Training Programme on bamboo based toilet construction at Kaziranga, Assam		100,000
	10	Capacity building programmes on good construction practices including emerging technologies at Kerala		217,208
	11	Film on EPS Based panel system	-	103,500
	12	Hosting of knowledge web portal at BMTPC	-	117,014
	13	Developing of mobile application on construction of bamboo based technology for housing		400,000
	14	Developing of curriculum on sustainable building technology for engineering and architecture education	-	316,500
	15	National seminar on Emerging Building Materials Construction Technology at New Delhi		1,659,170
	16	National consultation on Housing for All under PMAY	-	1,063,261
	17	National workshop on use of construction & demolition waste in housing technologies		100,000
		Sub-Total (B)	2,032,658	4,709,153
с		Disaster Mitigation & Management		
	1	Design,development & implementation of mobile application for earthquake hazard zonning maps of india	136,045	381,578
	2	Preparation of vulnerability Atlas of India	131,961	19,985
	3	Preparation of Disaster management plan	-	422,500

 3
 Preparation of Disaster management plan

 4
 Technical workshop for Engineers in Aizwal to develop capacity in Earthquake Resistant Construction

 Sub-Total (C)
 268,006
 859,161

 TOTAL (A+B+C)
 30,576,805
 40,476,295



35,098

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

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#### SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON 31 MARCH 2018

			Amount (₹ )
CHED	ULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
1	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 35 BLC Project	638,340,000	1,298,640,000
2	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 46 BLC Project	420,540,000	1,520,640,000
3	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 17 BLC Project	288,900,000	292,200,000
4	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 6 AHP Project	2,611,380,000	526,620,000
5	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for HUDCO for CLSS Schemes	1,900,000,000	350,000,000
6	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jammu & Kashmir for 84 BLC Project	155,394,000	483,829,300
7	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 36 BLC Project	812,460,000	661,440,000
8	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 119 BLC Project	329,100,000	146,760,000
9	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 76 BLC Project	71,008,800	53,520,000
10	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Pradesh for 1 AHP Project	135,360,000	123,388,000
11	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Nagaland for 2 BLC Project	23,940,000	11,700,000
12	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the National Housing Bank (NHB) (CLSS for EWS/LIG)	25,500,000,000	6,000,000,000
13	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Odisha for 27 BLC Project	292,500,000	156,300,000
14	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Sikkim for 2 BLC Project	4,740,000	9,600,000
15	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 50 BLC Project	707,640,000	1,090,980,000
16	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 6 AHP Project	139,740,000	53,700,000
17	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tripura for 20 BLC Project	120,000	174,700,000
18	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 78 AHP Project	3,984,360,000	-
19	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 40 AHP Project	6,572,100,000	-
20	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 14 BLC Project	422,100,000	-
21	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 67 BLC Project	3,931,980,000	-
22	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 24 BLC Project	1,244,340,000	-
23	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 16 BLC Project	563,280,000	-
24	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 16 AHP Project	3,852,180,000	-
25	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 16 BLC Project	835,020,000	•
26	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 34 BLC Project	430,740,000	ELHON & CO

			Amount (₹)
SCHEI	DULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
27	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 32 BLC Project	3,358,080,000	-
28	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 17 AHP Project	3,001,740,000	-
29	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Assam for 06 BLC Project	10,260,000	-
30	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 12 BLC Project	634,860,000	-
31	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 10 BLC Project	166,320,000	-
32	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 24 BLC Project	155,100,000	-
33	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 31 BLC Project	559,020,000	-
34	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 54 BLC Project	1,542,240,000	-
35	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Bihar for 57 BLC Project	352,352,000	-
36	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Chhattisgarh for 9 AHP Project	176,698,000	-
37	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Chhattisgarh for 122 BLC Project	519,840,000	-
38	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Chhattisgarh for 365 BLC Project	212,040,000	-
39	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Chhattisgarh for 196 BLC Project	1,288,260,000	-
40	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 62 BLC Project	413,820,000	-
41	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 64 BLC Project	573,600,000	-
42	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 11 BLC Project	158,640,000	-
43	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 97 BLC Project	673,320,000	-
44	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 4 AHP Project	210,900,000	-
45	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 4 Ray Project	90,768,000	-
46	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 8 AHP Project	232,392,000	-
47	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Haryana for 74 BLC Project	390,480,000	-
48	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Haryana for 170 BLC Project	160,860,000	-
49	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for HUDCO for CLSS Schemes	800,000,000	-
50	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jammu & Kashmir for 19 BLC Project	152,273,000	-
51	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 16 BLC Project	249,300,000	-
52	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 24 BLC Project	494,760,000	
53	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 36 BLC Project	871,800,000	-
54	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 36 BLC Project	689,460,000	-
55	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 36 BLC Project	466,920,000	, · · -
56	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 01 BLC Project	14,340,000	-
57	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 151 BLC Project	522,600,000	-

_			Amount (₹)
SCHED	ULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
58	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 105 BLC Project	299,880,000	-
59	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 354 BLC Project	623,160,000	-
60	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Kerala for 339 BLC Project	4,357,746,000	-
61	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 137 BLC Project	2,561,340,000	-
62	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 137 BLC Project	1,620,000	-
63	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 54 BLC Project	1,126,440,000	-
64	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 39 BLC Project	1,115,340,000	-
65	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 28 BI C Project	837,720,000	-
66	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 37 BLC Project	713,940,000	-
67	Central Assistance under Pradhan Manth Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 47 BLC Project	865,860,000	-
68	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Bradesh for 1 AHP Project	12,240,000	-
69	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Mathua Pradesh for 145 BLC Project	2,821,080,000	-
70	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Querement of Mathian Bradesh for 232 BLC Brainet	2,058,960,000	-
71	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	510,420,000	-
72	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	34,500,000,000	-
73	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	25,000,000,000	-
74	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	281,520,000	-
75	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	636,300,000	-
76	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	360,900,000	-
77	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	77,814,000	-
78	All Mission for the Government of Odisha for 1 Ray Project Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	255,013,000	· -
79	All Mission for the Government of Odisha for 07 Ray Project Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	224,406,300	-
80	All Mission for the Government of Punjab for 195 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	146,400,000	-
81	All Mission for the Government of Rajasthan for U/ AHP Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	442,440,000	-
82	All Mission for the Government of Tamil Nadu for 35 AHP Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	139,443,000	1
83	All Mission for the Government of Tamil Nadu for 58 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	180,540,000	-
84	All Mission for the Government of Tamil Nadu for 07 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	367,260,000	-
85	All Mission for the Government of Tamil Nadu for 12 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	329,820,000	-
86	All Mission for the Government of Tamil Nadu for 12 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	299,940,000	
87	All Mission for the Government of Tamil Nadu for 13 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	294,300,000	
88	All Mission for the Government of Tamil Nadu for 123 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 23 BLC Project	449,820,000	
			RED ACCOUNT

			Amount (₹)
CHED	ULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
89	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 130 BLC Project	929,760,000	-
90	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 01 AHP Project	13,020,000	-
91	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 2 AHP Project	5,760,000	-
92	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 86 BLC Project	1,002,660,000	-
93	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 275 BLC Project	1,689,195,000	-
94	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 435 BLC Project	5,023,045,000	-
95	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 438 BLC Project	9,417,360,000	-
96	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Littar Pradesh for 490 BLC Project	429,180,000	
97	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Littar Pradesh for 884 BL C Project	1,718,279,000	
98	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 02 AHP, Project	31,600,000	
99	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for (A AHP, Project	338,938,900	
100	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 08 AHB, Broject	201,600,000	-
101	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 104 BIC Project	1,660,260,000	
102	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 104 BLC Project	859,834,000	-
103	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 282 BL C Project	5,610,060,000	-
104	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Litter Pradesh for 516 BIC Project	7,255,920,000	-
105	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Littersthand for 14 BL C. Breiset	52,800,000	-
106	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of West Rangel for 12 BL C. Project	642,820,000	-
107	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of West Bengal for 26 BI C. Project	1,722,120,000	-
108	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Wast Bangal for 28 BI C. Project	1,070,460,000	-
109	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of West Bangal for 86 BL C. Project	112,860,000	-
110	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of West Bangal for 91 BL C. Project	3,310,500,000	-
111	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Andhra Pradesh for 26 AHP Project	-	4,060,073,000
112	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Covernment of Agrouph Pradesh for 181 C Project		95,580,000
113	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Microsoft For Angel Control of Angel Angel Control of Angel	-	108,660,000
114	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for		806,760,000
115	All Mission for the Government of Assam for 50 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for		820,680,000
116	All Mission for the Government of Assam for 66 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for		2,280,000
117	All Mission for the Government of Andaman & Nicobar for 1 BLC Project Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for	A	1,047,420,000
118	All Mission for the Government of Chhattisgarh for 19 AHP Project Central Assistance under Pradhan Mantri Awas Yoina (PMAY) (URBAN)-Housing for	SERHONAC	3,056,340.000
	All Mission for the Government of Chhattisgarh for 349 BLC Project	* CHIMACCOUNT	

			Amount (₹)
SCHED	ULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
119	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Dadra & Nagar Haveli for 1 AHP Project	-	111,360,000
120	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Daman & Diu for 2 AHP Project	-	17,940,000
121	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 2 AHP Project	-	85,512,730
122	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 20 BLC Project	-	651,300,000
123	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 5 AHP Project	-	374,760,000
124	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Gujarat for 6 ISSR Project	-	42,760,000
125	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Haryana for 93 BLC Project	-	1,081,200,000
126	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 7 AHP Project	-	1,609,955,000
127	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Jharkhand for 17 AHP Project	-	2,026,970
128	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karanataka for 220 BLC Project	· ·	1,524,780,000
129	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 234 BLC Project	-	937,260,000
130	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 3AHP Project		70,620,000
131	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 51 BLC Project	-	131,220,000
132	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 10 AHP Project		6,594,240,000
133	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 12 AHP Project		961,560,000
134	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Karnataka for 110 AHP Project	-	2,897,928,000
135	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Kerala for 52 BLC Project	-	162,420,000
136	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Kerala for 49 BLC Project		343,140,000
137	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Kerala for 75 BLC Project	-	833,820,000
138	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhy Pradesh for 56 BLC Project	-	1,325,940,000
139	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Pradesh for 133 BLC Project	-	2,500,440,000
140	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Pradesh for 15 AHP Project	-	884,580,000
141	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Pradesh for 340 BLC Project	-	8,144,400,000
142	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Madhya Pradesh for 4 AHP Project	-	1,715,040,000
143	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Mizoram for 6 BLC Project	-	425,400,000
144	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Mizoram for 7 BLC Project	•	149,400,000
145	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Odisha for 88 BLC Project	A	1,031,700,000
146	Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Puducherry for 3 BLC Project	HERE HOW & CO	77,220,000

		Amount (₹)
CHEDULE 16 - NUHF-Central Assistance from EBR under PMAY (U)	2018-19	2017-18
147 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Puducherry for 4 BLC Project	-	90,660,000
148 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Punjab for 117 BLC Project	-	637,453,000
149 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Rajasthan for 06 AHP Project	•	332,160,000
150 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Rajasthan for 9 AHP Project	-	318,846,000
151 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 34 AHP Project	-	837,060,000
152 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tamil Nadu for 8 AHP Project	-	228,780,000
153 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Telangana for 100 AHP Project	-	4,719,960,000
154 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Telangana for 73 AHP Project	-	603,703,000
155 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Tripura for 20 BLC Project		163,181,000
156 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 06 AHP Project	-	273,120,000
157 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 20 AHP Project	-	1,113,622,000
158 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 44 BLC Project	-	547,920,000
159 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttar Pradesh for 644 BLC Project	-	10,565,798,000
160 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttarakhand for 10 BLC Project	-	58,380,000
161 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttarakhand for 2 AHP Project	-	144,000,000
162 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of Uttarakhand for 75 BLC Project		423,660,000
163 Central Assistance under Pradhan Mantri Awas Yojna (PMAY) (URBAN)-Housing for All Mission for the Government of West Bengal for 70 BLC Project	-	1,301,964,000
Total	200,000,000,000	80,000,000,000



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

Ministry of Housing & Urban Affairs, Government of India

#### SCHEDULE 17: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS

Overview

7

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

- Significant Accounting Policies-
  - System of Accounting: The accounts have been prepared to comply with all material aspects with applicable principals in India a) and notified Accounting Standards.
  - Property,Plant & Equipment: Fixed assets are stated at cost of acquisition less accumulated depreciation provided as per b) 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.
  - Depreciation: Depreciation is provided at written down values rates and in the manner as specified in the Income Tax Act 1961. c)
  - Government Grants: d)

(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.

- **Retirement Benefits**e)
  - (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) Liability in respect of Gratuity and Leave Encashment to employees is provided by way of premium paid to LIC and is charged to revenue in the year of payment.

- General: Accounting policies not specifically mentioned are otherwise in consonance with generally accepted accounting practices. f) Contingent Liabilities: Claims against the Council not acknowledged as debts - NIL.
- 2
- In opinion of the Management, the amount on realization of current assets, loans and advances in the ordinary course of business would 3 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.
- The Council is registered under section 12AA of the Income Tax Act and its income is exempt from Income Tax.Provision for Income 4 Tax has thus not been made in the accounts. The Council is regularly depositing TDS, GST and other statutory liabilities with the government authorities
- Income and Expenditure: Since there are large number of income and expenditure accounting heads, expenses and revenue of similar 5 nature and falling under different Heads are clubbed together wherever required for better presentation of financial statements.
- 6 Prior period item includes tax for previous years, arrear of property tax paid for the years from 2004-05 to 2017-18
  - 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 fulfil the repayment obligations at the agreed upon terms and conditions as decided by the Ministry of Finance.
  - 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 b) 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) During the year, the council has received an amount of Rs.20,000 crore from HUDCO(Previous year Rs.8000 crore from NSSF) as loan on behalf of Government of India and the entire amount has been disbursed to States/UT's and Central Nodal Agencies under the PMAY(U) scheme.
  - The principal and interest payable to the lenders on loans taken under National Urban Housing Fund (NUHF) for PMAY (Urban) d) 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.
- Previous year figures have been rearranged & regrouped wherever required and all the above said information has been given by the 8 management and relied upon by the auditors
- Schedule 1 to 17 annexed to and form integral part of financial statements for the year ended 31.03.2019. Q

As per our report of even date attached. For Building Materials & Technology For M S SEKHON & CO. **Promotion Council** HON & Chartered Accountants FRN: 003671N S.B. Simualon Yana ELHI onden 1 Rajlv Tandon S. Balasrinivasan Dr. Shailesh Kr. Agrawal (Partner) Chief (Finance) (Executive Director) DACC M.No.87343

Place: New Delhi Date: 21.10.2019

#### **ANNEXURE I**

#### PARTICIPATION IN NATIONAL AND INTERNATIONAL EVENTS

I. EXHIBITIONS

**DNS** During the year, the Council actively participated in various exhibitions which have helped in sharing knowledge and experience in cost effective & emerging, environment friendly and energy efficient building materials, construction technologies and simple machines for production of building components including emerging technologies:

- Exhibition "Srishti" during May 22-24, 2018 at Dayananda Sagar College of Engineering, Bengaluru
- Govt. Achievements & Schemes Expo organised by National News Service (NNS) Events & Exhibitions Pvt. Ltd. during July 27-29, 2018 at Pragati Maidan, New Delhi
- 22<sup>nd</sup> National Exhibition on the Theme of "New India: Future Leader of the Globe" organised by Central Calcutta Science & Culture Organisation for Youth during August 3-6, 2018 at Kolkata
- 6<sup>th</sup> Indian National Exhibition cum Fair 2018 (National Level Science, Technology, Mass Awareness Exhibition & Seminar) organised by Bengal Human Resource Development Foundation during July 26-29, 2018 at Kolkata
- Municipalika 2018, 15<sup>th</sup> International Exhibition & Conference on Smart and Sustainable City Solutions and Innovative Building Materials and Technologies on September 19-21, 2018 at Mumbai
- Exhibition of Prize Winning Paintings of Differently Abled Children on the theme "Municipal Solid Waste Management" during World Habitat Day 2018 celebration on October 5, 2018 at New Delhi
- 23<sup>rd</sup> Sundarban Krishi Mela from 20-29 December, 2018 at Kultali, Sourh 24 Parganas, West Bengal
- BMTPC's Display during Global Housing Technology Challenge -India (GHTC-India), Construction Technology India 2019 Expocum-Conference on 2-3 March, 2019 at New Delhi

#### II. SEMINARS/ CONFERENCES/ WORKHOPS/TRAINING PROGRAMMES etc.

- Training cum Workshop for Experts/PSPs of PMU team under PMAY(U) on April 16, 2018, New Delhi
- CPWDTraining Programmes for Engineers on New and Emerging Construction Technologies – 16-18 May, 2018, National CPWD Academy, Ghaziabad
- Sensitization Programme on Good Construction Practices & Emerging Technologies for housing for PMAY (U) was organized on 2<sup>nd</sup> June 2018 in Lucknow
- The Massive Earth Summit 2018, 6-7 June, 2018, New Delhi
- Workshop on Rajbhasha on June 30, 2018 at New Delhi
- Interactive session for Local Construction and Logistics Support Partners under "Global Housing Technology Challenge-India (GHTC-India)" on August 21, 2018 at New Delhi
- Capacity Building Programme on "Good Construction Practices including Emerging Technologies for Housing" on August 30-31, 2018 at Jodhpur, Rajasthan
- Training programme on 'Swachhta Hi Sewa' organized by HPL on October 1, 2018 at HPL, New Delhi
- Workshop on 'Eradicate Corruption Build a New India" on October 30, 2018 at CPWD Conference Hall, New Delhi

Workshop on Use of Bamboo in Housing & Building Construction from October 24 to November 2, 2018 at Namsai, Arunachal Pradesh

- Brain storming workshop on 3-D Construction Technology organized by IIT Madras on November 15, 2018 at Chennai
- TERI-GRIHA Summit on December 11, 2018 at New Delhi
- Seminar on "Emerging Technologies for Affordable Housing: Opportunities and Challenges", was organized on December 17, 2018 at Amity University, Noida

- CESDOC 2018 2<sup>nd</sup> International Conference on Civil Engineering for Sustainable Development, Opportunities and Challenges December 18-20, 2018 at Guwahati.
- National Seminar on Emerging Building Materials and Sustainable Construction Technology (NSEBMSCT- 2019) was organized from 14-15 March 2019 Gautam Buddha University, Greater Noida
- "GHTC-India Launch" organized by MoHUA on January 14, 2019 at National Media Centre, New Delhi
- Interactive session with Heads of the Foreign Missions on GHTC-India organized by MoHUA on January 21, 2019 at New Delhi
- Global Housing Technology Challenge India (GHTC-India), Construction Technology India 2019 Expo-cum-Conference on 2-3 March, 2019 at New Delhi
- Seminar for DDA Engineers on New Technologies, March 15, 2019 at New Delhi

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

- 33<sup>rd</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on April 27, 2018 at New Delhi.
- 54<sup>th</sup> meeting of the Executive Committee of BMTPC held under the Chairmanship of Secretary, MoHUA on April 27, 2018 at New Delhi.
- 34<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on May 30, 2018 at New Delhi.
- Jury Panel meeting of School of Planning & Architecture on June 11, 2018 at New Delhi.
- Review of PMAY(Urban) by Secretary (H&UA) on June 16,2018 at New Delhi

35<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on June 25, 2018 at New Delhi
- Meeting of Expert Group on Vulnerability Atlas of India on June 26, 2018 at New Delhi
- Hindi Karyashala by BMTPC on July 3, 2018 at BMTPC New Delhi
- CPWD Foundation Day celebration held on July 12, 2018 at Vigyan Bhawan, New Delhi
- 36<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on July 24, 2018 at New Delhi
- Meeting on New Emerging Construction Systems organized by CPWD on August 3, 2018 at New Delhi.
- Preparatory meeting for celebration of World Habitat Day 2018 on August 8, 2018 chaired by Addl. Secretary (H), MoHUA at New Delhi
- 14<sup>th</sup> meeting of Technical Assessment Committee (TAC) of PACS held on August 10, 2018 at New Delhi
- Meeting on effective utilization of 'Flyash' in construction sector chaired by with JS(Textile) on August 14, 2018 at Udyog Bhawan, New Delhi
- 37<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on August 23, 2018 at New Delhi
- Training Programme on Emerging Construction Technology organized by HPL on August 24, 2018 at New Delhi
- Meeting of the Expert Committee constituted by NITI Aayog for effective utilization of Fly Ash under the Chairmanship of JS, M/o EF&CC on September 5, 2018 at New Delhi
- 38<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on September 26, 2018 at New Delhi
- Meeting with Secretary, M/o EF&CC on C&DWaste Management held on October 5, 2018 at New Delhi
- Meeting to discuss the status of implementation of the restructured National Bamboo Mission chaired by JS & Mission Director (NBM) on October 5, 2018 at New Delhi

- Meeting with Ministry's Hindi Officials to see the progress of Hindi use in official matter at BMTPC on October 9, 2018
- Meeting chaired by Secretary (HUA) regarding issues related to use of Textiles, Fly Ash and C&D waste and review the progress on October 10, 2018 at New Delhi
- 39<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on October 30, 2018 at New Delhi
- Rajbhasha Hindi Karyashala Karyawan Samiti meeting on October 31, 2018 chaired by JS(Admn.) at New Delhi
- 55<sup>th</sup> Executive Committee (EC) meeting of BMTPC on November 11, 2018 at Nirman Bhawan, New Delhi
- 40<sup>th</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on November 28, 2018 at New Delhi
- Meeting of the Expert Group on revision of Vulnerability Atlas of India on December 12, 2018 at BMTPC, New Delhi
- 41<sup>st</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on December 27, 2018 at New Delhi
- 19<sup>th</sup> Meeting of the Board of CIDC held on January 4, 2019 at New Delhi
- Study Tour of Standing Committee on Urban Development to Guwahati and Kolkata on 17 & 18 January, 2019
- Study tour of Standing Committee on Urban Development to Port Blair and Vishakhapatnam from 19 to 22 January, 2019
- Meeting regarding Use of Bamboo in Disaster Resilient Infrastructure under the chairmanship of Member, NDMA on January 24, 2019 at NDMA New Delhi
- 42<sup>nd</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on January 30, 2019 at New Delhi
- Review Meeting of Building Energy Efficiency Projects at IIT, Delhi on February 8, 2019 at New Delhi

- 43<sup>rd</sup> meeting of CSMC of PMAY(U) under the Chairmanship of Secretary, MoHUA on February 25, 2019 at New Delhi
- 71<sup>st</sup> meeting of ResearchAdvisory Committee (RAC) of NCCBM held on March 6, 2019 at NCCBM Ballabgarh, Haryana
- 15<sup>th</sup> meeting of Technical Assessment Committee (TAC) of PACS held on March 29, 2019
- A series of meetings of Technical Evaluation Committee constituted under Global Housing Technology Challenge – India (GHTC-India) to shortlist the Proven Technology Providers

#### IV. OTHERS

- Assessment of the claims of M/s Berger Paints India Limited, Bhomoraguri, Naltali, Distt. Nagaon, Assam; M/s S. M. Calchem Industries, Jorabat, Dist. Kamrup (Metro), Assam and M/s S.D. Ceramics LLP, Tamulkuchi, Byrnihat, Ri-Bhoi District, Meghalaya under Central Capital Investment Subsidy Scheme (CCIS), 2007 of Department of Industrial Policy and Promotion, Ministry of Commerce and Industry.
- The Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) requested BMTPC for providing Project Management Consultancy for their projects of affordable housing for industrial workers in Haryana. In this regard, several meetings have been held with HSIIDC.
- United Nations Office for Project Services (UNOPS) has also requested BMTPC for providing Project Management Consultancy services for project of affordable housing in Goa. A proposal has been sent to UNOPS.
- National Health Mission (NHM), Govt. of Uttar Pradesh has also requested BMTPC for providing Project Management Consultancy services for Construction of Drug Warehouses using Prefab Technology in Uttar Pradesh. A detailed report has been submitted to NHM.
- The Govt. of Kerala requested BMTPC to assist in selection of technologies for reconstruction of damaged houses during the recent floods. The Council is providing its technical services to Govt. of Kerala.

# **ANNEXURE II**

## PAPERS PRESENTED/PUBLISHED INCLUDING PRESENTATIONS MADE

- Presentation on Emerging Construction Systems for Mass Housing during Training cum Workshop for Experts/PSPs of PMU team under PMAY(U) on April 16, 2018, New Delhi
- Presentation on Emerging Construction Systems for Mass Housing during CPWD Training Programmes for Engineers on New and Emerging Construction Technologies – 16-18 May, 2018, National CPWD Academy, Ghaziabad
- Presentation on Emerging Construction Systems for Mass Housing during The Massive Earth Summit 2018, 6-7 June, 2018, New Delhi
- Presentation on Emerging Construction Systems for Mass Housing at Nirma University, 13 June, 2018, Ahmedabad
- Presentation on "Emerging Construction Systems for Mass Housing" during CPWD Training Programmes for Engineers on New and Emerging Construction Technologies – July 3, 2018, National CPWD Academy, Ghaziabad
- Presentation on "Earthquake Resistant Design and Construction" at Vivekananda International Foundation (VIF) on October 25, 2018 at New Delhi
- Paper on "Emerging Housing Technologies Are they really Green?" published in Special Issue of BMTPC Newsletter "Nirman Sarika" brought out on the occasion of World Habitat Day, October, 2018.
- Presentation on Emerging Construction Systems for Mass Housing during TERI-GRIHA Summit on December 11, 2018 at New Delhi
- Presentation on Emerging Construction Systems for Mass Housing during Seminar on Emerging Technologies for Affordable Housing: Opportunities and Challenges, December 17, 2018 at Amity University, Noida
- Presentation on Emerging Construction Systems for Mass Housing during CESDOC 2018 – 2nd International Conference on Civil Engineering for Sustainable Development, Opportunities and Challenges December 18-20, 2018 at Guwahati.
- Presentation on C&D Waste Management during TERI GRIHA
  & Australia Programme at New Delhi on January 9, 2019

- Presentation on Emerging Construction Systems for Mass Housing during ICFAI Programme at Hyderabad on January 11, 2019
- Presentation on Emerging Construction Systems for Mass Housing at CSE NIMLI, Rajasthan on January 18, 2019
- Paper on "New Building Technologies for Affordable Housing" published in Book on Sustainable Building Technologies edited by K.S.Jagadish, January, 2019.
- Presentation on "Standardization and Certification of New Materials & Technologies" during Global Housing Technology Challenge–India (GHTC-I) Expo-cum-Conference, organized by MoHUA on March 2-3, 2019 at New Delhi
- Presentation on "Emerging Construction Systems for Sustainable Mass Housing" during National Seminar on Emerging Building Materials & Sustainable Technologies, March 14, 2019, Gautam Budhha University, Greater Noida
- Presentation on Emerging Construction Systems for Mass Housing during Seminar for DDA Engineers on NewTechnologies, March 15, 2019 at New Delhi

### **ANNEXURE III**

# PUBLICATIONS BROUGHT OUT DURING THE YEAR

- Special Issue of Newsletter "Nirman Sarika" on the theme of the World Habitat Day 2018 "Municipal Solid Waste Management".
- 2. Ready Reckoner for Utilization of Recycled Produce of C&D Waste.
- 3. Compendium of Prospective Emerging Technologies for Mass Housing Third Edition.
- 4. Guidebook for Concreting Artisans (in Hindi)
- 5. Manual on Waterproofing of GFRG / RAPIDWALL Buildings
- 6. Book on "Sustainable Building Technologies" edited by K.S.Jagadish and published by BMTPC.
- 7. Pocket book on Emerging Construction Systems
- 8. GFRG/Rapidwall Construction Manual



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

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