Annual Report

2015–2016

bmtpc

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

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2015-2016

Building Materials & Technology Promotion Council
Ministry of Housing & Urban Poverty Alleviation, Govt. of India
Core-5A, First Floor, India Habitat Centre, Lodhi Road
New Delhi – 110003

FOREWORD

It is my proud privilege and pleasant duty to table the Twenty-sixth Annual Report of my organization i.e. the Building Materials & Technology Promotion Council for the year 2015-2016, an autonomous body under the Ministry of Housing & Urban Poverty Alleviation, Govt. of India.

Since its inception in 1990, BMTPC has completed 26 years of service to nation with an obligation to promote cost effective, eco-friendly, energy-efficient building materials including disaster resistant construction practices, primarily based on locally available materials and local skills for field level applications. In this expedition of promotion of alternate materials other than conventional brick & concrete construction, BMTPC had to strive really hard with rejuvenated efforts several times so as to change the mind-sets of professionals & users and make them understand the positives of sustainable technologies. With the fast changing demography & continuous urban migration coupled with international exposures, the aspiration of construction sector, professional & users have also taken leapfrog. Looking at the housing shortage and demand & supply scenario especially in urban areas, BMTPC in recent years has made visible strides in identifying and evaluating prospective construction systems/technologies for mass housing. Also, a few state governments have already started embracing these new emerging technologies to tackle housing shortage in their respective states. A Compendium of Emerging Technologies brought out this year will go a long way in creating better, safe & quality housing stock. There has been good response from public and private agencies and slowly albeit surely, state governments have started incorporating these new systems in their conventional construction tenders. The mass housing projects recently being executed by DSIIDC, DDA & DUSIB in Delhi, KSDB in Karnataka, AHM in Gujarat, APSHCL in AP, MHADA & Pimpri-Chinchwad Municipal Corporation in Maharashtra stand testimony to BMTPC's efforts.

One of the important components of technology transfer is demonstration construction using alternative materials and technologies. BMTPC since beginning has been instrumental in constructing model demonstration houses in different parts of the country. After streamlining the guidelines for undertaking the Demonstration Housing Project with the State Governments, the Ministry of Housing & Urban Poverty Alleviation, Govt. of India requested the Chief Secretary of 16 State Governments for participation in the "Demonstration Housing Project" of BMTPC to further popularize and mainstream the proven and Emerging Technologies in construction. In response, BMTPC, during the year, has received requests from 8 State Governments showing their interest for construction of Demonstration Houses. The construction work of Demonstration Housing Project at Nellore, Andhra Pradesh has been started and reached upto plinth level and the work for construction of demonstration houses at Bhubaneswer, Odisha has been awarded and is likely to start very soon. Planning and designing of projects at Biharshariff, Bihar; Hyderabad, Telangana and Distt. Kanchipuram, Tamil Nadu is in progress. The State Governments of Haryana, Maharashtra, Uttar Pradesh and Karnataka have been requested to identify suitable land. The state level sensitization programmes & workshops are being organized along with hand holding of state engineers so that emerging technologies can be mainstreamed.

In addition, BMTPC also evaluates and certifies prospective construction systems & new materials and products so as to bring economy, quality, environmental protection and speed in housing construction. During the year, emerging technologies namely, Waffle-Crete Building System, Modular Tunnelform, Reinforced EPS Core Panel System, Precast Large Concrete Panel System, Sismo Building Technology, Rapid Panels, Walltec Hollowcore Concrete Wall Panels and Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFS-ICP) Technology have been awarded certificate under the Performance Appraisal Certification Scheme (PACS) of BMTPC and number of them are being evaluated namely Concrewall Panels, Stay-in-Place Formwork System, Insulated Concrete, Prefabricated Fibre Reinforced Sandwich, Easywalls Hollowcore Concrete Wall, Structurally Insulated, Dry Wall Insulated Panels etc. Till date, BMTPC has issued Performance Appraisal Certificates (PAC) for 43 products/systems covering various items.

BMTPC has been proactively supporting and work as a technical resource Centre for Ministry of Housing & Urban Poverty Alleviation's Mission schemes by way of appraising, monitoring, review of Third Party Inspection & Monitoring (TPIM) and handholding of ULBs. The Government of India has launched "Pradhan Mantri Awas Yojana - Housing for All (Urban)" with the objective of providing every family a pucca house. The Ministry of Housing & Urban Poverty Alleviation has set up a Technology Sub-Mission under "Housing for All (Urban) Mission". 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 will also facilitate preparation and adoption of layout designs and building plans suitable for various geo-climatic zones. It will also assist States/Cities in deploying disaster resistant and environment friendly technologies. BMTPC is working as Secretariat of the Technology Sub-Mission.

One of the strength of BMTPC has been Disaster Mitigation & Management. BMTPC is committed to establish the proactive approach towards it and has been in the forefront in educating professionals and creating mass awareness amongst various stakeholders including common man. Recognizing BMTPC's effort & it's widely used publication Vulnerability Atlas of India 1997 & 2006, the National Disaster Management Authority (NDMA) entrusted BMTPC for the development of updated Earthquake Hazard Zoning Maps up to district level. The state & district wise seismic zoning Maps for the entire country are under printing. Besides, revision of Vulnerability Atlas of India has also been initiated. In order to provide Training of Trainers in earthquake resistant design and construction, the Council provided training to engineers and architects of State Government of Bihar. Like previous year, BMTPC, IIT Roorkee and NORSAR, Norway also organized two Indo-Norwegian Training Programmes on Seismic Design of Multi-storey Buildings: IS 1893 vs. Eurocode 8 at New Delhi.

The Council also participated in the HUDCO BuildTech 2015 and put up exhibition on Alternate and Emerging Building Materials and Construction Systems during India International Trade Fair at Pragati Maidan, New Delhi. BMTPC exhibition also included participation by various technology providers/ companies in the area of emerging housing technologies by putting up their display within the BMTPC area. Like preceding years, on the occasion of World Habitat Day 2015, the Council brought out the Special Issue of "Nirman Sarika" on the theme "Public Spaces for All" 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 information base and database in the construction sector, the Council has brought out a number of publications during the year namely, Third edition of "IITK-BMTPC Earthquake Tips", Booklet on Schedule of Rates for GFRG Panel Building System, Manual of Waterproofing of GFRG Panels, A Case Study on the Making of Bawana Industrial Workers Housing with Cost Effective Technologies, Multi-Attribute Evaluation Methodology for Selection of Emerging Housing Technologies, Model Expression of Interest for empanelment of agencies for construction of houses /buildings using alternate technologies on Design and Built basis and Book entitled "Emerging Building Materials & Construction Technologies". With a focus on development and promotion of innovative building technologies, specific R&D projects have also been initiated. 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 and Members of the Board of Management, the Chairperson and Members of the Executive Committee and Ministry of Housing & Urban Poverty Alleviation for various programmes undertaken and executed by the Council. BMTPC is grateful to Planning Commission, Parliamentary Standing Committee on Urban Development, HFA Mission Directorate, MoHUPA, 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, BIPARD, UNDP, UNIDO, RICS school of Built Environment, TAC and UN-Habitat 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 Poverty Alleviation, which helped the Council to meet its mandate and further its objectives.

(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, cost-effective, 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 grant-in-aid organisation of the Ministry of Housing & Urban Poverty Alleviation, Govt. of India. BMTPC is mandated to promote and transfer cost-effective, environment-friendly and energy-efficient building materials and housing technologies including disaster resistant construction practices for large scale field application.

Aligning with the objectives of Ministry of Housing & Urban Poverty Alleviation, BMTPC initiated several multi-disciplinary activities so as to create enabling environment for mainstreaming building materials and construction practices including safe construction. In recent years, the Council has reoriented its approach towards promotion of not only eco-friendly building materials but also emerging prefabricated housing technologies for social mass housing through intensive evaluation, certification and dissemination. The Council has been striving for the successful transfer of the innovative, cost-effective, environment-friendly and energy-efficient alternate building materials and technologies in various parts of India. The Council also initiated the field level application of these materials and technologies through demonstration construction of model houses and other structures such as informal markets, community centre, etc. in different parts of India. Through continued R&D efforts in collaborations with academic institutions, BMTPC is also in pursuit of development of innovative materials and technologies. Bamboo Mat Corrugated Sheet (BMCS) is one such material developed by BMTPC as an alternate to ACC/GI sheets.

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. Apart from bringing out the first ever Vulnerability Atlas of India in 1997 and then in 2006, the Council has prepared updated Earthquake Hazard Zonation Maps for NDMA, state-wise. Besides, the Council regularly publishes valuable guidelines/manuals on disaster resistant construction. Under the recently launched “Pradhan Mantri Awas Yojana - Housing for All (Urban)”, the Council is working as one of the agencies for scrutiny of the projects received from various states and working as Secretariat of the Technology Sub-Mission.

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 environment-friendly, 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.
- Development of design packages using alternate technologies for affordable housing.
- 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 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 follows a three-tier system for discharging its administrative and technical duties as given below:

i. Board of Management headed by Hon'ble Minister of Housing & Urban Poverty Alleviation
ii. Executive Committee headed by Secretary, HUPA
iii. Executive Director

The Board of Management of the Council consists of 15 Members from various Ministries and related organisations. The Executive Committee consists of 10 Members from Ministry of Housing & Urban Poverty Alleviation, Planning Commission, 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:

Board of Management (as on 31.3.2016)

S.No.	Members	
1	Shri M. Venkaiah Naidu Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs, Government of India	President
2	Shri Babul Supriyo Hon'ble Minister of State for Housing & Urban Poverty Alleviation and Urban Development Government of India	Vice-President
3	Dr. Nandita Chatterjee Secretary Ministry of Housing & Urban Poverty Alleviation, Government of India	Vice-President
4	Dr. Ashok Kumar Jain Advisor (RD & HUA) NITI Aayog	Member
5	Prof. Ashutosh Sharma Secretary, Ministry of Science & Technology Government of India	Member
6	Shri K.K. Jalan Secretary, Ministry of Micro, Small & Medium Enterprises, Government of India	Member
7	Shri Naveen Verma Secretary, Ministry for the Development of North Eastern Region, Government of India	Member
8	Shri R.K. Jain Member, National Disaster Management Authority, Government of India	Member
9	Dr. Girish Sahni Director General Council of Scientific & Industrial Research	Member
10	Shri Divakar Garg Director General Central Public Works Department	Member

S.No.	Members	
11	Dr. M. Ravi Kanth Chairman & Managing Director, Housing & Urban Development Corporation	Member
12	Shri Harish Kumar Arora D 6&7,Lajpat Nagar-III New Delhi-110024	Expert Member
13	Shri Rajiv Ranjan Mishra Joint Secretary (Housing) Ministry of Housing & Urban Poverty Alleviation, Government of India	Member
14	Ms. Jhanja Tripathy Joint Secretary & FA, Ministry of Housing & Urban Poverty Alleviation, Government of India	Member
15	Dr. Shailesh Kr. Agrawal Executive Director, Building Materials & Technology Promotion Council	Member - Secretary

Executive Committee (as on 31.3.2016)

S.No.	Members	
1	Dr. Nandita Chatterjee Secretary, Ministry of Housing & Urban Poverty Alleviation, Government of India	Chairperson
2	Shri Rajiv Ranjan Mishra Joint Secretary (Housing) Ministry of Housing & Urban Poverty Alleviation, Government of India	Member
3	Ms. Jhanja Tripathy Joint Secretary & FA, Ministry of Housing & Urban Poverty Alleviation, Government of India	Member
4	Shri. Amrit Abhijat Joint Secretary (HFA) Ministry of Housing & Urban Poverty Alleviation, Government of India	Member
5	Dr. Ashok Kr. Jain Advisor (RD & HUA) Niti Aayog	Member
6.	Dr. M. Ravi Kanth Chairman & Managing Director, Housing & Urban Development Corporation	Member
7	Prof. Satish Chandra Director (Add. Charge) Central Building Research Institute, Roorkee	Member
8	Prof. A. S. Arya Professor Emeritus and Former National Seismic Advisor, Ministry of Home Affairs	Member
9	Shri. Kuldeep Singh Channa C-119/ D/S Ramesh Nagar, New Delhi-110015	Co-opted Member
10	Dr. Shailesh Kr. Agrawal Executive Director, Building Materials & Technology Promotion Council	Member - Secretary

MAJOR INITIATIVES AND ACTIVITIES DURING THE YEAR 2015-2016

I. MODEL DEMONSTRATION CONSTRUCTION USING ALTERNATE TECHNOLOGIES

1. Demonstration Housing Projects using Green/Emerging Technologies in different parts of the country

In the context of the massive housing initiatives by the Government of India and various State/ UT Governments under various schemes / programme, an urgent need is felt around the country to propagate and popularize the proven / green and emerging technologies vigorously and introduce appropriate interventions to close the gap between availability of these technology options and application of the same increasingly in large scale Housing initiatives.

The Council has been promoting proven and emerging building materials & technologies in different regions of the country through identification, evaluation, standardization, certification, capacity building & training 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.

In a fresh bid to popularize and mainstream the Proven / Green and Emerging technologies, as a part of the effort to make housing affordable, the Council has initiated a demonstration housing project for construction of demonstrations houses with these technologies in various parts of the country. Through demonstration housing construction, BMTPC will also provide training to local construction workforce and organize capacity Building programmes for the state professionals so as to create awareness and sensitize public in the region.

The Ministry of Housing & Urban Poverty Alleviation, Govt. of India requested the Chief Secretary of State Government of Maharashtra, Kerala, Andhra Pradesh, Telengana, Karnataka, Rajasthan, Haryana, West Bengal, Odisha, Sikkim, Gujarat, Uttar Pradesh, Uttarakhand, Tamil Nadu, Bihar and Chhattisgarh for participation in the “Demonstration Housing Project” of BMTPC to further popularize and mainstream the proven and Emerging Technologies in construction.

In response to the above, BMTPC has during the year

received requests from the State Government of Andhra Pradesh, Telengana, Odisha, Haryana, Maharashtra, Uttar Pradesh, Bihar and Karnataka for construction of Demonstration Houses using alternate building technologies. The progress on the various Demonstration Housing Projects are as given below:

1. The Government of Andhra Pradesh has allotted the land for construction of 36 demonstration houses and a demonstration community building at Saraswathi Nagar, Chowtaplem Villagr, Venkatachalam Mandal, SPS Nellore District admeasuring 1.85 acres. The foundation stone of the project was laid by Shri M. Venkaiah Naidu, Hon"ble Minister of Housing and Poverty Alleviation, Urban Development and Parliamentary Affairs on 31st May, 2015. The demonstration houses are being constructed with Glass Fibre Reinforced Gypsum (GFRG) Panel System and Community building is being constructed using alternate technologies such as filler slab for roofing and flyash blocks for walling. The layout plan, designs and estimates of the houses and community building have been finalised in consultation with IIT Madras and APSHCL. The work for construction of 36 demonstration houses has been entrusted to FRBL, Cochin, a Government of India Enterprise and manufacturer of GFRG panels and work for construction of community building and onsite infrastructure has been entrusted to APSHCL, Govt. of Andhra Pradesh. The construction of demonstration houses has reached upto plinth Level and ground floor for three blocks out of five blocks have been completed using GFRG panels. The work at Community Centre has also reached upto roof level. The work is being monitored by a joint team of IIT, BMTPC & FRBL. Three technical staff on each from IIT, FRBL and BMTPC is stationed at the site on strict compliance and quality control & assurance.

2. The work for construction of demonstration houses at Bhubaneswer, Odisha using EPS Panel System has been awarded through open tenders. The work is likely to start very soon. The finalization of building plan & selection of technology has been done in consultation with Bhubaneswar Development Authority, the designated State nodal agency for the project.

3. Planning and designing of the demonstration housing project at Biharshariff, Bihar using emerging

Shri M.Venkaiah Naidu, Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs, laying the foundation stone of the Demonstration Housing Project at Saraswathi Nagar, Venkatachalam Mandal, SPS Nellore District on 31st May, 2015

technologies has been completed after discussions with the local authorities. The tender for construction of demonstration houses is under preparation.

4. Planning and designing of the demonstration housing project at Hyderabad, Telengana is in progress.

5. In order to assess the suitability of site for construction of demonstration housing project at District Kanchipuram, Tamil Nadu, a site visit was made along with the officials of Tamil Nadu Slum Clearance Board. The site proposed by the TNSCB was not found suitable due to low lying area. Now TNSCB has identified another site for construction of demonstration houses and site has been found suitable. Based on the discussions with the TNSCB officials, the planning and designing of the project has been initiated.

6. The State Governments of Haryana, Maharashtra, Uttar Pradesh and Karnataka have been requested to identify suitable land for construction of demonstration houses. The Govt. of Uttar Pradesh has identified the land for the purpose.

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

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

The Government of India has launched "Pradhan Mantri Awas Yojana - Housing for All (Urban)" with the objective of providing every family a pucca house with water connection, toilet facilities, 24x7 electricity supply and access by the time the Nation completes 75 years of its Independence i.e. 2022. Ministry of Housing & Urban Poverty Alleviation, Government of India has set up a Technology Sub-Mission 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 will also facilitate preparation and adoption of layout designs and building plans suitable for various geo-climatic zones. It will 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 with Executive Director, BMTPC as its Member Secretary.

Progress under the Technology Sub-Mission

i) Technology Sub-Mission was constituted on 21st July, 2015 by the Ministry of Housing & Urban Poverty Alleviation, Government of India under the chairmanship of Joint Secretary (HFA). The members included representatives from five IITs (Gandhinagar, Jodhpur, Madras, Kanpur & Roorkee) and six states (Gujarat, Maharashtra, Karnataka, Andhra Pradesh, Odisha & Haryana) on rotation basis and experts.

ii) The first meeting of Technology Sub-Mission held on 28th August 2015 to discuss the way forward for appropriate technical solutions and improvement in Design and Planning. The Second meeting of Technology Sub-Mission was held on 29th January 2016.

iii) So far, MoUs have been signed with 4 IITs (Roorkee, Madras, Kharagpur and Hyderabad), 9 NITs (Silchar, Calicut, Uttrakhand, Patna, Rourkela, Jallandhar, Itanagar, Surathkal and Warangal) and 2 Architecture/Planning institutes (SPA Bhopal and CEPT University Ahemdabad).

iv) It is also planned to establish Regional Hubs in identified IITs to cater to the needs at regional level covering nearby states. The identified institutions under consideration are IIT Kharagpur (East), IIT Kanpur (West), IIT Roorkee (North), IIT Madras (South), IIT Hyderabad (Central) and NIT Silchar (North East).

v) BMTPC organized Open House Discussion on the Technology Sub-Mission under Housing for All (Urban) on 11th March 2016 to facilitate discussions and query resolution relating to the Technology Sub-Mission for the benefit of State Government functionaries. Representatives from the states of Jammu & Kashmir, Rajasthan, Tamil Nadu and Madhya Pradesh attended the discussion. IIT Madras, IIT Bhubaneshwar, NIT Surathkal, NIT Hamirpur, NIT Srinagar, MANIT Bhopal, MNIT Jaipur

Open House Discussion on the Technology Sub-Mission under Housing for All (Urban) Mission to facilitate discussions and query resolution relating to the Technology Sub-Mission for the benefit of State Government functionaries held on March 11, 2016

and NIT Tiruchirappalli also participated.

vi) Bureau of Energy Efficiency (BEE) has been involved for providing inputs on energy efficiency in housing. National Remote Sensing Center (NRSC), Hyderabad is also roped in for geo-tagging of houses and monitoring through satellite based system.

vii) BMTPC has prepared a BLOG for networking with State Govts, IITs/NITs/SPAs for the activities related to the Technology Sub – Mission.

viii) Proposal from IIT Kanpur for "Developing a Protocol for testing of emerging technologies" was approved by CSMC in its second meeting held on 27th October 2015 at a project cost of Rs. 31.33 lakhs with time frame of one year. Proposal from CBRI to develop comprehensive manual on EPS technology was approved by CSMC in its third meeting held on 18th November 2015 at a project cost of Rs. 29.00 lakhs with time frame of 10 months.

ix) MoHUPA has given in-principle concurrence to two projects under "Uchhatar Avishkar Yojana" of MOHRD. Fabrication and Testing of Resilient and Sustainable Fiber Reinforced Precast Pre-stressed Hollow core Slabs for Affordable Housing from IIT Hyderabad. Development of Modular, Infill and Interlocking AAC Blocks with its Design Interface for Market Driven Affordable Mass Housing for Low Income Group in India from IIT Roorkee.

x) NIT Patna has submitted draft proposals for Identifying specific solutions and appropriate design considering local conditions including DOs and Donts for housing projects for LIG and EWS.

xi) On the recommendation of the Committee constituted by PMO on Catalyzing the Market for Affordable Housing, MoHUPA has initiated the following under the overall guidance of Secretary (HUPA):

a) Awareness Creation and Capacity Building on New Technologies:
   - It was decided that on-line training modules be prepared on new technologies for Engineers and Architects. Based on series of meetings with representatives of CSIR, CBRI, Roorkee; Hindustan Prefab Ltd, IGNOU,

BMTPC and Google; under the Chairmanship of Joint Secretary (Housing), it was proposed to develop following modules in association with IGNOU, IIT Roorkee, IIT Madras and HPL. Outlines of the modules were prepared.

i) Need for Emerging New Technologies
ii) Technology Specific Modules
- Monolithic Concrete Construction
- Prefabricated Construction
- EPS based construction system and
- Steel structure
iii) Procurement Process
iv) Quality Assurance

b) New Technology Demonstration Projects:
- Ministry is interacting with CPWD, Railways, Defence and Public Sector units who can adopt new technologies for their employees and other housing projects and thereby catalyze the market.

The Council is also working as one of the agencies for scrutiny of the projects received under Pradhan Mantri Awas Yojana - Housing for All (Urban) Mission from various states. The following projects have been scrutinized by BMTPC during 2015-16:

S. No	City/Town	Location	No. of Projects
CHHATTISGARH			
1	Raipur	Construction of 4168 LIG, (S+8) and 3104 EWS Flats (G+3) and Development of 25.30 Hect. Land at Kamal Vihar, Town Development Scheme-04, Distt Raipur.	4
2	Machewa, Distt Mahasamund	Construction of 20 HIG, 136 MIG, 150 LIG and 336 EWS Flats and Development of 7.55 Hect. Land at Machewa, DisttMahasamund	
3	Raipur	Construction of 7688 LIG Type A & Type B and 7720 EWS Flats and Development of 47.37 Hect. Land at Sector 7,12,16,30 & 34, Naya Raipur, Distt Raipur	
4	Pendri, Distt Rajnandgaon	Construction of 272 EWS Flats (G+3), 210 LIG (G+3), 33 HIG Type II, 26 Jr MIG-I, 25 Jr MIG-II, 11 Sr MIG-I, 11 Sr. MIG-II and Development of 7.28 Hect. Land at Pendri, Distt Rajnandgaon	

S. No	City/Town	Location	No. of Projects
GUJARAT			
1.	Rajkot	Affordable Houses for 1266 units of EWS category by Rajkot Municipal Corporation under AHP Scheme	9
2.	Surat	Affordable Houses for 848 units of EWS category at 3 location by Surat Municipal Corporation under AHP Scheme	
3.	Ahmedabad	DPR under AHP for EWS (4369) at 9 Location on Ahmedabad	
4.	Kalol	DPR under AHP for EWS (2421) in Kalol	
5.	Surat	Insitu Redevelopment of Slums at Vivekanandnagar Behind textile market, BRTS road, Anjana	
6.	Surat	Insitu Redevelopment of Slums at Gandhinagar, Chimnitekro, Juno Depo, and Islam pura near textile market, ring road, Anjana	
7.	Ahmedabad	Development of Integrated Group Housing Facility at Slum at Odhav on PPP/Turn key Basis (Package-2)	
8.	Rajkot	Insitu Redevelopment of Slums on PPP basis by RMC at Jaybhim Nagar, Nana Mauva (PPP-8)	
9.	Vadodara	Sama - Sanjay Nagar-1,2 & Indira Nagar	
ANDHRA PRADESH			
1.	Bhimavaram	Construction of 9500 EWS houses in Bhimavaram Municipality	5
2.	Tadepalligu-dem	Construction of 5376 EWS houses in Tadepalligudem Municipality	
3.	Palacole	Construction of 7159 EWS houses in Palacole Municipality	
4.	Mandapeta	Construction of 4064 EWS houses in Mandapeta Municipality	
5.	Chailakaluri-peta	Construction of 4512 EWS houses in Chailakaluripeta Municipality	
TELANGANA			
1	Hyderabad, Chikalguda, Kranthi RajakaSangam	KranthiRajakaSangam (Dhobi Ghat) in GHMA (circle 18)	1

III. DISASTER MITIGATION - REPAIR, RECONSTRUCTION AND RETROFITTING

1. Preparation of Updated Earthquake Hazard Zoning Maps and Atlases

Looking at the recurrent earthquakes and associated risks in Indian context during recent years, the National Disaster Management Authority (NDMA), Government of India entrusted BMTPC the task of preparing updated earthquake hazard maps up to district level incorporating latest data as available from Survey of India, Census of India 2011, Geological Survey of India, India Metrological Department etc. based on Seismic Zoning Map of India as per IS:1893-2002.

The Council has completed preparation of updated Earthquake Hazard Zoning Map for the whole country up to district level based on the Survey of India administrative boundary data. Subsequently, it was desired by NDMA that boundary data of sub-division (blocks) to be taken from Census of India 2011.

The Council completed preparation of updated Earthquake Hazard Zoning Map for the whole country upto district level based on district level data from Survey of India and sub-division level data from Census of India. The final Maps and Atlases have been submitted to NDMA. The process of printing has been initiated. The Council is awaiting authentication of international boundary and coastal areas from the Survey of India before final printing.

It is first time that Seismic Zoning Map of India is being published on A0 size and seismic hazard zone upto sub-district level are being delineated.

2. Training of Trainers (TOT) Programme on Earthquake Resistant Design & Construction for State Engineers and Architects

The Bihar Institute of Public Administration and Rural Development (BIPARD), Government of Bihar at the behest of the Bihar State Disaster Management Authority requested BMTPC's assistance in conducting Training of Trainers (TOTs) on Earthquake Resistant Design and Construction.

During the year, following batches of TOTs were conducted at BIPARD Campus, Patna:

S.No.	Batches	Dates
1	Batches 12 & 13	June 8-11, 2015
2	Batches 14 & 15	June 15-18, 2015
3	Batches 16 & 17	December 14-17, 2015

4	Batches 18 & 19	February 23-26, 2016
5	Batches 20 & 21	March 8-11, 2016

So far twenty one batches of the TOTs have been imparted training at Patna as per request from BIPARD. The resource persons were from IIT Roorkee, IIT Mumbai, NIT Patna, BMTPC including other experts in the field. At the end of training of each batch, evaluation of trainees has also been conducted through examination.

3. Indo-Norwegian Training Programme on Seismic Design of Multi-storey Buildings : IS 1893 vs. Euro Code 8

BMTPC has always been imparting quality education and creating mass awareness amongst common men and professionals through training courses, symposia, conferences and publishing manuals, guidelines, brochures, etc. on disaster resistant design and construction including safe construction practices in collaboration with various technical and academic institutions.

Since 2006, BMTPC has been organizing Training Courses jointly with IIT Roorkee on regular basis. IIT Roorkee is one of the premier organization having excelled in the area of earthquake resistant design and construction and one of the first School of Earthquake Engineering in India.

In 2014, NORSAR, Norway under Indo-Norwegian Collaboration Project “EQRisk” supported by the Norwegian Embassy to India, New Delhi collaborated with IIT Roorkee. NORSAR, Norway is an independent research foundation specialized in seismological research and engineering services relevant for the society and their efforts have over the past years included seismic hazard and risk projects in many earthquake exposed countries. They are also instrumental in imparting training to professionals in India on design of earthquake resistant structures.

BMTPC, IIT Roorkee and NORSAR, Norway initiated the three-days Indo-Norwegian Training Programme on Seismic Design of Multi-storey Buildings: IS 1893 vs. Eurocode 8. In the series, the first programme during the year was organized at New Delhi from May 27 to 29, 2015. The programme was attended by around 100 participants from various parts of the country. The course was specifically targeted to Structural, Geotechnical Engineers and Designers in public and private sectors with emphasis on real-life problems and tackling them through hands-on training.

Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation, Government of India addressing during the Indo-Norwegian Training Programme on Seismic Design of Multi-Storey Buildings: IS 1893 vs. Eurocode 8 organised by BMTPC from May 27-29, 2015

Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation, Government of India delivering the inaugural address during the Indo-Norwegian Training Programme on Nonlinear Analysis and Performance Based Design of Multi-Storey Buildings organised by BMTPC from December 3-5, 2015

Second Indo-Norwegian Training Programme on “Nonlinear Analysis and Performance Based Design of Multistorey Buildings” was organized from 3-5 December, 2015 at New Delhi. The programme was attended by around 70 participants from various parts of the country. The programme was inaugurated by Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation.

4. Revision 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 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 State and Central for disaster management and planning.

The Council has initiated preparation of third edition of Vulnerability Atlas of India based on latest census and other associated data on earthquakes, landslides, cyclones etc. A Peer Group has been constituted by the Ministry under the Chairmanship of Prof. A.S.Arya with representation from IIT Roorkee, SERC Chennai, Geological Survey of India Kolkata, Central Water Commission New Delhi, National Remote Sensing Centre Hyderabad, India Meteorological Department New Delhi and BMTPC.

Two meetings of the Peer Group were held. Basic format of the proposed Atlas and modifications to be made have been discussed. Various organizations such as IMD, CWC, GSI and NIDM have been asked to provide the latest data. A meeting of Working Group for preparation of landslide hazard map in the proposed revision of Vulnerability Atlas of India was also held on March 10, 2016. Modalities to use various available data on landslides to prepare the landslide incident maps was finalized.

5. Capacity Building Programme on Earthquake Resistant Structures and Retrofitting of Buildings for NCR Region at New Delhi

Under the Chairmanship of Secretary, Ministry of Home Affairs, a meeting was held to take stock on Earthquake Risk Reduction in National Capital Region. During the meeting, it was desired that BMTPC and NIDM may jointly organise capacity building programmes for engineers and architects of NCR region (UP, Haryana & Delhi) on

Earthquake Resistant Structures and Seismic Retrofitting of Buildings. Accordingly, a Capacity Building Programme on Earthquake Resistant Structures and Retrofitting of Buildings for the State of Haryana was organized on May 22-23, 2015 at Haryana Regional Chapter (ITPI), Panchkula, Haryana. The Programme was inaugurated by Shri P. Raghavendra Rao, IAS, Additional Chief Secretary to Govt. of Haryana, Town & Country Planning Department and addressed by Shri J. S. Redhu, Chief Co-ordinator Planner (NCR), Directorate of Town & Country Planning, Haryana and Dr. Shailesh Kr.Agrawal, Executive Director, BMTPC. The programme was attended by more than 70 participants mainly State Engineers & Architects of Government of Haryana. The faculty from IIT Roorkee and other Institutions include Prof. D. K. Paul, Professor Emeritus, Prof. Y. Singh, Prof. R. N. Dubey from Department of Earthquake Engineering, IIT Roorkee; covered various topics on Earthquake Resistant Structures and Retrofitting of Buildings.

IV. ACTIVITIES IN NORTH-EASTERN REGION

1. Significant Activities in North-Eastern Region

BMTPC is actively involved in developing and promoting bamboo based technologies in the North-Eastern Region and other bamboo growing areas. The major activities encompasses setting up of Bamboo Mat Production Centres for processing of bamboo, encouraging commercial production of bamboo based products, and construction of demonstration houses/structures. The Council is constantly imparting training to the local artisans as regards use of bamboo in building construction. The activities undertaken in the North Eastern Region during the year are:

- Workshop and Training Programme on Bamboo Structure of Housing and Construction was organized by BMTPC jointly with South Asia Bamboo Foundation (SABF) and Nagaland Bamboo Mission from May 12 – 16, 2015 at Dimapur, Nagaland. The Training Programme was attended by more than 30 trainees and state govt. officials. During the programme construction of two bamboo toilets were undertaken for training purposes. The bamboo toilets were launched by the Governor of Nagaland and Assam.
- Organized a Training Programme on use of Bamboo in Housing and Building Construction from 29th February 2016 - 5th March 2016 at Itanagar,

Capacity Building Programme on Earthquake Resistant Structures and Retrofitting of Buildings for the State engineers and architects of Haryana was organized on May 22-23, 2015 at Haryana Regional Chapter (ITPI), Panchkula, Haryana

Construction of Bamboo Toilet during Training Programme on Bamboo Structure of Housing and Construction organized by BMTPC from May 12 – 16, 2015 at Dimapur, Nagaland.

Construction of Bamboo Toilet during Training Programme on use of Bamboo in Housing and Building Construction from February 29, 2016 - March 5, 2016 at Itanagar, Arunachal Pradesh

Arunachal Pradesh in association with South Asia Bamboo Foundation (SABF) Guwahati and Arunachal Pradesh Bamboo Resource Development Agency (APBRDA). Around 30 workers were provided training on construction of toilet using bamboo based technologies.

V. STRENGTHENING THE INFORMATION AND DATABASE IN THE CONSTRUCTION SECTOR

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

The Ministry of Housing & Urban Poverty Alleviation celebrated the World Habitat Day on 5th October, 2015 at New Delhi. To mark the occasion, BMTPC brought out a Special Issue of its Newsletter "Nirman Sarika" on the theme "Public Spaces for All", 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 Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

2. Publication of third edition of the booklet entitled "IITK-BMTPC Earthquake Tips"

Recurrent earthquakes in Indian sub-continent have been causing loss to properties and lives of people at regular intervals. The Latur earthquake in 1993, Jabalpur earthquake in 1997, Chamoli earthquake in 1999, Bhuj earthquake in 2001, Kashmir earthquake in 2005, Sikkim earthquake in 2011, Doda earthquake in 2012, and most recently Nepal Earthquake in 2015, have clearly demonstrated the earthquake vulnerability profile of our country. Even though at national level, the Government is conscious and has initiated proactive pre-disaster mitigation measures, its implementation at ground level is only possible, if general awareness is created among professionals associated with construction activities, as well as the non-professionals, who are directly and indirectly affected, on earthquake occurrences, their unpredictability, their effect on different types of buildings and measures required to be taken to make buildings safe.

Keeping the above in view, the Indian Institute of Technology Kanpur (IITK) and the Building Materials &

Technology Promotion Council (BMTPC), a constituent of Ministry of Housing and Urban Poverty Alleviation, GoI launched the IITK-BMTPC series of Earthquake Tips in early 2002. Professor C.V.R. Murty of IIT Kanpur was entrusted to take up the daunting task of expressing the concepts in very simple language for the benefit of readers ranging from school kids, non-professionals to professionals.

In the 1st Phase of this exercise, 24 Tips, covering general concept of earthquake occurrences and its measurement, its effect on masonry and RCC buildings, concept of earthquake resistant design and construction; importance of Indian Standard Codes on earthquake resistant structures and advanced techniques to reduce the damaging effect of earthquake, were published. Utmost care was taken to ensure that despite complexity of the concepts, the Tips are simple to comprehend and unambiguous. To ensure the highest quality of technical contents, each Tip is carefully reviewed by two or more experts both within and outside India and their feedback is incorporated before finalizing the Tips.

Seeing the interest of readers in the Tips and considering the potential of creating awareness through the Tips, it was decided to extend it further by adding 8 more Tips, covering features of confined masonry, importance of quality control, earthquake resistant foundation, protection of non-structural elements, liquefaction of soils, importance of loads paths in buildings. This 2nd Phase version of the publication contains all the 32 Tips brought out so far. It is hoped that this volume will be useful in understanding the basics of earthquakes, it's effect on buildings and various aspect of earthquakes resistant design and construction of buildings in the most simplest manner. It is hoped that these Tips may also serve as reference book on earthquake engineering education, and go a long way in BMTPC's effort to make India, an earthquake resilient society.

The publication was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

3. Publication of Booklet on Schedule of Rates for Glass Fibre Reinforced Gypsum (GFRG) Panel Building System

Glass Fibre Reinforced Gypsum (GFRG) Panel Building System is an emerging construction system replacing

conventional masonry/RCC framed construction and has potential to be used for social mass housing at a reasonable cost. Essentially GFRG panel system is a green alternative construction system as it makes use of waste byproduct i.e. gypsum from fertilizer industry. Currently these panels are being manufactured at Rashtriya Chemical Fertiliser (RCF) Mumbai and Fertilisers And Chemicals Travancore Ltd. (FACT) Kochi. The technology is originally developed by GFRG Building Systems Australia and being studied, evaluated and promoted by IIT Madras for its adoption in Indian context.

In order to mainstream any new construction system, it is imperative to create an equivalent eco system which exists for conventional construction system so that technology can be implemented in the field hassle free. It calls for development of detailed specifications, design guidelines, construction manuals, standards and most importantly Schedule of Rates which will equip construction agencies both public and private to use these systems at level playing field with conventional construction. BMTPC in its pursuit to promote appropriate technological solutions for housing in different geo-climatic condition of India has been associated with the promotion of GFRG technology along with IIT Madras and other R&D organizations. In the process, the GFRG panel system has been certified by BMTPC through Performance Appraisal Certification Scheme (PAC No.1009-S/2012) and Design Manual has also been published along with IIT Madras. The standard has also been developed and draft code is being circulated by Bureau of Indian Standards (BIS).

A need was felt to develop Schedule of Items and Rate Analysis for GFRG Construction which can be used by any agency which wishes to construct structures using GFRG technology. This publication is the outcome of the recently constructed demonstration building using GFRG by IIT Madras who readily agreed to make use of the data for preparation of the document. The present document will help the construction industry for preparing tender documents using the technology.

The publication was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

4. Publication of "Manual of Waterproofing of Glass Fibre Reinforced Gypsum (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 and Schedule of Rates for GFRG panel system which was prepared by IIT Madras.

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. IIT Madras has come out with this publication being published by BMTPC which can be readily used by construction agencies while implementing the technology in the field.

The water proofing solution provided in the publication is based on indigenously produced nano technology by Zydex Industries which is tailor made 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. 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 IIT Madras who has been putting R&D efforts to make the GFRG panel system as a viable alternate system for housing.

The Manual of Waterproofing of Glass Fibre Reinforced Gypsum (GFRG) /RAPIDWALL Buildings was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on

October 5, 2015 at New Delhi.

5. Publication entitled "Demonstrating Cost Effective Technologies - A Case Study of Bawana Industrial Workers Housing Project"

BMTPC since its inception in 1990 has been toiling hard to implement cost effective, energy efficient & eco-friendly building materials & technologies at gross root level. There have been number of success stories, however, the single largest project executed in India using these technologies has been by Delhi State Infrastructure & Industrial Development Corporation (DSIIDC) for industrial workers. Later the same concept was repeated for EWS housing projects by DSIIDC. These projects have been documented under one of the BMTPC's sponsored study so as to bring the entire gamut of these technologies right from implementation to cost-economics to construction management & quality control for the engineers & architects who are willing to adopt them for ensuing projects.

The technologies used are simple & rudimentary i.e. load bearing construction using modular bricks with cement-flyash blended mortar for structural framing, precast RC planks & joist for roofing & flooring. Also, ferrocement staircase treader–riser units, precast ferrocement sunshades, kitchen platform & precast ferrocement water tanks are used as an alternate to common conventional systems. It has been shown that there is overall saving of more than 20% over conventional construction in civil works. The single stack system for plumbing & sanitation has been used as a digression from the conventional dual stack system giving overall saving of more than 30% in plumbing services. There is also considerable saving of cement & steel which are energy intensive materials and based on natural resources which are finite in nature. Through this real time project, it has also been shown that there is considerable saving in time of construction. The publication presents all the details including cost analysis. It is also equally important to draw a strict QC/QA plan while implementing any new / alternate construction methodology/system. In light of Housing for All Mission launched by Govt. of India, it is hoped that this document will become a reference document for professionals and go a long way in BMTPC's mission to mainstream alternate materials & technologies.

The publication was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director,

UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

6. Publication entitled "Model Expression of Interest for Empanelment of Agencies for Construction of Houses/Buildings using Alternate Technologies on Design and Built Basis"

The Ministry of Housing and Urban Poverty Alleviation has launched the Pradhan Mantri Awas Yojana - Housing for All (Urban) Mission, under which the Central Government would be assisting the State Government in providing a pucca house to all eligible beneficiaries among the urban poor. The Mission is giving due attention to quality, speed, durability of construction etc. Introduction of fast track environmental friendly, cost effective and sustainable alternate technologies in housing sector is need of the hour. The process of bringing any technology to field application involves many steps, which are required to be addressed appropriately. Apart from establishing the technical suitability of any technology, there are operational bottlenecks which require attention. The conventional systems are well documented with Work Specification and Schedule of Rates by Public Works Departments. Alternate emerging technologies, using different materials and construction methodologies, lack such standardized documentation.

State Governments and various stake holders, during various interactions, have emphasized the need to develop a model tender document for selection of agencies for technology neutral construction of houses.

Considering various options, it was felt that the State Government could consider prequalifying/empanelment of alternate technology providers using technical and functional parameters in different capabilities depending upon the size of proposed project.

This document has been prepared under the guidance of Mission Directorate, Pradhan Mantri Awas Yojana - Housing for All (Urban) Mission to serve as model guidelines for inviting EOI for emerging alternate technologies.

The publication was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

7. Publication entitled "Multi-Attribute Evaluation Methodology for Selection

of Emerging Housing Technologies"

PMAY - Housing for All (Urban) Mission has been launched by the Ministry of Housing and Urban Poverty Alleviation on the 25th June, 2015. The mission inter-alia, envisages adoption of modern, innovative and green technologies and building materials for faster and quality construction.

A number of new technologies are being studied by Building Materials & Technology Promotion Council (BMTPC), under Performance Appraisal Certification Scheme (PACS) for their possible use in mass housing programme. Some of these technologies have been developed and are successfully being used in other countries and are trying to enter Indian construction industry.

Any technology used must, however, be structurally safe under Indian hazard and geoclimatic conditions, be durable, fulfill the functional need of the occupants and should also be economically viable for the project.

Use of conventional building materials are backed by provisions in relevant Indian Standard Specifications & Codes and National Building Code (NBC) of India. Alternate materials, method of design and construction not prescribed by the Codes, are also permitted by NBC, provided they are found to be satisfactory and conforming to relevant provisions of NBC.

BMTPC, in consultation with Mission Directorate, Pradhan Mantri Awas Yojana - Housing for All (Urban), has developed this Multi – Attributes Evaluation Criteria with other experts and professionals in the field. It includes mandatory and desirable attributes to be considered for selection of alternate technologies. Criteria was circulated to States and UTs for their views / comments. There is general agreement on the content of the document by the states.

It is hoped that this document will serve as a useful tool for performance appraisal of emerging technologies under PACS by BMTPC and for all state agencies in selecting emerging technologies for their future projects in an objective manner.

The publication was released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day 2015 held on October 5, 2015 at New Delhi.

8. 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.

9. Standardization and Product Evaluation

Performance Appraisal Certification Scheme (PACS)

Performance Appraisal Certification Scheme (PACS), being operated by BMTPC, 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.

Approval of PACs

Technical Assessment Committee (TAC) constituted for the purpose of approval of Performance Appraisal Certificate (PAC) in its meetings has approved issue of PACs for the following new products/systems:

8th TAC Meeting held on 9th April, 2015:

(i) Insulla Tiles manufactured by M/s Japewa Engg. Pvt. Ltd., Chennai
(ii) Bamboowood Flooring manufactured by M/s Mutha Industries Pvt. Ltd., Agartala
(iii) QuickBuild 3D Panels manufactured by M/s Beardsell Ltd., Chennai
(iv) Modular Tunnelform manufactured by M/s Outinord Formworks Pvt. Ltd., Pune

9th TAC Meeting held on 15th October, 2015:

(i) Reinforced EPS Core Panel System manufactured by M/s Jindal Steel & Power Ltd., Raigarh (Chattisgarh)
(ii) Ultra Sound Pipes & Fittings manufactured by M/s Huliot Pipes & Fittings Pvt. Ltd., Vadodra
(iii) SRPL Building System (Waffle-Crete) manufactured by M/s Shaival Reality Pvt. Ltd., Bharuch (Gujarat)
(iv) Walltec Hollowcore Concrete Walls manufactured by M/s B N Precast Pvt. Ltd., Gandhinagar (Gujarat)
(v) Plastic Honeycomb Panels manufactured by M/s Anjani Technoplast Pvt. Ltd., Greater Noida (UP)

10th TAC Meeting held on 10th March, 2016:

(i) Sismo Building Technology manufactured by M/s M K S Infosolutions Pvt. Ltd., Manesar (Haryana)
(ii) Rapid Panels manufactured by M/s Worldhaus Construction Pvt. Ltd., Bangalore
(ii) Precast Large Concrete Panel System manufactured by M/ Larsen & Toubro, Bangalore
(iii) Light Gauge Steel Framed Structure with Infill Concrete Panels manufactured by M/s Society for Development of Composites, Bangalore

Inspection of Works

Inspection of Works of the following new products/systems has been carried out by the officers of BMTPC and TAC members:

(i) Ultra Sound Pipes & Fittings on 22nd & 23rd May, 2015
(ii) SRPL Building System (Waffle-Crete) on 15th July, 2015
(iii) Walltec Hollowcore Concrete Walls on 16th July, 2015
(iv) Plastic Honeycomb Panels on 22nd July, 2015
(v) Sismo Building Technology on 28th September, 2015
(vi) Light Gauge Steel Framed Structure with Infill Concrete Panels on 28th December, 2015

(vii) Precast Large Concrete Panel System on 29th December, 2015
(viii) Rapid Panels on 30th December, 2015

Surveillance Inspection of Works

Surveillance Inspection of Works of the following products/systems for renewal of the PACs has been carried out by the officers of BMTPC:

(i) Underground Water Storage Tank (Sump) manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 24th & 25th May, 2015
(ii) Insulated Roof Panel manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 24th & 25th May, 2015
(iii) Plastocrete Panel manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 24th & 25th May, 2015
(iv) PVC Profile Door manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 24th & 25th May, 2015
(v) Formwork for Monolithic Concrete Construction manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 24th & 25th May, 2015
(vi) Glass fibre Reinforced Gypsum Panel manufactured by M/s RCF LTd., Mumbai on 7th March, 2016
(vii) Polyethylene Underground Septic Tank manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 8th March, 2016
(viii) Continuous Sandwich Panel manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 8th March, 2016
(ix) Marshal Door manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 8th March, 2016
(x) FRP Manhole manufactured by M/s Sintex Industries Ltd., Kalol (Gujarat) on 8th March, 2016

Applications under process for issuance of PACs

Applications received for issue of PACs are in the pipeline as per the details given below:

(i) Concrewall Panels of M/s Schnell Wire System, Italy
(ii) Stay-in-Place Formwork System of M/s Coffor Construction Technology India, Vadodra (Gujarat)
(iii) Insulated Concrete Forms of M/s Reliable Insupacks Pvt. Ltd., Greater Noida (UP)
(iv) Prefabricated Fibre Reinforced Sandwich Panels of M/s HIL Ltd., Hyderabad (AP)

Inspection visit to Glass fibre Reinforced Gypsum Panel manufactured by M/s RCF Ltd., Mumbai on March 7, 2016 for certification under PACS

TAC Members alongwith BMTPC officials visiting Stay-in-Place Formwork System of M/s Coffor Construction Technology India at Vadodra (Gujarat) on February 3, 2016 under PACS

(v) Easywalls Hollowcore Concrete Wall Panels of M/s Mahesh Prefab Pvt. Ltd., Gurgaon (Haryana)
(vi) Structurally Insulated Panels of M/s Pioneer Fabricators Pvt. Ltd., Meerut (UP)
(vii) Dry Wall Insulated Panels Of M/s E-Pack Polymers Pvt. Ltd., Greater Noida (UP)

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.

Besides, BMTPC held discussion with the Bureau of Indian Standards (BIS) to consider proposal for introduction of suitable provisions in the proposed section of National Building Code likely to be published in 2015, about selection and evaluation of new emerging technologies. The draft of the chapter has been prepared and forwarded to BIS for necessary action. A letter regarding incorporation of new technologies was also written by Secretary, HUPA and it is under active consideration by BIS to be included in NBC.

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

1. Organization of International Seminar on "Emerging Building Materials and Construction Technologies" at New Delhi

BMTPC organized an International Seminar on Emerging Building Materials & Construction Technologies on March 21-22, 2016 at New Delhi so as to bring all stakeholders on one platform to share their knowledge and experience.

The International Seminar was inaugurated by Shri M. Venkaiah Naidu, Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs, Government of India. Besides Academic, R&D Institutions, known experts of the country; agencies involved in bringing technologies from advanced countries also participated with their technical presentation and showcasing of products and system. The participants also include representatives of Govt. agencies, faculty & students of technical institutions.

The Council had planned the whole seminar under various sub-themes to have detailed discussions and each session was addressed by the eminent key experts working in that area for the benefit of participants during the seminar. Prof Ron Wakefield, Deputy Pro Vice Chancellor, International and Head of School at the School at the School of Property, Construction and Project Management, Royal Melbourne Institute of Technology, Australia delivered the key-note address about "Housing Construction Technologies-Experience from USA, Australia and Ideas for the future". More than 380 delegates participated in the Seminar.

On this occasion a publication titled "Emerging Building Materials & Construction Technologies" was released by the Chief Guest. The publication contains Technical Papers grouped in to following categories:

- Advancement in Basic Materials - Cement, Bricks, Concrete, Reinforcement
- Gainful Utilization of Industrial waste and construction debris
- Emerging Construction Technologies
- Green Initiatives in production & construction
- Waterproofing and Sanitation and other services

The Publication contains 52 papers covering different subject in the above categories. Low Calcined Clay and low carbon cement, viable alternatives to Natural fine and Coarse Aggregates Utilization of Industrial & Construction waste, smart materials for smart cities, Confined Masonry for disaster resistant construction are some of the topics, which were covered in the publication.

Besides an Audio-Visual CD titled "Hands-on Training for Masons" was also released on the occasion. One of the most important human resource for any construction activity is the Mason who actually constructs the building. It is necessary that a Masson knows the importance of various tools, materials and right way of doing the work. Keeping this in mind, BMTPC has developed an Audio-Visual Training Capsule containing following five modules:

- Line Layout
- Construction Tools
- Concrete & Mortar
- Brick Masonry and
- Reinforcement

The CD will impart training through video and animation in Hindi. These aspects are explained in simple way to make

Shri M. Venkaiah Naidu, Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs addressing during the International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 March 2016 at New Delhi

Shri M. Venkaiah Naidu, Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs releasing the Book on Emerging Building Materials and Construction Technologies on 21 March 2016 at New Delhi

Shri M. Venkaiah Naidu, Hon'ble Minister of Housing & Urban Poverty Alleviation, Urban Development and Parliamentary Affairs releasing the Exhibitor's Catalogue after inaugurating the Exhibition during the International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC, March 21-22, 2016 at New Delhi

the mason understand the subject. The CD will serve as a useful tool for the development of good skills in Masons.

To coincide with the International Seminar, an Exhibition on Emerging Building Materials and Construction Technologies showcasing various building products and construction technologies was also organized. More than 20 firms/companies displayed their products, technologies and systems. The following products/technologies were displayed during the exhibition:

- EPS Core panel system
- GFRG panels
- Bricks & Blocks from Industrial wastes
- Light weight panels from industrial wastes
- Light gauge steel framing technologies
- Precast concrete technologies
- Cement based products
- Hollow core concrete panels
- Toilets with Honeycomb composite panels
- Bio-digester with bamboo technology
- EPS lost formwork system
- Molded EPS panels
- Waterproofing compounds
- Bamboo based roofing materials
- Structural formwork system
- Gainful Utilisation of C&D waste
- GRC panels

The exhibition attracted the attention of the participating Policy Makers/ Officials from Central/ State Governments/ULBs/Housing Boards, Practicing Engineers & Architects, Real Estate Developers, Construction Companies, Consultants & Housing Experts, Technical & Academic Institutions, for providing alternate solutions for mass housing.

2. Conference on Emerging Technologies in Housing and Building Construction at New Delhi

BMTPC organised a Conference on 'Emerging Technologies in Housing and Building Construction' jointly with NAREDCO on 24 July, 2015 at New Delhi. Nearly 100 delegates primarily from housing development companies, State Govt. agencies and technology providers participated in a day long deliberations.

In the welcome address, Shri Navin M.Raheja, Chairman, NAREDCO referred to the challenge posed by the Pradhan Mantri Awas Yojana to housing construction industry for

The Secretary, Ministry of Housing & Urban Poverty Alleviation during the Conference on Emerging Technologies in Housing and Building Construction organized by BMTPC jointly with NAREDCO on 24th July, 2015 at New Delhi

construction of 20 million houses by 2022 and called upon developers to become partners in the Housing for All Mission of the Government of India, which offers a game changer opportunity in housing sector. He emphasised on the need for modern prefab technology to reduce cost & time to complete the projects.

Inaugurating the Conference, Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation emphasized on the role of new technologies and alternate building materials in order to come out of 'Housing Poverty'. She elaborated the four verticals of Housing for All (Urban) Mission under Pradhan Mantri Awas Yojana. The Secretary, MoHUPA referred to the Technology Sub-Mission which shall focus on design and planning of habitats, adopting green building techniques, minimizing the cost etc. She expressed the need to adopt alternate technologies with a view to conserve the depleting natural resources, safeguard environment, use local materials and minimize the use of scarce skilled manpower.

In his theme presentation, Dr. Shailesh Kr.Agrawal, Executive Director, BMTPC emphasized that tapping the huge housing demand shall not be possible with conventional technologies alone, therefore in future, buying of housing shall be linked to factory, assembling in-situ, use of smart materials leading to zero energy buildings. Industrialization of housing sector is the need of the hour. Speaking on the occasion Shri Sunil Mantri, President, NAREDCO emphasis the need for lowering the cost of new technology for high rise buildings.

Shri Sanjeev Kumar, Joint Secretary (Housing for All), Ministry of HUPA, chaired the Panel Discussion. He informed about the initiatives being taken by the Ministry of Housing and Urban Poverty Alleviation for facilitating the adoption of alternate technologies for mass housing.

3. Capacity Building Programmes on "Good Construction Practices and Emerging Technologies"

BMTPC has planned to organize capacity building programmes in various states to enhance the capacity of engineers & architects in the area of quality control and good construction practices and also to introduce them with the emerging technologies in housing sector. In line with this, BMTPC organized the first two-days Capacity Building Programme on "Good Construction Practices including Emerging Technologies" at Vadodara, Gujarat on 29 - 30 July, 2015. Nearly 70 engineers and architects from various

Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing organized from July 29-30, 2015 at Vadodara, Gujarat

Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing organized from October 8-9, 2015 at Jaipur

Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing organised from December 18, 2015 at Bhubaneswar

Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing organised at Gangtok, Sikkim from March 1-2, 2016

state govt. departments participated in the programme.

The programme was inaugurated by Shri H.S.Patel, Municipal Commissioner, Vadodara Municipal Corporation. In the keynote address, Dr. Shailesh Kr.Agrawal, ED, BMTPC explained the objective of the programme made an elaborate presentation on Cost Effective and Emerging Technologies. The expert faculty made presentations on various subjects such as Planning & Design Aspects for Housing projects, Good Construction Practices and Quality Assurance in construction projects, Earthquake Resistant Design & Construction Practices. Presentations were also made by the Technology Providers on emerging technologies such as Glass Fibre Reinforced Gypsum (GFRG) technology, Light Gauge Steel Frame (LGSF) technology, expanded polystyrene core panel technology for construction of houses, precast RCC waffle panels for walling and roofing, factory made precast RCC panel based technology and Modular transportable Housing system.

In the series of the Capacity Building Programmes on Good Construction Practices including Emerging Technologies for Housing, following more programmes were organized by BMTPC during the year:

S.No.	Location	Dates
1	Jaipur, Rajasthan	October 8-9, 2015
2	Bhubaneswar, Odisha	December 18, 2015
3	Gangtok, Sikkim	March 1-2, 2016

Around 60 to 65 participants from housing development agencies and State Governments participated in each programme.

4. Skill Development Programmes in the area of Alternate and Cost Effective Building Materials & Construction Technologies

Earlier, a Building Artisan Certification System consisting of eight modules was evolved by BMTPC. The detailed assessment system and procedure were also evolved for five most important modules namely Mason, Master Mason, Barbender, Concreting and Shuttering through Pilot Assessment of more than 300 building artisans.

Under the project, Pilot Training Assessment & Certification of Building Artisans on five modules were conducted in Gujarat, NCR & Uttrakhand region. The details are given as below:

Gujarat:

Dates	Modules	Location	No. of Artisans trained
28 to 30-1-2016	Concreting	Kharane Murvada	11
11 to 13-12-2016	Barbender	Jitpur	13
13 to 15-3-2016	Barbender	Valetapur	14
10 to 12-2-2016	Mason	Mahudi	20
16 to 18-3-2016	Mason	Marmath	15
	Total		**73**

NCR & Uttrakhand:

Dates	Modules	Location	No. of Artisans trained
5 to 8-1-2016	Asstt. Masons	Dehradun	11
12 to 15-2-2016	Asstt. Masons	Noida Extn.	17
12 to 15-2-2016	Asstt. Masons	Noida Extn.	22
12 to 15-2-2016	Mason	Dehradun	19
12 to 15-2-2016	Mason	Noida Extn.	14
23 to 26-12-2015	Mason	Noida Extn.	18
23 to 26-12-2015	Shattering	Noida Extn.	27
27 to 30-12-2015	Shattering	Noida Extn.	27
9 to 12-1-2016	Concreting	Noida Extn.	10
20 to 23-2-2016	Concreting	Dehradun	20
20 to 23-2-2016	Concreting	Noida Extn.	8
27 to 30-1-2016	Barbender	Noida Extn.	27
27 to 30-12-2015	Barbender	Dehradun	15
	Total		**242**

The Training programme comprised of classroom sessions as well as hands-on sessions. The assessment in the form of written test and calculation tests were conducted first. Next the group was divided in teams of two individuals to take up the hands-on exam. This was accompanied simultaneously by the oral exam.

5. World Habitat Day 2015 Celebrations

On the occasion of World Habitat Day 2015, 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 “Public Spaces for All” in the categories viz. (i) Mentally Challenged, (ii) Hearing Impaired and (iii) Visually Impaired children.

In invited 32 schools, 12 schools have taken part in the Painting Competition. From the 167 selected entries sent by the respective Schools, the Jury in BMTPC selected the best entries for prizes. The prizes were awarded to winning

Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat releasing the publications of BMTPC during the World Habitat Day on October 5, 2015 at New Delhi

Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat giving away the Prizes to the winners of Painting Competition of Differently Abled Children organised by BMTPC during the World Habitat Day on October 5, 2015 at New Delhi

entries by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the celebration ceremony of World Habitat Day held on October 5, 2015 at New Delhi.

Release of Publications

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

a. Special Issue of Newsletter “Nirman Sarika” on the theme of the World Habitat Day “Public Spaces for All”.
b. Third edition of the booklet entitled “IITK-BMTPC Earthquake Tips”.
c. Booklet on Schedule of Rates for Glass Fibre Reinforced Gypsum (GFRG) Panel Building System.
d. Manual of Waterproofing of Glass Fibre Reinforced Gypsum (GFRG) /RAPIDWALL Buildings
e. Demonstrating Cost Effective Technologies - A Case Study of Bawana Industrial Workers Housing Project

These publications were released by Dr.Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation and Ms. Aisa Kirabo Kacyira, Deputy Executive Director, UN-Habitat during the World Habitat Day function.

6. Participation in India International Trade Fair, 2015, Pragati Maidan, New Delhi from 14-27 November 2015

BMTPC participated in the HUDCO BuildTech 2015 during the India International Trade Fair, Pragati Maidan, New Delhi by putting up exhibition on Alternate & Emerging Building Materials and Technologies. Shri Babul Supriyo, Hon’ble Minister of State for Housing & Urban Poverty Alleviation and Urban Development & Vice President, Board of Management, BMTPC, inaugurated BMTPC Display. Besides displaying following 6 emerging technologies, two demonstration houses using emerging building materials and construction technologies were constructed by the technology providers for the benefit of the common public:

- EPS Based Lost Formwork System
- EPS Based Stay-in-site Formwork Block System
- EPS Based Panel System, Speed Floor System, Light Gauge Steel Structure
- Stay in place Formwork System
- Precast concrete panels system using concrete, welded mesh and plates, polystyrene core system

Shri Babul Supriyo, Hon'ble Minister of State for Housing & Urban Poverty Alleviation and Urban Development at BMTPC Display during the India International Trade Fair, 2015 at Pragati Maidan, New Delhi

Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation at BMTPC Display during the India International Trade Fair, 2015 at Pragati Maidan, New Delhi

- Honey Comb Panel System

VII. TECHNOLOGY DEVELOPMENT, DIFFUSION AND TRANSFER

1. Identification and Evaluation of Emerging Housing Technologies

The Council has been studying the practices adopted world over to identify, evaluate and promote suitable technologies suiting Indian condition on regular basis. In the process, during the year, following technologies were identified, which have potential to be used for mass housing in the country:

Waffle-Crete Building System

Waffle-Crete Building system consists of large, structural, ribbed panels of reinforced precast concrete, bolted together and the joints between the panels are caulked to form the walls, floor and pitched or flat roofs of buildings. The surface of each panel consists of 51 mm thick slab or skin, stiffened with the ribs around the perimeter and across the panel, giving an overall panel thickness of 152 mm or 203 mm. In single storey buildings, floors are constructed using precast reinforced concrete floor panels supported on precast concrete grade beams on well-compacted earth. The walls are constructed of 152 mm thick wall panels of precast reinforced dense concrete.

Services like water supply and electricity are normally accommodated in preformed slots in the ribs of panels, before the walls are lined. The building after construction can be shifted from one place to another as the structure is joined using bolt connections.

Modular Tunnelform

Tunnel formwork is a mechanized system for cellular structures. It is based on two half shells which are placed together to form a room or cell. Several cells make an apartment. With tunnel forms, walls and slab are cast in a single day. The structure is divided into phases. Each phase consists of a section of the structure that will cast in one day. The phasing is determined by the programme and the amount of floor area that can be poured in one day. The formwork is set up for the day's pour in the morning. The reinforcement and services are positioned and concrete is poured in the afternoon. Once reinforcement is placed, concrete for walls and slabs shall be poured in one single

operation. The formwork is stripped the early morning and positioned for the subsequent phase.

Reinforced EPS Core Panel System

Expanded Polystyrene Core Panel System is a factory produced panel system for the construction of low rise buildings upto G+3 and as filler walls in high rise RCC and steel frame buildings. In this technique a core of undulated polystyrene is covered with interconnected zinc coated welded wire mesh on both sided reinforcement and shortcrete concrete.

The panels are finished on site by pouring concrete (double panel, floors and stairs) and spraying concrete to realise the following different elements of the system:

- Vertical Structural Walls
- Horizontal Structural elements
- Cladding elements

Precast Large Concrete Panel System

Precast construction system is generally a large panel system, modular system or a combination of both. Precast Large Construction Panel (PLCP) system consists of various precast elements such as walls, beams, slabs, columns, staircase, landing and some customized elements that are standardized and designed for stability, durability and structural integrity of the building. Precast residential building construction involves design, strategic yard planning, lifting, handling and transportation of precast elements. This technology is suitable for construction of high rise buildings resisting seismic and wind induced lateral loads along with gravity loads. The building framing is planned in such a way that maximum number of repetitions of moulds is obtained. These elements are cast in a controlled factory condition. The factory is developed at or near the site which provides an economical solution in terms of storage and transportation.

Sismo Building Technology

Sismo Building Technology is an insulating shuttering kit for whole building based on a three-dimensional lattice made of galvanized steel wire. The lattice is filled with materials of different nature to serve as formwork.

The basic structure of the Sismo building module is steel wire lattice. At the exterior sides of the lattice, infill panels are inserted, which transform the lattice into a closed

structure that can be filled with concrete. The type of infill panels used depends on the purpose of the wall: load bearing or not, insulated or otherwise, etc. The steel wire also acts as armature and anchoring for the finished material and it holds reinforcement bars in place during concrete filling.

Description of the components is as follows:

- 3D lattice (2.2 mm Ø galvanized steel wire)
- Infill panels (EPS, rock wool, mineral board)
- Structural filler (concrete)
- Finishing (plastering, natural stone, paneling etc.)

Rapid Panels

Rapid Panel is a prefabricated assembly of high-strength steel wire forming a panel with a core of expanded polystyrene (EPS). During construction, Rapid Panels are installed as walls and/or slabs. Specified mixtures of mortar or concrete are applied to the surfaces of the panels to complete the structure. The basic unit of the Rapid Panel is the zig-zag truss. Steel wire is bent into a zig-zag shape to form a continuous chain of web members. This bent wire is then welded to continuous chord wires at every node to form the complete truss. Rapid panels are manufactured in a fully automated plant.

Walltec Hollowcore Concrete Wall Panels

Walltec wall panels are extruded non-load bearing concrete hollowcore wall panels manufactured in fully automated machines. Walltec wall panels are factory produced using light weight concrete made of river sand, crushed stone aggregate, light weight aggregate and Ordinary Portland cement. The concrete is extruded and cut while still wet to the requisite length. Curing and sealing are followed for 24 to 48 hours by stacking and palletizing after which the walls are watered and cured for a further period of 7 to 8 days. After 15 days the panels are ready for transportation to site. Walls have cylindrical hollow cores incorporated with 7 No. 53 mm dia voids in the 92mm thickness and 6 No.74 mm dia. voids for the 120 mm thickness panels. Hollows are incorporated in Walltec walls to reduce weight, facilitate mechanical, electrical and plumbing services through hollows, thereby increasing sound and thermal insulative properties. The sides of all panels are tongued and grooved to facilitate positive jointing.

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

Light Gauge Steel Framed Structure with Infill Concrete Panels (LGSFS-ICP) Technology is an innovative emerging building and construction technology using factory made Light Gauge Steel Framed Structure (LGSFS), light weight concrete and precast panels. The LGS frame is a “C” cross-section with built in notch, dimpling, slots, service holes etc. produced by computerized roll forming machine. These frames are assembled using metal screws to form into LGSF wall and roof structures of a building. Provisions for doors, windows, ventilators and other cutouts as required are incorporated in the LGSFS.

The LGS frames are manufactured in the factory and assembled into LGSF wall structures, transported to the construction site and erected wall by wall on a pre-built concrete floor as per the floor plan of the building.

2. Development of Knowledge Portal on Sustainable Habitat for Emerging Technologies

The Council is striving to create a platform which will facilitate sustainable faster construction, using new prospective emerging construction systems being practiced globally. In this direction, the Council had prepared a document for creation of Web Portal on emerging technologies. The portal displaying all the information about emerging technologies and building materials, such as detailed description, case studies, expert opinions, cost, life cycle, comparative analysis, descriptions of building products, materials, systems, design and construction codes, best industry practices, reviews, links to manufacturers, suppliers etc., will be helpful in transferring the information to all the stakeholders. The interlinked cataloguing system for the proposed web portal will fill this gap by connecting design related information, standards and codes, public opinion and reviews backed by case studies, detailed description on products, materials, technology and building systems with validated list of manufacturers, suppliers, experts, designers and consultants. Sharing of such advanced and centralised information across the globe through the portal shall help in fastening the delivery of housing units thereby meeting the mission objectives.

The purpose of the Knowledge Portal on Sustainable Habitat is to launch a content centric cataloguing website consisting of technical information on building products, materials, technologies, systems and processes encompassing sustainable habitat. After inviting tender

through newspapers for designing, developing and hosting the proposed Knowledge Portal based on the approved conceptual design, the work on has been started. The System Requirement Specification (SRS) document has been completed for development of the web portal.

3. Development of Guidebook (Margadarshika) for Construction Workforce

The Council has prepared Guidebook (Margadarshika) for 5 trades i.e. Assistant Mason, Mason, Bar bender, Concreting Artisan & Shuttering Artisan in English. In order to cater to the Hindi speaking areas, tender has been floated for preparation of Margadarshika in Hindi and selection of nodal agencies for undertaking the training programmes. The Guidebooks (Margadarshikas) will be brought out for 5 trades i.e. Assistant Mason, Mason, Bar bender, Concreting Artisan & Shuttering Artisan in Hindi.

4. Preparation of Draft Indian Standard Code of Practice for Design of Glass Fibre Reinforced Gypsum (GFRG) Panels for Buildings

GFRG panel system is one of the identified emerging building technology for housing. Glass Fibre Reinforced Gypsum (GFRG) is the name of a new building panel product, made essentially of gypsum plaster, reinforced with glass fibres, and is also known in the industry as Rapidwall (originally invented in Australia). These are manufactured as large light-weight panels, typically 12 m long and 3 m high, with 124 mm thickness and with hollow cavities.

GFRG panels can be manufactured from various types of gypsum; the use of industrial waste gypsum, which is a waste product of the fertilizer industry, is particularly beneficial from the perspective of sustainability and recycling of waste.

Use of GFRG panels as walls and floor slabs in buildings, with the cavities filled with concrete or appropriate inert material, contribute significantly to sustainability and ‘green building’ concept, owing to the resulting savings in the use of high energy-intensive and scarce materials such as cement, steel, sand and water.

The provisions for structural design of GFRG buildings given in this Code of Practice are based on the GFRG Building Structural Design Manual published by Building Material Technology Promotion Council (BMTPC), Ministry of Housing & Urban Poverty Alleviation, Govt. of India in December, 2013. These design provisions have been based primarily on extensive research carried out at the

Department of Civil Engineering, Indian Institute of Technology Madras.

The draft Indian Standard has been considered by the concerned Technical committee of Bureau of Indian Standards and was issued for wide circulation for comments.

5. Project on "Estimate of Embodied Energy for Low Carbon Building Construction"

The Council has initiated a Project with IIT Roorkee on "Estimate of Embodied Energy for Low Carbon Building Construction". The objectives of the project are:

- Study of the CPWD Analysis of Rates for material breakups and computation of revised EER values of the items of work using EEV of the individual building materials.
- Upgradation of the existing data on the 'Schedule of Energy Rates' to the 'Schedule of Embodied Energy Rates'.
- Application of the Schedule for a range of case studies for validation.
- Derivation of best fit equations to serve as a tool for preliminary EEE estimates.
- Development of a software tool to:
    - Directly estimate the EECT of a building construction using its, BOQ and the upgraded' Schedule of Embodied Energy Rates'
    - Highlight the best predictors of embodied energy in the building construction under study
    - Provide suitable low embodied energy (or low carbon) substitutes for the high carbon materials used in the original construction proposal based upon regional parameters
    - Calculate the CO, emissions of the proposed construction
    - Estimate the reduction in CO emissions with the low carbon substitutes and convert the reduced emissions into carbon credits.
- Recommendations for economizing the manufacture and use of low carbon building materials.
- Preparation of the Handbook.
- Validation of results through a small prototype construction.

Embodied energy of a proposed building can be estimated

by computing the material requirements of the project, multiplying each material content with its corresponding embodied energy value (EEV) and by summation, obtaining the total EEC. The drawback with this method is that the material requirements are not directly available, but have to be computed from the Bill of Quantities (BOQ) of the project. A more efficient methodology would be to use the BOQ directly for estimating the embodied energy. The proposed project aims to present such a methodology in which the embodied energy of a building can be directly computed from its BOQ, by prescribing energy values for the individual items of work. These values are termed as Embodied Energy Rates (EER).

6. Development of Compendium of Green Technologies for states of Punjab, Haryana, the Union Territory of Chandigarh (UTC) and the National Capital Region (NCR)

The Council has initiated a Project for Development of Compendium of Green Technologies for states of Punjab, Haryana, the Union Territory of Chandigarh (UTC) and the National Capital Region (NCR).

This compendium will survey the contiguous states of Punjab, Haryana, the Union Territory of Chandigarh (UTC) and the National Capital Region (NCR) which fall in the Composite Climate belt. It will describe the current construction practices in urban areas, lists materials and construction systems that are manufactured/ available in the region while evaluating their environmental impacts (greenness), suggests other technologies that are not yet available but would be suitable, presents case studies of exemplary projects in the region and lists design practitioners engaged in affordable and green construction. A graphic tool for representing greenness will also be developed. The building technology options for individual house, low rise & high density (3-4 storied house) and high rise buildings will also be analyzed from the point of view of greenness.

7. Project on Structural Stability Assessment and Development of Design Guidelines for Expanded Polystyrene Core Panel System

The Council has initiated a Project for Structural Stability Assessment and Development of Design Guidelines for Expanded Polystyrene Core Panel System with IIT Roorkee.

Expanded Polystyrene Core Panel System (EPS) is an emerging technology for construction of affordable

buildings. In this technique a core of polystyrene is covered with welded wire mesh reinforcement and micro-concrete. This results in a light weight structural system with efficient thermal and acoustic insulation. The system can be used as load bearing wall system in low-rise buildings and as partitions in high-rise RC and steel frame buildings. Due to its light weight it requires thin load bearing sections to resist the gravity and earthquake actions and is expected to much economical in comparison with the conventional building structural systems. However, due to its reduced thickness it poses some challenges in in-place and out-of-plane action of EPS walls. The system is still at its development stage in India. Some companies have started use of this system in India, but no standard guidelines are currently available in the country for design.

It is proposed to develop guidelines for assessment of structural safety and design of this system for stability against gravity, wind and earthquake loading in Indian condition. Another study on durability assessment of these systems has been planned The major objectives of the project are as follows:

- Study of literature, codes and design guidelines for this system available worldwide to assess the prevailing methodologies for design and construction of these buildings.
- Interaction with the companies / agencies in Indian involved in promotion of this technology to identify their needs and challenges faced.
- Development of a testing protocol for characterization of material and components of EPS, for quality control and safety.
- Development of analytical methods for design of EPS systems, which can be adopted in design offices.
- Evaluation of the prevailing construction practices and designs for their safety against combined action of gravity and earthquake forces in different zones in the country and development of design guidelines for structural safety of EPS systems.
- Detailed investigation of typical designs, using nonlinear finite element analysis to validate the proposed methodology.

In the project, details of the tests to be conducted for experimental investigation finalized and equipment for preparation of samples has been procured. Finite element Analysis of a representative G+3 building has been conducted. It demonstrates that the Reinforced Sandwitch

Panels (RCSP) system with 35 mm thick concrete wythes and standard welded wire mesh reinforcement is adequate to resist the gravity loads and earthquake forces corresponding to the most severe seismic zone in India. Further study is in progress.

A technical paper titled “Composite Panel Structural System: a promising Alternative for future Buildings” was presented by Prof. Yogendra Singh, IIT Roorkee during the International Seminar on Emerging Building Materials and Construction Technologies, organized by BMTPC on 21-22 March 2016 in New Delhi.

8. Project on Durability Assessment and Enhancement of Service Life of Expanded Polystyrene Core Panel System

The Council has initiated a Project on Durability Assessment and Enhancement of Service Life of Expanded Polystyrene Core Panel System with IIT Roorkee. Expanded Polystyrene Core Panel System (EPS) is an emerging technology for construction. In this technique a core of polystyrene is covered with welded wire mesh reinforcement and micro-concrete. This results in a light weight structural system with efficient thermal and acoustic insulation. The system can be used as load bearing wall system in low-rise buildings and as partitions in high-rise RC and steel frame buildings. Due to its light weight it requires thin load bearing sections to resist the gravity and earthquake actions and is expected to much economical in comparison with the conventional building structural systems. However, due to its reduced thickness it poses some challenges regarding its durability. The reduced cover to the reinforcement may lead to its rapid corrosion and lower service life. It is proposed to develop guidelines for assessment of durability and expected service life of this system using accelerated corrosion test. The study will be conducted with the following objectives:

- To review the available studies regarding durability and service life assessment of thin concrete sections with welded wire mesh reinforcement.
- To perform accelerated corrosion test of EPS panels to assess their service life.
- To develop techniques for enhancing service life of EPS panels.
- To develop design guidelines and good construction techniques for enhanced service life of EPS.

9. Development of Fly Ash based Advanced Ligno-Silico-Aluminious Geo-polymeric Binder useful for making Cement Free Green Concrete

The Council is undertaking a Project with CSIR-AMPRI, Bhopal on “Development of Fly Ash based Advanced Ligno-Silico-Aluminious Geo-polymeric Binder useful for making Cement Free Green Concrete”. The objective of the project proposed is to develop Fly Ash based Advanced Ligno-Silico-Aluminious Geo-polymeric Binder useful for making Cement Free Green Concrete and Characterization and Evaluation of Engineering Properties of developed materials.

The agency has identified Fly-ash from the NTPC, Sarni (MP) generated from ESP 3 as basic material for project work. Fly-ash about 200 Kg. were procured for feasibility studies. Ligno Silico Aluminous (LSA) Alkaline Activator using Rice Husk and Alkali has been prepared. The prepared Geo-polymer Concrete was tested for Compressive Strength at various temperature i.e. at 60 degree, 90 degree, 120 degree and 150 degree and optimization process is under progress.

10. Development of Discarded Fishnet Reinforced Hybrid FRP sheet for Indoor Partitions: A Low Cost housing Solution

The Council is undertaking a Project on “Discarded Fishnet Reinforced Hybrid FRP sheet for Indoor Partitions: A Low Cost housing Solution”. The project is being executed by University College of Engineering, Anna University, Nagercoil. The project focus on the reuse of discarded fishnet as reinforcing material in polyester matrix for the manufacturing of Hybrid Fish Net Reinforced Plastics (HFNRP) and fabrication of flat panels and hollow framework.

Under the project, the mould has been designed after detailed study. Various sample of the raw materials were collected and sample sheets were prepared for testing purpose. The mould was prepared as HFNRP 1 consists of two glass fibers and one fishnet sandwiched. HFNRP 2 consists of two glass fibers and three fishnets sandwiched. HFNRP 3 consists of two glass fibers and five fishnets sandwiched. HFNRP 4 consists of two glass fibers and seven fishnets sandwiched. The flat specimens of sizes 2x2 and 3x3 were prepared. The testing of the same is under progress.

11. Development of Commercial Process for Utilization of Pond Ash in

manufacture of Cold Setting Building Brick and Block

The Council is undertaking a project on the "Development of commercial process for utilization of pond ash in manufacture of cold setting building brick and block" jointly with CSIR-Institute of Minerals & Materials Technology (IMMT), Bhubaneswar. The objectives of the project is to develop a commercial process for the use of pond ash as a raw material along with sand and mineral cementation binder in manufacture of cold setting building brick and block conforming to BIS specification IS: 12894:2002 of Class-7.5 & above.

Raw materials such as pond ash, commercial chemicals have been procured. The workable process for manufacturing of Brick and Block using pond ash from 50%-60% has been developed. Similarly the workable process for manufacturing of Brick and Block using pond ash from 70% has been developed. The developed process is being optimized and related experiments are under progress.

VIII. PROJECTS UNDER 10% LUMP-SUM PROVISION FOR NER STATES INCLUDING SIKKIM AND JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION (JNNURM)

1. BMTPC's Role in Implementation of projects under 10% Lump-Sum Provision for NER States including Sikkim

The Ministry of Housing & Urban Poverty Alleviation, Govt. of India, is implementing projects under 10% Lump-sum Provision for NER States including Sikkim. The Council has been designated as one of the Appraisal Agencies for appraising the projects received under 10% Lump-sum Provision for NER States including Sikkim. The following projects has been appraised during the year:

S. No	State	Project Name	No. of Projects
Arunchal Pradesh			
1	Tawang	Construction of Housing for EW Section at Tawang	**8**
2	Roing	DPR for Construction of Vendors Market-cum-Unemployed women Hostel at Roing Township in Arunachal Pradesh	
3	Passighat	Construction of Multi-Utility Complex at Passighat Town of Arunachal Pradesh	
4	Daparijo	Construction of Affordable Housing at Daparijo	
5	Chimpu, Itanagar	Construction of Non-Working Women Hostel at Dirang, Arunachal Pradesh	

S. No	State	Project Name	No. of Projects
6	Bomdila	Construction of Town Resource Centre at Bomdila	
7	Pasighat	Construction of Affordable Housing at Pasighat	
8	Seppa	Construction of EWS Housing at Seppa	
ASSAM			
1	Mangaldoi	Submission of DPR for MultiutilistyBudiling at Mangaldoi Town under 10% Pool fund by MoHUPA	**1**
Nagaland			
1	Mokokchung Town	DPR for construction of Working Women Hostel at Mokokchung Town in Nagaland at total cost of Rs. 1050.00 Lakhs	**4**
2	Mokokchung Town	Construction of Urban Resources Centre for Urban Poor at Yimyu, Mokokchung, Nagaland	
3	Kohima	Solar Strreet Lighting of kohima Town Road, Nagaland	
4	Tuli	DPR for construction of Market Complex at Tuli Town in Nagaland, at total project cost of Rs. 499.97 lakhs	
MIZORAM			
1	Mizoram All Districts	Making of Street Vendors Carts	**1**

2. BMTPC's Role in Implementation of projects under JNNURM

Appraisal of Detailed Project Reports (DPRs) under JNNURM

BMTPC has been involved in the implementation of the JNNURM sub-components Basic Services to Urban Poor (BSUP) and Integrated Housing & Slum Development Programme (IHSDP) for Appraisal of DPRs, Monitoring of Projects, Third Party Inspection & Monitoring (TPIM) Reviews, and organization of capacity building programmes. The projects appraised by the Council include housing and other infrastructure services such as roads, water supply, sewerage, storm water drains, community facilities, health centres, education facilities etc.

During the year, the Council appraised revised DPR of BSUP project from Andhra Pradesh. The BSUP& IHSDP Sub component is under extension phase & no new projects are being sanctioned.

S. No	City/Town	Location	No. of Projects
BSUP			
Andhra Pradesh			

1.	Vijayawada	DPR for providing G+3 Group Housing and Basic Services for Urban Poor in slums located in Circle-I of VMC, JNNURM - BSUP.	1

Review of TPIM Reports

The Council has been undertaking review of Third Party Inspection & Monitoring (TPIM) reports for BSUP, IHSDP& RAY projects. During the year, TPIM Review of the following projects were undertaken and submitted to the Mission Directorate:

S.No	Name of State	TPIM Review Reports Submitted to Mission Directorate
1.	Bihar	1
2.	Chandigarh	1
3.	Delhi	1
4.	Gujarat	32
5.	Haryana	1
6.	Himachal Pradesh	2
7.	Karnataka	2
8.	Orissa	4
9.	Punjab	1
10.	Rajasthan	6
11.	Uttarakhand	2
12.	Uttar Pradesh	25
Total		**78**

ORGANISATION

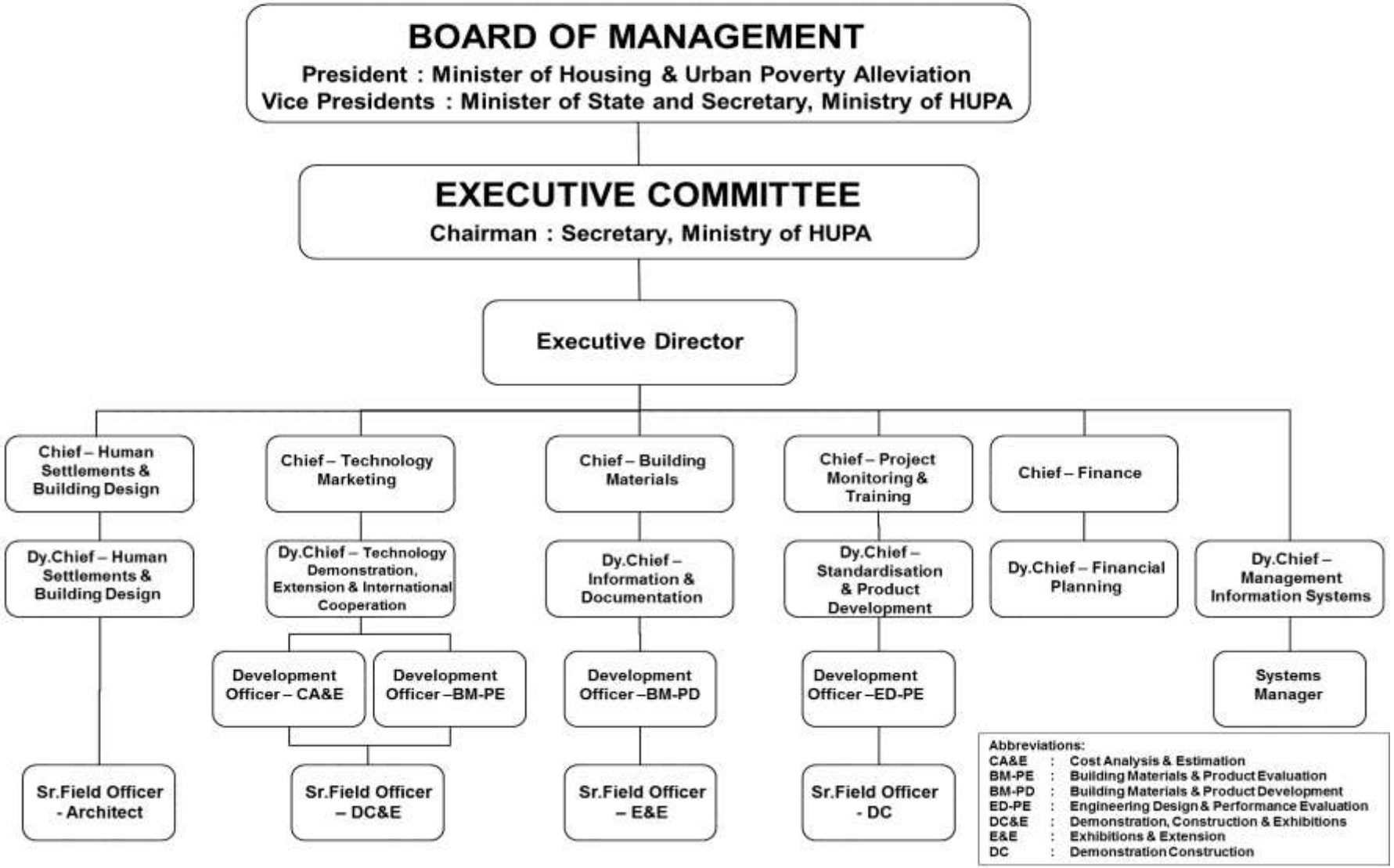
The organizational structure of the Council is depicted at next page. As on 31st March, 2016, BMTPC had a staff strength 39 comprising 21 officers and 18 supporting staff. Also technicians/professionals are hired on contract on project and need basis.

The Council has continued following administrative and financial measures for bringing transparency, responsiveness and greater participation of the employees:

- Implementation of modified Byelaws, Recruitment-cum-Promotion Rules and Delegation of Power.
- Internal Committee for smooth and harmonious functioning of the Council:
    - Investment Committee
    - Advertisement Committee
    - Printing Committee
    - Local Purchase Committee
    - Store Purchase Committee
    - Transport Committee
    - 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 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.
- Independent audit of implementation of Citizen's Charter.
- Independent audit of implementation of public grievance redressal system.

BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL

ORGANISATION CHART



STAFF STRENGTH (as on 31.3.2016)

S.No.	Name & Designation	Date of Joining
1.	Dr. Shailesh Kr. Agrawal *Executive Director*	17.01.08
2.	S.Balasrinivasan *Chief-Finance*	08.04.92
3.	J.K.Prasad *Chief-Building Materials*	01.09.03
4.	M. Ramesh Kumar *Chief- Human Settlements & Building Design*	01.04.93
5.	Arun Kumar Tiwari *Chief-Project Monitoring & Training and Administration*	22.07.03
6.	S.K.Gupta *Deputy Chief- Technology, Demonstration Extension & International Cooperation*	26.10.93
7.	Arvind Kumar *Deputy Chief- Management Information Systems*	15.04.99
8.	Dr. Amit Rai *Deputy Chief (On Lien to UNIDO)*	05.11.98
9.	Chandi Nath Jha *Deputy Chief- Standardization & Product Development*	09.09.99
10.	Pankaj Gupta *Deputy Chief-Information & Documentation*	14.10.99
11.	D.P.Singh *Development Officer-Engineering Design & Product Evaluation*	05.10.98
12.	Dalip Kumar *Senior Field Officer- Demonstration Construction & Exhibition*	04.03.91
13.	Alok Bhatnagar *Senior Field Officer- Exhibition & Extension*	05.10.98
14.	Akash Mathur *Senior Field Officer- Architect*	01.01.02
15.	Anita Kumar *Sr. Programmer*	03.10.96
16.	M.Ramakrishna Reddy *Liaison Officer*	29.10.03
17.	Pankaj Gupta *Personnel Officer*	01.03.94
18.	Praveen Suri *Systems Analyst*	01.09.94
19.	S.S.Rana *Library Officer*	01.04.98
20.	D.Prabhakar *Field Officer*	29.01.04
21.	Ashwani Kumar *Asstt. Field Officer*	01.01.02

ACCOUNTS

The Council received grants of Rs. 13,00,00,000 from the Ministry of Housing & Urban Poverty Alleviation, Government of India during the FY 2015-16. The total expenditure incurred was Rs. 11,31,22,593 during the year, as per Receipt & Payment 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	4,27,26,375
• Organisation and participation in various Seminars, Conferences, Workshops Housing for All (Handholding, Documentation, Sensitization and Capacity Building), S&T support to various schemes of Ministry, Technology Sub-Mission, Mainstreaming Emerging Technologies through Dissemination, Knowledge Transfer with State Govt.	3,18,69,791
• Expenses towards JNNURM, BIPARD, Building Centers	18,49,292
• Expenditure on Salary, Establishment & Administration expenses including office equipments, computer peripherals, etc.	3,66,77,135
TOTAL	**11,31,22,593**

The Accounts have been audited by M/s A.N. Garg & Company, Chartered Accountants. The balance sheet and the statement of accounts of the year 2015-16 is placed in the report.

INDEPENDENT AUDITOR'S REPORT

To

The Members,
Building Materials & Technology Promotion Council
NEW DELHI

Report on the Financial Statements

We have audited the accompanying financial statements of **BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL** ("the SOCIETY") registered under the Societies Registration Act 1860, which comprise the Balance Sheet as at March 31, 2016 and statement of Income and Expenditure for the year ended and a summary of significant accounting policies and other explanatory information.

Management Responsibility for the Financial Statement

Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance in accordance with the Accounting Principles generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Society's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

Contd....2.....

309-310, Aggarwal Millenium Tower-1, Netaji Subhash Place, Pitampura, Delhi-110 034
Ph.: +91-11-27351188, 45781199 I Email : angargco@gmail.com I Web : www.angargcompany.com

We believe that the audit evidences we have obtained are sufficient and appropriate to provide a basis for our unqualified audit opinion.

Basis for Opinion:

Opinion

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 conformity with the accounting principles generally accepted in India:

(a) In case of Balance Sheet, of the state of affairs of the Society as at March 31, 2016;
(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.

Report on Other Legal and Regulatory Requirements:

We report that:
(a) We have obtained all the information and explanation, which to the best of our knowledge and belief were necessary for the purpose of our audit.
(b) In our opinion, proper books of accounts as required by the law have been kept by the Society so far as it appears from our examination of the books.
(c) In our opinion, the Balance Sheet & Statement of Income & Expenditure account dealt with by the report complies with the Accounting Standards issued by the Institute of Chartered Accountants of India.
(d) The Balance Sheet and Statement of Income & Expenditure account dealt with by this Report are in agreement with the books of accounts.
(e) The Receipts and Payment Account dealt with by this report are in agreement with the books of accounts.

FOR A N GARG & COMPANY
Chartered Accountant
(FRN: 004616N)

A.N. GARG
(FCA, Partner)
M. No. 083687

Place: DELHI
Date: 11-08-2016

Building Materials & Technology Promotion Council

Ministry of Housing & Urban Poverty Alleviation, Government of India

BALANCE SHEET AS ON 31 MARCH 2016

Amount (₹)

	Schedule	2015-16	2014-15
CORPUS/CAPITAL FUND AND LIABILITIES			
CORPUS/CAPITAL FUND	1	1,000,000	1,000,000
RESERVES AND SURPLUS	2	281,920,015	194,580,742
EARMARKED FUNDS	3	1,162,578	1,335,014
CURRENT LIABILITIES AND PROVISIONS	4	26,865,458	2,061,111
TOTAL		**310,948,051**	**198,976,867**
ASSETS			
FIXED ASSETS	5	38,607,056	38,920,484
CURRENT ASSETS, LOANS & ADVANCES ETC.	6	272,340,995	160,056,383
TOTAL		**310,948,051**	**198,976,867**
SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS	14		

As per our report of even date attached.

For A.N.GARG & COMPANY

Chartered Accountants

FRN: 04616N

A.N.GARG

(FCA,Partner)

M.No. 083687

For Building Materials & Technology Promotion Council

S. Balasrinivasan
(Chief - Finance)

Dr. Shailesh Kr. Agrawal
(Executive Director)

Place :Delhi

Date : 11.08.2016

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

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 MARCH 2016

Amount (₹)

	Schedule	2015-16	2014-15
INCOME			
Grants / Subsidies	7	104,596,166	49,900,000
Jnnurm Monitoring/Appraisel/TPIMA/Ray Fees/Training Programmes Receipts	8	77,795,615	16,351,190
Income from Publications and PAC's Fee etc.	9	931,090	1,112,361
Interest Earned	10	13,671,270	13,564,560
TOTAL (A)		**196,994,141**	**80,928,111**
EXPENDITURE			
Expenditure on Salary,Establishment & Adminstration	11	35,327,596	40,921,145
Expenditure on Dissemination / Seminars/Workshops, Training Programmes,HFA, JNNURM etc.	12	33,046,647	23,302,997
Expenditure on Financial Assistance, Sponsored Studies etc.	13	40,379,722	14,989,940
Depreciation	5	900,903	1,135,226
TOTAL (B)		**109,654,868**	**80,349,308**
Excess of income over expenditure (A-B)		87,339,273	578,803
BALANCE BEING SURPLUS CARRIED TO BALANCE SHEET		**87,339,273**	**578,803**
SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS	14		

As per our report of even date attached.
For A.N.GARG & COMPANY
Chartered Accountants
FRN: 04616N

A.N.GARG
(FCA,Partner)

For Building Materials & Technology Promotion Council

S. Balasrinivasan
(Chief - Finance)

Dr. Shailesh Kr. Agrawal
(Executive Director)

Place :Delhi
Date : 11.08.2016

Building Materials & Technology Promotion Council

Ministry of Housing & Urban Poverty Alleviation, Government of India

RECEIPTS & PAYMENT ACCOUNT FOR THE YEAR ENDED 31 MARCH 2016

Amount (₹)

	2015-16		2014-15	
RECEIPTS				
1 **Opening Balance**				
Cash Balances in hand		31,744		75,930
Bank Balances				
With Scheduled Banks:				
- On Deposit Account	129,634,094		130,578,006	
- On Savings Accounts:				
- Canara Bank (Parliament Street)	10,621,207		1,585,808	
- Canara Bank (Hauzkhas)	380,245		365,479	
- Canara Bank, Bangalore	188,552		49,544	
- State Bank of Hyderabad (Scope Complex)	1,961,214	142,785,312	7,357,212	139,936,051
2 Grants-in-aid from Central Government (Ministry of Housing & Urban Poverty Alleviation)		130,000,000		49,900,000
3 Receipts towards JNNURM Monitoring/Appraisel/TPIMA/RAY Fees/UNDP/Training Programme receipts		72,201,431		20,153,524
4 Security Deposit etc		150,431		300,000
5 Income from Publications etc.		931,090		1,112,361
6 Interest Earned		14,822,500		13,456,316
TOTAL		**360,922,508**		**224,934,182**
PAYMENTS				
1 Purchase of Fixed Assets	587,475		391,569	
2 Expenditure on Salary, Establishment & Administration	35,484,229		40,915,296	
3 Expenditure on Training Programmes, Seminars/Workshops, etc.	31,869,791		6,261,485	
4 Expenditure on Financial Assistance, Sponsored Studies,HFA etc.	40,367,576	108,309,071	14,993,940	62,562,290
5 Loan & advances(Net)		2,358,799	-	837,273
6 Security Deposit etc		605,431		-
7 Earmarked funds				
BIPARD	232,436		178,560	
Rejuvenation and strengthening of Building Centers	440,000		243,000	
Capacity Building Training Programme on IPOMS, Quality Assurance and TPIMA	-		1,196,763	
Vambay	-	672,436	50,000	1,668,323
8 Expenditure on JNNURM		1,176,856		17,049,240
9 **Closing Balance**				
Cash Balances in hand		58,289		31,744
Bank Balances				
With Scheduled Banks:				
- On Deposit Account	127,383,062		129,634,094	
- On Savings Accounts:				
- Canara Bank (Parliament Street)	113,257,654		10,621,207	
- Canara Bank (Hauzkhas)	395,606		380,245	
- Canara Bank, Bangalore	197,196		188,552	
- State Bank of Hyderabad (Scope Complex)	6,508,108	247,741,626	1,961,214	142,785,312
TOTAL		**360,922,508**		**224,934,182**

As per our report of even date attached.

For A.N.GARG & COMPANY
Chartered Accountants
FRN: 04616N

A.N. GARG
(FCA,Partner)
M.No. 083687

For Building Materials & Technology Promotion Council

S. Balasrinivasan
(Chief - Finance)

Dr. Shailesh Kr. Agrawal
Executive Director

Place :Delhi
Date : 11.08.2016

SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2016

Amount (₹)

SCHEDULE 1- CORPUS/CAPITAL FUND	2015-16	2014-15
Balance as at the beginning of the year	1,000,000	1,000,000
TOTAL	1,000,000	1,000,000

SCHEDULE 2- RESERVES AND SURPLUS		2015-16		2014-15
1. Capital Reserve				
Opening Balance	87,762,973		87,371,404	
Addition during the year	587,475	88,350,448	391,569	87,762,973
2. Excess of Income over Expenditure				
Opening Balance	106,817,769		106,630,535	
Add : Amount transferred from Income & Expenditure A/c	87,339,273		578,803	
	194,157,042		107,209,338	
Less transferred to Capital Reserve	587,475	193,569,567	391,569	106,817,769
TOTAL		281,920,015		194,580,742

SCHEDULE 3- EARMARKED FUNDS		2015-16		2014-15
1 BIPARD PROJECT				
Opening Balance	252,689		405,942	
Less : Utilisation/Expenditure during the year	232,436	20,253	153,253	252,689
2 Rejuvenation and strengthening of Building Centers				
Opening Balance	1,082,325		1,325,325	
Less : Utilisation/Expenditure during the year	440,000	642,325	243,000	1,082,325
3 UNDP-Developing Toolkit forUrban Managers				
Received during the year		500,000		-
4 Capacity Building Training Programme on IPOMS, Quality Assurance and TPIM				
Opening Balance	-		1,196,763	
Add : Amount Refunded during the year	-	-	1,196,763	-
TOTAL		1,162,578		1,335,014

SCHEDULE 4- CURRENT LIABILITIES AND PROVISIONS	2015-16	2014-15
CURRENT LIABILITIES		
- Outstanding Liabilities	438,347	582,834
- Security Deposit	1,023,277	1,478,277
- Balance of Grants carried forwarded	25,403,834	-
TOTAL	26,865,458	2,061,111

A.N. GARG & CO. CHARTERED ACCOUNTANTS N. Delhi

SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2016

Amount (₹)

SCHEDULE 5- FIXED ASSETS							2015-16	2014-15
	GROSS BLOCK			DEPRECIATION			NET BLOCK	NET BLOCK
	Cost as at 01.4.15	Additions	Total	Upto 01.04.15	Current year	Upto 31.03.16	As at 31.03.16	As at 31.03.15
Office Building including Land	34,319,817	-	34,319,817	-	-	-	34,319,817	34,319,817
Furniture and Fixtures	3,648,651	-	3,648,651	2,655,157	99,349	2,754,506	894,145	993,494
Office Equipments	19,003,139	587,475	19,590,614	17,349,047	295,869	17,644,916	1,945,698	1,654,092
Computers/ Peripherals	17,209,621	-	17,209,621	16,736,906	283,629	17,020,535	189,086	472,715
Air conditioners	1,035,166	-	1,035,166	637,946	59,583	697,529	337,637	397,220
Fan & Coolers	81,224	-	81,224	45,693	5,330	51,023	30,201	35,531
TV and VCR	380,450	-	380,450	313,736	10,008	323,744	56,706	66,714
Exhibits, Panels, Display Models	12,084,905	-	12,084,905	11,104,004	147,135	11,251,139	833,766	980,901
	87,762,973	**587,475**	**88,350,448**	**48,842,489**	**900,903**	**49,743,392**	**38,607,056**	**38,920,484**
Previous Year (2014-15)	**87,371,404**	**391,569**	**87,762,973**	**47,707,263**	**1,135,226**	**48,842,489**	**38,920,484**	**39,664,141**

A.N. GARG & CO. CHARTERED ACCOUNTANTS N. Delhi

SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2016

Amount (₹)

SCHEDULE 6 - CURRENT ASSETS, LOANS, ADVANCES ETC.	2015-16		2014-15	
A. CURRENT ASSETS:				
1. Cash in hand		58,289		31,744
2. Bank Balances				
- On Deposit Account	127,383,062		129,634,094	
- On Savings Accounts:				
- Canara Bank (Parliament Street)	113,257,654		10,621,207	
- Canara Bank (Hauz Khas)	395,606		380,245	
- Canara Bank (Bangalore)	197,196		188,552	
- State Bank of Hyderabad (Scope Complex)	6,508,108	247,741,626	1,961,214	142,785,312
B. LOANS, ADVANCES AND OTHER ASSETS				
1. Advances to staff	2,489,084	2,489,084	2,339,104	2,339,104
2. Advances and other amounts recoverable in cash or in kind or value to be received				
a.Amount Recoverable & other Advances	4,285,955		2,077,136	
b.Security Deposit (Space)	420,000		420,000	
c. Tax Deducted at Source Recoverable	8,519,914	13,225,869	2,425,730	4,922,866
3. Interest Accured on FDR's		8,826,127		9,977,357
TOTAL (A + B)		**272,340,995**		**160,056,383**

A.N. Gupta & Co. CHARTERED ACCOUNTANTS N. Delhi

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON 31 MARCH 2016

Amount (₹)

SCHEDULE 7- GRANTS/SUBSIDIES (Irrevocable Grants & Subsidies Received)		2015-16	2014-15
1	Central Government (Ministry of Housing & Urban Poverty Alleviation, Government of India)	130,000,000	49,900,000
	Less:Unultilised Grants carried forwarded to Financial Year 2016-17	25,403,834	-
	TOTAL	**104,596,166**	**49,900,000**

SCHEDULE 8 - FEES/SUBSCRIPTIONS		2015-16	2014-15
1	Jnnurm Monitoring/Appraisal/TPIMA/RAY fees from Ministry of Housing & Urban Poverty Alleviation & Training Programme Fees	77,795,615	16,351,190
	TOTAL	**77,795,615**	**16,351,190**

SCHEDULE 9- INCOME FROM PACS FEE, PUBLICATION ETC.		2015-16	2014-15
1	Receipts towards sale of publications, PACS etc	931,090	1,112,361
	TOTAL	**931,090**	**1,112,361**

SCHEDULE 10- INTEREST EARNED		2015-16	2014-15
1	On Term Deposits With Scheduled Banks	11,031,251	12,660,156
2	On savings Accounts With Scheduled Banks	2,058,754	698,723
3	On Advance to employees	581,265	205,681
	TOTAL	**13,671,270**	**13,564,560**

SCHEDULE 11- EXPENDITURE ON SALARY, ESTABLISHMENT & ADMINISTRATION		2015-16	2014-15
1	Pay and Allowances	25,684,482	35,073,458
2	Leave Travel Concession	240,745	316,268
3	Reimbursement of Medical Expenses	1,038,504	1,337,709
4	Honorarium	241,000	211,000
5	Administration Expenses (Ref: schedule 14,Part 6)	8,122,865	3,982,710
	TOTAL	**35,327,596**	**40,921,145**

A.N. GARG & CO. CHARTERED ACCOUNTANTS N. Delhi

Amount (₹)

	SCHEDULE '12' - EXPENDITURE ON DISSEMINATION / SEMINARS/WORKSHOPS, TRAINING PROGRAMMES, HFA,JNNURM ETC.	2015-16	2014-15
1	Exhibition and publicity	2,739,508	1,936,798
2	Seminar and Conference Expenses	5,274,532	2,699,742
3	Printing,Publication & Advertisement	1,172,642	1,423,287
4	Books and Periodicals	37,934	193,930
5	JNNURM Expenditure including Administration Expenses(Ref: schedule 14,Part 6)	1,176,856	17,049,240
6	Supervision and Monitoring of Demonstration Housing Project in various parts of India	3,136,503	-
7	Housing for All(Handholding,documentation,sensitization & Capacity Building)	8,053,336	-
8	S&T support to various schemes of ministry i.e 10% NE,NULM	1,004,252	-
9	Technology Submission	5,414,047	-
10	Main stream Emerging Technologies through Dissemination,Transfer and Exchange with State Government	5,037,037	-
	TOTAL	**33,046,647**	**23,302,997**

A.N. GARG & CO. CHARTERED ACCOUNTANTS New Delhi

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON MARCH 2016

Amount (₹)

SCHEDULE '13' - EXPENDITURE ON SPONSORED STUDIES, FINANCIAL ASSISTANCE, ETC. (contd.)	2015-16	2014-15
A Building Materials & Construction Technologies		
1 Brain storming session on promotion of prefab sector for mass Housing jointly with HPL	106,465	-
2 Construction of demonstration houses and community centre at Nellore	26,763,627	-
3 Construction of demonstration houses at Bhubaneshwar	190,887	-
4 Construction of demonstration houses at Bihar Sharif	61,721	-
5 Conference on Emerging technologies in housing & building construction at New Delhi	234,486	-
6 Design & Planning of affordable innovative green social housing(Coastal region & plain region)	50,000	-
7 Guidelines for utilisation of C&D waste in construction of dwelling units & related infrastructure in housing scheme of Govt.	732,450	-
8 Seismic Performance studies on bamboo structure in North East	200,000	-
9 Estimation of embodied energy for low carbon building construction	338,400	-
10 Testing & validation of multi attributes evaluation framework for emerging technologies for housing	149,995	-
11 Development of schedule of rates on emerging technologies	372,500	-
12 Preparation of compendium of green technology for different geo climate zones for Madhya Pradesh	297,500	-
13 Preparation of compendium of green technology for different geo climate zones for three states Delhi,Punjab & Haryana including Noida & Greater Noida	548,400	-
14 HU Motor: A Humane way to utilise human efforts	300,000	-
15 Structural stability assessment and development of guidelines for expanded polystrene core panel system	800,000	-
16 Representation of GFRG structure using building information model	314,486	-
17 Durability of assessment & enhancement of service life of expanded polystreme core panel system	600,000	-
18 Documentation of traditional housing typology for the poor,based on building material usage in Andhra Pradesh	237,500	237,500
19 Design of housing option for the poor for different geo climate zones in the coastal areas of Andhra Pradesh	237,500	237,500
20 Development of fly ash based advanced Ligno-Silico-Aluminious Geopolymeric Binder useful for making cement free green concrete	647,220	395,485
21 Development of discarded fishnet reinforced hybrid sheet for indoor partition	101,750	305,200
22 Performance appraisel certification scheme	923,097	819,030
23 Developing matrix for selection emerging technologies based on multi attributes as well as evaluation methodology	222,472	889,891
24 Developing portal titled knowledge network for sustainable habitat in India	427,775	299,400
25 Workshop on standard & Specification for design & planning of affordable innovative green housing	3,445	66,002
26 Workshop & Training programme on bamboo based structure at Dimapur,Nagaland	100,000	300,000
27 Development of concrete columns for low cost housing	300,000	300,000

A.N. GARG & CO. CHARTERED ACCOUNTANTS N. Delhi

Amount (₹)

SCHEDULE '13' - EXPENDITURE ON SPONSORED STUDIES, FINANCIAL ASSISTANCE, ETC. (contd.)		2015-16	2014-15
28	Brain storming session on understanding Bottleneck in use of emerging, alternate housing technologies	-	73,712
29	Construction of demonstration houses at Bilaspur	-	60,000
30	Workshop on affordable innovative green housing at Kolkata for EWS & LIG	-	120,552
31	Workshop on developing guidelines & Specification for affordable housing with focus on western region orgainsed at Ahmedabad	-	342,980
32	Workshop on design & planning of affordable,sustainable housing for coastal areas at Vijaywada	-	138,749
33	Workshop on emerging building materials and construction technologies at Hyderabad,Telangana	-	542,655
34	Design & Planning of affordable innovative green social housing (Coastal Region & Plain Region)	-	500,000
35	Development of commercial process for utilization of pond ash in manufacture of cold setting building brick and block	-	543,375
36	Seismic Retrofitting of school building having double storey masonry store at Govindpuri	-	225,000
37	A case study on construction of EWS houses in Baprola,Delhi	-	112,360
38	Developing Draft IS code & manual on filler slab	-	81,910
39	Developing Draft IS code & manual on rat trap bond	-	81,910
40	Standard & specification for EWS & LIG Housing	-	220,000
41	Preparation of planning document for Building Technology Park	-	39,671
42	Workshop on standard and specification for affordable Housing organised at Ahmedabad for Western Region	-	43,322
43	Energy efficient construction material for buildings	-	98,000
44	Construction of demonstration houses at Barwaripur,UP	-	2,600,868
45	Guidelines for rapid visual screening of building of masonry & reinforced concrete as prevalent in India	-	100,000
	Prototype design & planning of low cost innovative housing for doaba region in Punjab and surrounding region	-	150,000
	Prototype design & planning of low cost innovative housing for kolkata and surrounding region	-	150,000
	Sub-Total (A)	**35,261,676**	**10,075,272**

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT
FOR THE YEAR ENDED AS ON 31 MARCH 2016

Amount (₹)

SCHEDULE '13' - EXPENDITURE ON SPONSORED STUDIES, FINANCIAL ASSISTANCE, ETC. (contd.)		2015-16	2014-15
B	**Capacity Building & Skill Development**		
1	Capacity building programmes on good construction practices including emerging technologies in Vadodara,Gujarat	286,326	-
2	Capacity building programmes on good construction practices including emerging technologies in Jaipur,Rajasthan	310,810	-
3	Capacity building programmes on good construction practices including emerging technologies in Bhubaneshwar,Orissa	200,000	-
4	Capacity building programme on Good construction practices including Emerging Technologies in the state of Sikkim at Gangtok	260,790	-
5	Capacity Building Programme on E.Q.R structures & retrofitting of building at Panchkula	196,929	-
6	Assessment of building artisans for BMTPC artisan certification in Gujarat	412,000	-
7	Training Programme on 'Seismic Design of Multi-Storey Buildings: IS 1893 vs. Eurocode 8 on May 2015	247,225	-
8	Pilot Training assessment & certification of 270 nos. building artisans in NCR,Uttrakhand & Gujarat on 5 modules i.e Assistant masons,Bar Bender,Concreting,Shuttering & Masons	1,241,790	-
9	Workshop & Training Programme on bamboo based Toilet,Itanagar	300,000	-
10	Workshop & Training Programme on bamboo based Toilet construction at Imphal, Manipur	300,000	-
11	Preparation of 5 training manual i.e Assistant masons,Bar Bender,Concreting,Shuttering & Masons for artisan in Hindi	850,500	-
12	Certified training programme for technicians	-	210,113
13	Training Programme for building artisan pilot assessment phase II	-	800,000
14	Training Programme for masons on filed level application of cost effective technologies at Raebareli	-	66,000
15	Training Programme for masons on cost effective,Environment friendly & disaster resistant construction techniques at Hazaribagh(Jharkhand)	-	31,560
16	Training Programme on construction on Bamboo Toilets for Private & community at Kochi,Kerala	-	100,000
17	Training Programme on seismic design of multi storey building IS 1893 Vs Euro code 8 on May 2014,2015	-	1,270,969
18	Training Programme on cost effective & disaster resistant technology at jaipur	-	200,000
19	Training Programme on cost effective & disaster resistant technology for masons,architect & Engineers at Srinagar(Garhwal)	-	44,000
20	Training Programme on cost effective & disaster resistant technology for masons, architect & Engineers at (Tiruchirappalli)	-	200,000
21	Training Programme on using bamboo structure in housing & building construction at Haflong,Assam	-	400,000
22	Evolving building artisan friendly certification programmer linked to decentralised modules	-	300,000
	Sub-Total (B)	**4,606,370**	**3,622,642**

A.N. GARG & CO. CHARTERED ACCOUNTANTS N. Delhi

Amount (₹)

SCHEDULE '13' - EXPENDITURE ON SPONSORED STUDIES, FINANCIAL ASSISTANCE, ETC. (contd.)		2015-16	2014-15
C	**Disaster Mitigation & Management**		
23	Training Programme on nonlinear analysis and performance based design of building	329,736	-
24	Preparation of revised vulnerability Atlas of India	87,603	-
25	Organisation of training of trainers with BIPARD on earthquake resistant design & construction at Patna	94,337	106,137
26	Capacity building programme for engineering & architecture on earthquake resistant structure & retrofittng of building for NCR Region	-	365,889
27	Preparation of seismic design manual for earthquake disaster mitigation	-	820,000
	Sub-Total (C)	**511,676**	**1,292,026**
	TOTAL (A+B+C)	**40,379,722**	**14,989,940**

A.N. GARG & CO. CHARTERED ACCOUNTANTS N.Delhi

SCHEDULE 14: SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS

1 **Significant Accounting Policies**

a) **System of Accounting** - The accounts have been prepared to comply with all material aspects with applicable principals in India and notified Accounting Standards.

b) **Fixed Assets** - Fixed assets are stated at cost of acquisition and depreciation is provided at written down values rates and in the manner as specified in the Income Tax Act 1961.

c) **Retirement Benefits** -

1.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.

2. Liability in respect of Gratuity to employees is provided for by way of annual premium paid to LIC under Group Gratuity Scheme.

3 Liability in respect of Leave Encashment payable to the employees is provided for by way of annual premium paid to LIC of master policy and the premium paid is charged to revenue.

d) **General** - Accounting policies not specifically mentioned are otherwise in consonance with generally accepted accounting practices.

2 **Contingent Liabilities** - Claims against the Council not acknowledged as debts - NIL.

3 In opinion of the Management, the amount on realisation of current assets, loans and advances in the ordinary course of business would not be less than the amount at which they are stated in the Balance Sheet. Further, provision for all known liabilities has been made in the accounts.

4 As there being no taxable income under the Income Tax Act, 1961, provision for Income Tax has not been made in the accounts. The Coucil is regularly depositing TDS, Service Tax and other statutory liabilities.

5 In respect of office space at India Habitat Centre, Lodhi Road, New Delhi, the exact cost has not been apportioned by IHC amongst the different allottees. As such a sum of Rs. 3.43 crores has been capitalized by the Council on the basis of calls/payment made to IHC.

6 During the current Financial Year 2015-16, the administration expenditure has been debited only to Grants as JNNURM has come to an end and in earlier years administration expenditure were equally apportioned to Grants and JNNURM projects.

7 Figures have been rearranged & regrouped wherever required and all the above said information has been given by the management and relied upon by the auditors.

As per our report of even date attached.
For A.N.GARG & COMPANY
Chartered Accountants
FRN: 04616N

A.N.GARG
(FCA, Partner)

S. Balasrinivasan
Chief (Finance)

For Building Materials & Technology Promotion Council

Dr. Shailesh Kr. Agrawal
(Executive Director)

Place :Delhi
Date : 11.08.2016

ANNEXURE I

PARTICIPATION IN NATIONAL AND INTERNATIONAL EVENTS

I. EXHIBITIONS

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

- "Infra Educa 2015 - 13th in the Series" organized by Friends Exhibitions and Promotions Pvt. Ltd., New Delhi during 20 – 21 June 2015 at Pragati Maidan, New Delhi

- Indian National Exhibition – cum- Fair 2015 organized by Bengal Human Resource Development Foundation, Kolkata on Role of Indian Technologies for Make in India from 22 to 26 August, 2015 at Kolkatta

- 19th National Exhibition on the theme of Make in India – Commitment to the Nation organised by Central Calcutta Science & Culture Organsation for Youth', Kolkata during 9 – 13 September, 2015 at Kolkata.

- Exhibition during Engineers Day organised by Institution of Civil Engineers (India), New Delhi on 15th September, 2015 at New Delhi.

- 4th Science Expo 2015 organised by Sansa Foundation during 28 – 30 September, 2015 at Daman, Daman & Diu.

- HUDCO BuildTech'15 during India International Trade Fair from 14-27 November, 2015 at Pragati Maidan, New Delhi.

- Municipalika 2015, 13th International Conference & Exhibition on Sustainable Habitat and Smart Cities organised by Good Governance India Foundation, New Delhi during 9 – 11 December, 2015 at Jaipur, Rajasthan.

- National exhibition-cum-fair & seminar titled "11th Jatiya Sanhati Utsav-O-Bharat Mela-2015" organised by Bangiya Seva Samity, West Bengal during 12 – 18 December, 2015 at Kolkata.

- 103rd Indian Science Congress: Pride of India Expo organised by The Indian Science Congress Association (ISCA) during 3 – 7 January, 2016 at University of Mysore, Mysuru, Karnataka.

- 2nd Vision Jammu & Kashmir 2016 organized by Friends Exhibitions & Promotions Pvt. Ltd., New Delhi during 22 – 24 January, 2016 at Jammu, J&K.

- Build Intec 2016 organised by Codissia Intec Technology Centre during 12 – 15 February, 2016 at Codissia Trade Fair Complex, Coimbatore.

- Exhibition during International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 – 22 March 2016 at New Delhi.

II SEMINARS/ CONFERENCES/ WORKHOPS/TRAINING PROGRAMMES etc.

– Workshop on Green Building initiative of West Bengal Govt. on 2nd April, 2015 at Kolkata.

– National Conference on "Sustainable Built Environment (SBU-15)" organised by IIT-Roorkee during 10th -12th April, 2015 at Roorkee.

– Conference on "Creation of Housing Stock in India: A Realistic View" organised by PHD Chamber on 14th May, 2015 at New Delhi.

– Central Consultation & Advocacy Workshop for "Post Disaster Needs Assessments (PDNA) Study for India" under National Cyclone Risk Mitigation Project" assisted by World Bank organized by National Institute of Disaster Management (NIDM) on May 18-22, 2015 at New Delhi.

– Consultative meet on "Fly Ash" organised by Fly Ash Research & Management, New Delhi on 4th June 2015 at New Delhi.

– Workshop on Housing for All (Urban) Mission organized by Ministry of HUPA at India Habitat Centre, New Delhi on 19th August 2015

- Training Programme on Decentralized Waste Water Treatment System (DEWATS) organized by Consortium of DEWATS Dissemination Society, on September 07-11, 2015 at Bangalore

- Real Estate and Infrastructure Summit 2015 organised by NAREDCO and APREA at Mumbai on 6th October 2015

- Seminar on Role of Prefab Sector in "Housing for All by 2022" on 12th October 2015 at India Habitat Centre, New Delhi

- National Workshop on Model State Urban Affordable Housing and Habitat Policy. Decisive Roadmap for achieving 'Housing for All' on 27th October 2015

- Indo-Norwegian Training Programme on Non-Linear Analysis and Performance Based Design of Multi Storey Buildings on 3rd-5th December, 2015

- National Consultation on Draft National Urban Rental Housing Policy, 2015 and inception meeting on National Housing & Habitat Policy 2017 on 4th December 2015

- Capacity Building Programme in Good Construction practice including Emerging Technologies for Housing on 18th December, 2015 organised by BMTPC with NAREDCO at Bhubaneswar.

- National Real Estate Summit-2016 organised by PHD Chamber of Commerce and Industry, New Delhi on 21st January, 2016 at New Delhi.

- Seminar on "Housing for All" using Prefab options: Precast RCC constructions organised by HPL jointly with BMTPC at Noida, UP on 22nd January 2016

- Workshop on "Role of Financial Institution for Disaster Risk Reduction with special reference to Wind Hazards" organised by Indian Society for Wind Engineering during 1st – 2nd February, 2016 at IIT-Roorkee.

- Two-day Workshop on "Good Construction Practices including Emerging Technologies" on 1st-2nd March 2016 at Sikkim, Gangtok

- Leadership Development Programme for Chairmen/ Directors of Housing Cooperatives jointly organized by National Centre for Cooperative Education (NCCE) & NCHF on 7-9 March, 2016 at New Delhi.

- Open House Discussion – regarding issues relating to Technology Submission Housing for All (Urban) Mission chaired by JS (H) at New Delhi on 11th March 2016.

- Regional Workshop for Northern Region on Pradhan Mantri Awas Yojana: Housing for All (Urban) organized by BMTPC on 11th March, 2016 at Lucknow.

- Regional Workshop on Pradhan Mantri Awas Yojana: Housing for All (Urban) organized by MoHUPA on 21st March, 2016 at Mumbai

- International Symposium on "Livable Habitat & Sustainable Urban Agenda" organized by MoHUPA, GoI & IIT, Kharagpur on 27-28 January, 2016 at Kolkatta.

III TECHNICAL COMMITTEE/ WORKING GROUPS /MEETINGS ETC.

- Meeting with Mr. Brotin Banerjee, MD & CEO, Tata Housing Corporation Development Company Limited regarding presentation on Affordable Housing at New Delhi on 13th April 2015

- 99th Meeting of the Governing Council at Mumbai on 22nd April 2015

- Meeting on Constitution of a committee to assess Glass Fibre Reinforced Gypsum Wall Panel (GFRG) Technology at New Delhi on 7th May 2015

- Steering Committee meeting for Ready Mix Concrete Plant Certification Scheme by Quality Council of India at New Delhi on 31st May, 2015

- Meeting with JS (UPA), chambers of Key stakeholders comprising of NBCC, CPWD, HUDCO & CSDCI to discuss the issue of Establishment of Skill Development Centre at New Delhi on 8th May 2015

- Meeting of stakeholders' consultation on roadmap for Skill Development in the construction sector at HUDCO's Human settlement Management Institute (HSMI), New Delhi on 29th May 2015

- Consultative Meet on use of Fly Ash in construction industry at New Delhi on 4th June 2015

- Meeting of Consultative Committee attached to Ministry of Urban Development and Ministry of HUPA at New Delhi on 10th June 2015

- Meeting with Senior Govt. officers of the 12 cities /towns falling under Seismic Zone V at NDMA Bhawan, New Delhi on 10th June 2015

- As part of team, to assess the claim of M/s K.D Infra, Guwahati under Central Capital Investment Subsidy Scheme (CCIS), 2007 of Department of Industrial Policy and Promotion, Ministry of Commerce and Industry visited Guwahati on 18th June 2015

- Inspection visit to SRPL Building System (Waffle-Crete) at Vadodra and Hollowcore Concrete Walls at Gandhinagar (Ahmedabad) from 14-16 July 2016.

- 7th General Body Meeting of 'GRIHA' Council at TERI, India Habitat Centre, New Delhi on 7th August 2015

- National Meet for Promoting Space Technology based Tools and Application in Governance Department at New Delhi on 7th September 2015

- Meeting regarding Disaster Management Plan of Ministries at New Delhi on 10th September 2015

- Review meeting chaired by Secretary (HUPA) to discuss the progress of JNNURM and RAY projects and HFA (Urban) Mission/PMAY at New Delhi on 17th September 2015

- Meeting of Panel for Building Materials, CED 46 for National Building Code by BIS at New Delhi on 8th October, 2015

- Meeting regarding the draft report on GFRG Panel System with IIT Madras at Chennai on 9th October, 2015.

- 9th TAC meeting for PACS at New Delhi on 15th October 2015

- Meeting in connection with Preparation of Tool-kits for Urban Manager at New Delhi on 21st October 2015

- 19th Meeting of (CSMC) under RAY at New Delhi on 27th October 2015

- Meeting of Panel for Prefabrication & Systems of National Building Code by BIS at New Delhi on 27th October, 2015

- 47th EC Meeting chaired by Secretary (HUPA) at New Delhi on 29th October 2015 at New Delhi

- Meeting with officers of Development Authorities regarding Demonstration Housing Project in Uttar Pradesh at Lucknow on 29th October, 2015.

- Meeting regarding Brainstorming meeting "Toolkit for Urban Managers to Mainstream Disaster Risk Reduction in Urban Housing at New Delhi on 16th November 2015

- 48th EC meeting Chaired by Secretary (HUPA) at New Delhi on 19th November 2015

- 9th meeting of a Technical Committee Member in the office of APSHCL, Hyderabad on 9th December 2015

- Site visit to Amarpali Group alongwith CMD, HPL on 10th December 2015

- CSMC meeting of all states at Ministry of HUPA at New Delhi on 21st December 2015

- Inspection visits to LGSFS-ICP of M/s Society for Development of Composites technology, Prefabricated Large Concrete Panel System of L&T and Rapid Panels of M/s World Haus at Bangaluru from 28 – 30 December, 2015.

- Second meeting of the Technology Sub-Mission on Sustainable Technological Solutions for faster and cost effective construction of houses suiting to Geo-climatic and hazard conditions of the country at New Delhi on 29th January 2016

- Study Visit of the Standing Committee on Urban Development (2015-16) to Mumbai and Trivandrum from 27th January, 2016 to 30th January, 2016

- Inspection visit to the manufacturing unit of M/s Coffor India Ltd., Vadodara for assessment of their technology namely Structural Stay-in-place Formwork under PACS on 2nd -3rd February, 2016

- Half-day Brain Storming Session on promotion of Prefab Sector for Mass Housing at New Delhi on 8th February 2016

- Meeting to discuss issues related to present status on developing a Toolkit for Urban Managers' at New Delhi on 10th February 2016.

- 11th Board of Management (BOM) meeting of BMTPC chaired by Hon'ble Minister, HUPA at New Delhi on 15th February 2016

- 6th CSMC meeting for (PMAY) Urban chaired by Secretary (HUPA) on 18th February 2016 at New Delhi

- Meeting chaired by Secretary (HUPA) regarding "Catalyzing the Market for Affordable Housing" at New Delhi on 19th February 2016

- Meeting chaired by Secretary (HUPA) regarding "Catalyzing the Market for Affordable Housing" at New Delhi on 22nd February 2016

- Meeting with JS(H) to discuss issues related to Main Streaming Disaster Risk Reduction Measures on ongoing National Flagship Programme at New Delhi on 25th February 2016

- Meeting with JS (H) regarding the issues relating to Greater Noida Housing Project of CGEWHO on 7th March 2016 at New Delhi

- Meeting with JS (H) regarding Preparation of Handbook for Urban Manager at New Delhi on 8th March 2016

- Meeting with JS (H) regarding Progress report of preparation of a Manual for Expanded Polystyrene (EPS) Core Panel System status on 10th March 2016 at New Delhi

- Meeting of stakeholders and issued related to National Guidelines for Hospital Safety on 11th March 2016 at NDMA Bhawan, New Delhi

- Meeting of Building Lime and Gypsum Product Selectional Committee CED 4 of BIS at New Delhi on 31st March, 2016.

ANNEXURE II

PAPERS PRESENTED/PUBLISHED

- Presentation on “New Housing Technologies for Social Mass Housing in India” during the All India Seminar on Advances in Engineering and Technology for Sustainable Development - AETSD - 2015 organized by Pant Nagar Local Centre, The Institution of Engineers (India), 12-13, June, 2015, Pant Nagar.

- Presentation on “Alternate and Emerging Housing Technologies” during the Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing on 29-30 July, 2015 at Vadodara, Gujarat.

- Presentation on “Earthquake Resistant Design & Construction Practices” during the Capacity Building Programme on Good Construction Practices including Emerging Technologies for Housing on 29-30 July, 2015 at Vadodara, Gujarat.

- Presentation on “Housing for All: Challenges of Housing Project in Multi-Hazard Prone Areas” during the Workshop on Enhancing Private Sector Partnership for Disaster Risk Reduction organised by FICCI on 24th August, 2015 at New Delhi.

- Paper entitled “Alternate and Emerging Materials and Technologies for Sustainable Built Environment”, IBC Journal, Research & Review in Technology, Volume 1, Inaugural issue, September 2015, pp 33-52.

- Paper entitled “Atihasik Smarakon Hetu Bhukampiya Suraksha Pahaluyan” (in Hindi) published in Special Issue of Nirman Sarika, BMTPC on the occasion of World Habitat Day, October 2015, New Delhi.

- Paper entitled “Decentralized Waste Water Treatment System (DEWATS) - A Sustainable Approach to Sanitation” published in Special Issue of Nirman Sarika, BMTPC on the occasion of World Habitat Day, October 2015, New Delhi.

- Presentation on Housing for All (Urban) Mission during the Real Estate and Infrastructure Investors Summit 2015 organised by NAREDCO and APREA on 6 October, 2015 at

Mumbai.

- Presentation on Building Technologies for Mass Housing during Smart Cities Summit 2015, Session-V – Housing for All by 2022 organised by FICCI on 9th October, 2015, New Delhi.

- Presentation on Earthquake Resistant Design & Construction Practices during Advanced Professional Programme in Public Administration organised by IIPA on 14th October, 2015 at New Delhi.

- Presentation on "Pre-engineered building & related technology" before Principal Secretary, Govt. of Bihar & other Officials of Urban Development Department on January 08, 2016 at Patna, Bihar.

- Presentation on Building Technologies for Mass Housing during Seminar on “Housing for All” using Prefab options: Precast RCC constructions organised by HPL jointly with BMTPC on 22nd January 2016 at Noida, UP.

- Presentation on Earthquake Resistant Design & Construction Practices during Capacity Building Programme on Good Construction Practices including Emerging Technologies organised by BMTPC on March 1, 2016 at Gangtok, Sikkim.

- Presentation on “Alternate & Emerging Building Materials & Technologies” in the Leadership Development Programme for Chairmen/ Directors of Housing Cooperatives jointly organized by National Centre for Cooperative Education (NCCE) & NCHF on 7-9 March, 2016 at New Delhi.

- Presentation on “Emerging Technologies for Mass Housing” in Regional Workshop for Northern Region on Pradhan Mantri Awas Yojana: Housing for All (Urban) organized by BMTPC on 11th March, 2016, Lucknow.

- Presentation on “Emerging Technologies for Mass Housing” in Regional Workshop on Pradhan Mantri Awas Yojana: Housing for All (Urban) on 21st March, 2016, Mumbai.

- Paper entitled “Future Habitat & Construction Technologies – A perspective” published in the proceedings of International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 – 22 March 2016 at New Delhi.

- Paper entitled “Emerging Building Materials & Construction Technologies–Opportunities, Impediments and Possible Approaches” published in the proceedings of International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 – 22 March 2016 at New Delhi.

- Paper entitled “Knowledge Portal Framework for Emerging Technologies in Affordable Housing” published in the proceedings of International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 – 22 March 2016 at New Delhi.

- Paper entitled “Environmental and Green Initiatives to Mitigate Climate Change” published in the proceedings of International Seminar on Emerging Building Materials and Construction Technologies organised by BMTPC on 21 – 22 March 2016 at New Delhi.

- Presentation on “Emerging & Green Building Materials & Technologies” in the International Symposium on “Livable Habitat & Sustainable Urban Agenda” organized by MoHUPA, GoI & IIT, Kharagpur on 27-28 January, 2016 at Kolkatta.

ANNEXURE III

PUBLICATIONS BROUGHT OUT DURING THE YEAR

1. Compendium of Prospective Emerging Technologies for Mass Housing

2. Special Issue of Newsletter "Nirman Sarika" on the theme of the World Habitat Day "Public Places for All"

3. Third edition of the booklet entitled "IITK-BMTPC Earthquake Tips"

4. Booklet on Schedule of Rates for Glass Fibre Reinforced Gypsum (GFRG) Panel Building System

5. Manual of Waterproofing of Glass Fibre Reinforced Gypsum (GFRG) /RAPIDWALL Buildings

6. A Case Study on the Making of Bawana Industrial Workers Housing with Cost Effective Technologies.

7. Multi-Attribute Evaluation Methodology for Selection of Emerging Housing Technologies

8. Model Expression of Interest for empanelment of agencies for construction of houses /buildings using alternate technologies on Design and Built basis

9. Book entitled “Emerging Building Materials & Construction Technologies”

ANNEXURE IV

BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
(BMTPC)

ACTION PLAN FOR THE YEAR 2015-2016

VISION, MISSION, OBJECTIVES AND FUNCTIONS

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, cost-effective, environment-friendly, disaster resistant building materials and technologies including locally available materials from lab to land for sustainable development of housing.

Objectives:

- Building Materials & Construction Technologies : To promote development, standardisation, mechanisation and large scale field application of 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.

Functions:

1. Identification, evaluation of innovative and emerging technologies available globally and encouraging joint venture in building materials and construction sector.
2. Promoting economy, efficiency and quality in construction.
3. Upscaling of technologies, know-how acquisition, absorption and dissemination.
4. Field level application of environment-friendly, energy-efficient and disaster resistant technologies for innovative, locally available and emerging technologies.
5. Formulation of Standards on innovative building materials/technologies including emerging technologies/systems and incorporation in the schedule of specifications/rates.
6. Formulation of Standards/Specifications for Affordable Housing
7. Documentation of benefits, durability and acceptability of cost effective and innovative building materials and technologies.
8. Skill upgradation of professionals and construction workers through capacity building programmes, training programmes, seminars, conferences, workshops, exhibitions nationally as well as internationally.
9. Promoting disaster resistant construction technologies.
10. Appraisal, monitoring and third party inspection of housing projects including undertaking project management and consultancy services.
11. Publication of user manuals, guidelines, compendiums, directories, brochures, techno-feasibility reports, video films, demonstration CDs, interactive website, blogs including documentation of success stories.

ANNUAL ACTION PLAN OF BMTPC FOR FY 2015-16

Objective	Actions by Outputs	Success Indicators	Budget Estimate (Rs. In lakhs)
1. To promote development, standardisation, mechanisation and large scale field application of innovative and emerging building materials and technologies in the construction sector.	**Action 1** • Identification, Evaluation and promotion of Emerging / Green Alternate Materials and Housing Technologies for different regions	• Study, evaluation, certification under PACS, Preparation of Technology profiles/manuals and advocacy to Govt. agencies, builders professional architects and technology providers	25.00
		• Publication of Multi-attribute Evaluation Methodology for emerging technologies including its advocacy	2.00
		• Development of model tender for introduction of emerging technology including its advocacy	2.00
		• Launch of portal on alternate and emerging technologies including Directory of Technologies, Technology providers, engineers and architects	15.00
		• Initiation of research on Durability and Service Life Assessment of Buildings using EPS system and submission of mid term report	10.00
		• Initiation of research on Development of design guidelines for EPS buildings including earthquake resistant designs and submission of mid term report	12.00
		• International Seminar on Emerging Trends in Construction Technologies	10.00
	Action 2 • Promotion of Green Building Materials and Technologies	• Preparation of region-specific detailed list of green technologies, its manufacturers, machines, machine manufacturers including brochures for each technology	30.00
	Action 3 • Dissemination and propagation of innovative and disaster resistant technologies	• Establishment of Resource cum Permanent Display Centres	15.00
	Action 4 • Utilization of C&D waste in construction	• Preparation of guidelines on C&D waste recycling and use in housing sector	20.00
	Action 5 • Organisation of Seminars, Exhibitions, for promotion of emerging/ cost effective technologies	• Organisation of one Exhibition on Alternate & Emerging Building Materials & Technologies during IITF 2015 or any other location in NCR	40.00

Objective	Actions by Outputs	Success Indicators	Budget Estimate (Rs. In lakhs)
	Action 6 • R&D Projects in the field of housing and building construction	• Initiation of sponsored studies leading towards development of alternate building materials and technologies	30.00
	Action 7 • Establishment of Building Technology Park on the land to be allotted by DDA at New Delhi	• Preparation of Detailed Project Report	30.00
	Action 8 • Dissemination of information through print & electronic media including website upkeeping	• Periodic sharing of information through journals (4 nos.), magazines (2 nos.), website update, advts.(3 nos.) and preparation of display material (40 panels)	10.00
		• Publication of Technical Reports / Manuals/ Guidelines/ Handbooks	7.00
	Action 9 • Participation in important Exhibitions related with Building Materials & Construction Technologies	• Participation in seminars/ workshops/ exhibitions	12.00
2. 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.	**Action 1** • Development of complete Guidebook (Margadarshika) for 5 trades i.e. Assistant Mason, Mason, Bar bender, Concreting Artisan & Shuttering Artisan including organisation of skill development programmes in two regions	• Publication of five Guidebooks	9.00
		• Skill upgradation of no. of masons, barbenders concreting artisans and shuttering artisans (five nos. each in two regions)	16.00
	Action 2 • Organisation of capacity building programmes (five nos.) for engineers, architects of state ULBs on good construction practices including emerging technologies	• Capacity building of no. of professionals	20.00
	Action 3 • Training Programmes (two nos.) on Bamboo based technologies in North Eastern States for engineers, architects and masons	• Capacity building and skill upgradation of no. of professionals	8.00
3. To promote methodologies and technologies for natural disaster mitigation,	**Action 1** • Publication of Earthquake Hazard Zoning Maps (sponsored by NDMA)	• Publication of maps	0.00

Objective	Actions by Outputs	Success Indicators	Budget Estimate (Rs. In lakhs)
vulnerability & risk reduction and retrofitting/ reconstruction of buildings and disaster resistant planning for human settlements.			
	Action 2 • Preparation of 3rd edition of Vulnerability Atlas of India	• Preparation of Maps for 15 States/UTs	8.00
	Action 2 • Organization of Training of Trainer Programmes for engineers and architects of State Governments	• Capacity building of Engineers and Architects	4.00
	Action 3 • Organisation of two Training Progammes on Disaster Resistant Technologies with IIT Roorkee and NORSAR	• Capacity building of no. of professionals	6.00
	Action 4 • Organisation of two Capacity Building Progammes of Engineers & Architects on Earthquake Resistant Construction and Retrofitting of Buildings	• Capacity building of no. of professionals	6.00
	Action 5 • Retrofitting of existing Buildings to showcase the seismic strengthening techniques	• Retrofitting of DDA School Building	40.00
Preparation of long term Perspective Plan for BMTPC	Perspective Plan	Perspective Plan	5.00
Refurbishment of Office of BMTPC, Upgradation of office automation	Refurbishment of Office of BMTPC, Upgradation of library, office automation etc.		35.00
Committed liabilities on ongoing projects			30.00
Staff Salary and Establishment Expenses	Establishment, Personnel and Office Expenses		500.00
		Total	**957.00**

Objective	Actions by Outputs	Success Indicators	Budget Estimate other than Grant-in-aid (Rs. In lakhs)
4. To undertake project management and consultancy services including appraisal, monitoring and third party inspection of housing projects under the various Central/State Schemes (funding from other sources)	**Action 1** • Appraisal, monitoring, TPIM review of projects under JNNURM / RAY as per Ministry's requirement	Submission of Reports	200.00