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A Newsletter of BMTPC

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BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
Ministry of Housing & Urban Poverty Alleviation, Government of India

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bmtpc expo'12 Appropriate Building Materials & Housing Technologies

BMTPC organized bmtpc expo'12 - Exhibition-cum-Seminar on "Appropriate Building Materials & Housing Technologies" at New Delhi from 6-8 November, 2012. Three days seminar was also organized to coincide the exhibition. This exposition on building materials and construction technologies show-cased the latest, emerging and cost effective trends in the building materials & construction sector. The bmtpc expo'12 received overwhelming response from R&D and Academic Institutions, NGOs, Building Centres, Manufacturers, Builders, Housing & Urban Development Authorities, public and private sector departments/agencies working in the area of housing and building construction. Besides, a number of serious visitors, around 150 students from the MNIT, Jaipur, Deenbandu Chhotu Ram University of Science & Technology Sonepat, Manav Rachna University Faridabad, Jamia Milia Islamia University, IIT Bombay, NIT Nagpur, NIT Hamirpur visited the exhibition and participated in the Seminar.

The Council also constructed a demonstration house to demonstrate various alternate housing technologies which were showcased during the bmtpc expo'12 having plinth area of 36.10 sqm. consists of two habitable rooms, kitchen, one separate bath, WC and varandah. The various technologies used are Rat-Trap Bond walls in Clay Bricks and Fly ash Bricks, Cellular Light-weight Concrete Blocks, Fly Ash Interlocking Blocks, RCC Filler slab with Bricks and earthen Pots as infill, MCR Tile Roofing, Arch opening, Inbuilt Brick Jallies, Brick on Edge Lintels, RCC Door Frames, Steel section glazed window, Brick Corbelling, Bamboo mat door, Ferro cement Shelves, Sunshades, Kitchen Slab and Precast concrete tile flooring and includes RCC Plinth Bands, Lintel Bands, Roof Band and Vertical Steel Reinforcement at corners & Junctions as Earthquake/Cyclone Resistant Features. The demonstration house was handed over to NSIC by the Secretary, Ministry of Housing & Urban Poverty Alleviation.

From the Desk of the Executive Director

There have been discernible changes in the construction systems as far as housing and infrastructural development is concerned around the globe. The technologies for infrastructures have been adapted well in India such as flyovers, metros, rigid and flexible pavements, bridges etc., however, in housing sector, still cast-in-situ RCC framed construction with infill walls is being persisted despite of knowing the fact that it is time consuming, energy intensive and not viable in the context of sustainable habitat. Therefore, it is high time, we change gears and look at the construction systems which are based on new innovations and materials and provide quick but durable and safe options. Also, there is need to bring mechanization in the construction sector. Gone are the days, when supervisors, contractors, architects & engineers take decisions at the site without understanding the implications of it on the overall performance of the structure. Further, the components of project management related to cost, time, safety, resources, energy, sustainability need to be addressed at the time of conceiving the project. It is opportune for developing countries like India to look into these aspects before it becomes too late and we are blamed by posterity to leave nothing in legacy but an unsustainable habitat.

(Dr. Shailesh Kr. Agrawal)

Demonstration Houses at Rae Bareli : New Initiative

BMTPC has initiated construction of Demonstration Houses in Uttar Pradesh to propagate and showcase cost effective building materials and disaster resistant technologies in the region. The State Govt. has provided the land for construction of demonstration project at Barwaripur, Rae Bareli. In this Project, construction of 24 dwelling units (G+1) is being undertaken having each unit with plinth area of 32 sqm consisting of one living room, one bedroom, kitchen, one separate bath and WC. The infrastructure facilities like internal water supply, sanitation, electrical, pathways, septic tank, underground tank, street lighting, etc. will be undertaken under the project. The Foundation Stone for the project was laid by Smt. Sonia Gandhi, Hon'ble Chairperson, UPA in the gracious presence of Shri Ajay Maken, Hon'ble Minister of Housing & Urban Poverty Alleviation on 7th November, 2012. The project is being undertaken with the aim to popularize cost effective building materials and technologies in the area as part of BMTPC's mandate to disseminate sustainable technologies. The construction work has been started and excavation work has been completed. The brick work in foundation is in progress.

BMTPC's Display during IITF 2012

BMTPC participated in HUDCO BuildTech during India International Trade Fair (IITF) from 14-27 November, 2012. BMTPC stall attracted large number of professional, VIPs, foreign delegation and general public which evinced interest in the various innovative building materials and technologies being promoted by the Council. Shri Ajay Maken, Hon'ble Minister for Housing & Urban Poverty Alleviation visited BMTPC Display during IITF 2012.

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Alternate Building Materials & Technologies

Micro Concrete Roofing (MCR) Tiles

General

- Micro Concrete Roofing (MCR) tiles are precast tiles made out of a mix of micro chips (3 mm down), coarse sand and cement. These are made on a table vibrator. Tiles thus made are strong, durable and economical.
- MCR tiles are energy efficient, eco-friendly and low cost roofing elements. The tiles can be made in two distinctive profiles namely Pan and Roman.

Shape and Dimensions

- The nominal dimensions of the tiles shall be as given hereunder:

	Pan Tile	Roman Tile
Clear Length	488 mm	480 mm
Clear Width	240 mm	240 mm
Thickness	8mm or 10 mm	8mm or 10 mm
Corrugation depth	55mm	55mm
Weight (Min.)	2.25 kg (8 mm) 2.75 kg (10 mm)	
Loading Capacity (Min).	60 kg/m^2 80kg/m^2 (10 mm)	

Physical Characteristics

- ***Strength:*** When struck by coin the tile shall give a uniform ringing sound.
- ***Transverse Bending Strength:*** When tested in accordance with IS 654, transverse bending shall not be less than 60 kg weight for 8 mm thick tile and 80 kg weight for 10mm thick tile. Bearing capacity of the nib shall not be less than 20 kg weight.
- ***Water Tightness:*** Not more than 50 percent of the underside of the tile shall have signs of dampness if topside is made to be a water pool for 24 h. Underside shall be free from water droplets.
- ***Water Absorption:*** Average percentage of water absorption after soaking tiles in water at normal temperature and humidity for 24 h., shall not be more than 10 percent.
- ***Pores and Cracks:*** Pores, if any, shall not be deeper than 2mm , wider than 5mm and more than six in number with dia more than 2 mm. The cracks shall not be longer than 5mm.

Emerging Technologies for Building Construction

Pre-stressed precast prefab technology using hollow core slab, beams, columns, solid walls, stairs, etc.

Pre-stressed precast RCC technology using hollow core slabs, beams, columns, solid walls, stairs, etc. are designed and manufactured in factory, shipped and erected at site. Multi-storey precast concrete frames are constructed with column and beams of different shapes and sizes, stair and elevator shafts and floor slabs. The joints between the floors elements are executed in such a way that concentrated loads are distributed over the whole floor. This system is widely used for multi-storey buildings. The structural frame is commonly composed of rectangular columns of one or more storeys height. The beams are normally rectangular, L-shaped or inverted T-beams.

Materials used: Cement concrete, steel strands, reinforcing steel.

Salient Features:

- ***Saving in cost:*** Precast Prefab buildings can be constructed in less than half the time it takes to construct using conventional construction. This results in huge financial savings.
- ***Material Savings:*** Precast pre-stressed technology results in 40% reduction in slab weight. This reduces in building weight, material & foundation cost resulting in direct cost savings.
- ***Savings in Exterior Painting & Finishing:*** All exterior surfaces can be provided with aggregate or other such coloured finishes which require no additional painting over the life time of the building. Alternatively the walls are made with a very smooth mirror like finish saving in plastering costs.
- ***Increased Carpet Area:*** Because of the high strength of the concrete structure small sized walls can be used in lieu of thicker ones. This results in the increased carpet area for a similar construction of in-situ buildings.
- ***Energy savings:*** Hollow core slabs act as a natural insulator & thereby result in savings in air conditioning cost. Additionally, walls can have in-built foam insulation resulting in increased savings.
- ***Environmental Benefits:*** Prefab concrete can have fly ash as a ingredient in the concrete mix. This results in higher strength concrete while at the same time utilizing an otherwise waste product.
- ***Long Life Cycles:*** As buildings components are manufactured & cured in controlled conditions the resulting elements have better strength & durability. This results in buildings having much longer life cycles than conventional in-situ construction.
- ***Water Savings:*** Water requirement for curing of elements is minimal as compared to in-situ construction. Also in the factory the water is recycled thereby saving this precious natural resources.

Handing over of Demonstration Houses at Pinjore

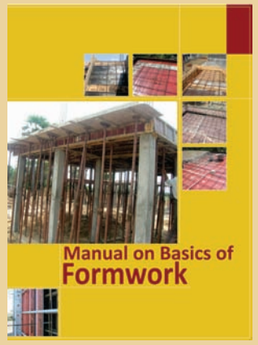
BMTPC, in continuation of its efforts to demonstrate cost effective, alternate and disaster resistant technologies, constructed Demonstration Houses in Haryana at the land provided by the State Govt. at Bitna Road, Pinjore. Under the Demonstration Housing Project, construction of 24 dwelling units (G + 1) was undertaken. Each Unit having plinth area of 411 sqft. consists of one living room, one bedroom, kitchen, one separate bath and WC. The Demonstration Housing Project includes onsite infrastructure facilities like pathways, septic tank, electricity, boundary wall, etc. Besides the housing units, the Project also includes Community Centre and Multi-purpose Meditation Hall. The project was handed over to the local administration by Kumari Selja, Hon'ble Minister of Social Justice and Empowerment on 8th December, 2012.

Road Show on Emerging Fast Track Technologies for Mass Housing

BMTPC organised Roadshow/Exhibition-cum-Seminar on 'Emerging Fast Track Technologies for Mass Housing' at Chennai from 18-19 December, 2012 jointly with Indian Concrete Institute.

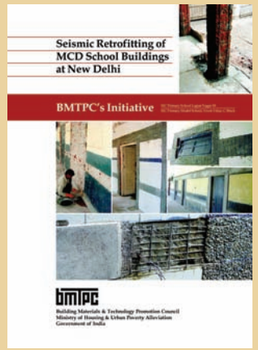
Recent Publications

MANUAL ON BASICS OF FORMWORK



Concrete is the most widely used versatile construction material, which can be moulded to any shape and size depending upon the requirement through formwork systems. Formwork system is critical elements of the overall construction plan and various details given in the Manual would help in developing general understanding of the subject and improving quality of formwork system.

SEISMIC RETROFITTING OF MCD SCHOOL BUILDINGS AT NEW DELHI - BMTPC'S INITIATIVE



BMTPC, in its endeavor to demonstrate retrofitting techniques to be adopted in load bearing masonry buildings, have undertaken seismic retrofitting of few MCD Schools in Delhi. This publication is brought out to explain the process of retrofitting from planning to execution. It elaborates step by step procedures to be adopted for seismic retrofitting of load bearing masonry structure through drawings and photographs.

DESIGN PACKAGE USING ALTERNATE BUILDING MATERIALS & TECHNOLOGIES : WEST ZONE

As a process to help mainstream the time proven technologies, BMTPC developed the Design Package on Alternate Building Materials & Technologies for various regions of the country having different geo- climatic condition and topography and are customized to the local needs and includes regional specific appropriate technologies. The Design Package for West Zone envisages to facilitate wide spread dissemination and adoption of proven cost effective and sustainable building materials and construction technologies as an alternate to the conventional.