



## Participation in India International Trade Fair 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 by SISMO India (Building Technology), Manesar
- EPS Based Stay-in-site Formwork Block System by Reliable Insupacks Pvt. Ltd., Greater Noida
- EPS Based Panel System, Speed Floor System, Light Gauge Steel Structure by Jindal Steel & Power Limited, Gurgaon
- Stay in place Formwork System by Coffor Construction Technology India, Vadodara
- Precast concrete panels system using concrete, welded mesh and plates, polystyrene core system by Mooreliving India Building solutions LLP, New Delhi
- Honey Comb Panel System by Anjani Technoplast Ltd., Greater Noida



## Celebration of World Habitat Day 2015



As a part of the World Habitat Day Celebrations 2015, BMTPC organised Painting Competition for Differently Abled Children on the theme "Public Spaces for All" in the categories viz. Mentally Challenged, Hearing Impaired and Visually Impaired. The winners were facilitated during the World Habitat Day Celebration Function in New Delhi on October 5, 2015. The publications which were also brought out to mark the occasion by BMTPC are (i) Special Issue of Newsletter "Nirman Sarika", (ii) Third edition of "IITK-BMT-PC Earthquake Tips", (iii) Booklet on Schedule of Rates for GFRG Panel Building System, (iv) Manual of Waterproofing of Glass Fibre Reinforced Gypsum, (v) A Case Study on the Making of Bawana Industrial Workers Housing with Cost Effective Technologies.

For further details, please contact:

**BMTPC** Executive Director  
**BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL**  
Ministry of Housing & Urban Poverty Alleviation, Government of India  
Core 5 A, 1<sup>st</sup> Floor, India Habitat Centre, Lodhi Road, New Delhi – 110003  
Phone: +91-11- 24638096, 24636705; Fax: +91-11-24642849  
E-mail: bmtpc@del2.vsnl.net.in, Website: www.bmtpc.org



### From the Desk of the Executive Director

BMTPC has been working towards promotion of new emerging & cost-effective construction systems in the construction sector for several years. Despite of our best & sincere efforts, these new systems of construction could not make much impression because of so many impending issues such as lack of capacities at various levels, absence of clear cut procurement processes, no standardization of spaces, no demonstration projects in Indian conditions and above all lack of specifications, codes & schedule of rates. In order to deal with all these, BMTPC has made concerted efforts to bring all experts & involved in the sector to contribute so as to evolve a comprehensive framework for smooth adoption of the technologies in the field.

Recently, BMTPC initiated demonstration housing projects in several states to showcase these new systems & at the same time sensitize the state authorities, local people & professionals including students. Also, it helps in studying the technologies deeply & in the process; we can collect data, which can be used for creating documents related with rates, specifications, implementation etc. At present, AP, Telengana, Tamilnadu, Bihar, Odisha are the states where new construction systems are being showcased. More to follow.....

*Shailesh*  
(Dr. Shailesh Kr. Agrawal)

Published by:  
Building Materials & Technology  
Promotion Council, New Delhi

## Indo-Norwegian Training Programme on Nonlinear Analysis and Performance Based Design of Multistorey Buildings

The Council organized a Indo-Norwegian Training Programme on Nonlinear Analysis and Performance Based Design of Multistorey Buildings from December 3-5, 2015 at New Delhi in collaboration with Indian Institute of Technology, Roorkee, Royal Norwegian Embassy to India and NORSAR, Norway.

The programme was inaugurated by Dr. Nandita Chatterjee, Secretary, Ministry of Housing & Urban Poverty Alleviation. During the Inaugural Session, the participants were addressed by Dr. Shailesh Kr. Agrawal, Executive Director, BMTPC, Mr. Arild Oksnevad, Counsellor, Royal Norwegian Embassy to India, New Delhi, Dr. Dominik Lang, Senior Advisor & Project Manager, NORSAR, Norway and Dr. Yogendra Singh, Professor, Department of Earthquake Engineering, IIT Roorkee. The course was specifically targeted to Structural and Geotechnical Engineers, Practitioners, Designers in public and private sectors. The programme was attended by 70 participants from various parts of the country.



## Technical Assessment Committee meeting under Performance Appraisal Certification Scheme (PACS)

The meeting of the Technical Assessment Committee (TAC) under Performance Appraisal Certification Scheme (PACS) was held on 15<sup>th</sup> October, 2015 under the Chairmanship of ED, BMTPC and approved issuance of PACs for the following new products/systems:

- Sound proof drainage Piping System – M/s Hulirot Pipes & Fittings Pvt. Ltd., Vadodra
- SRPL Building System (Waffle-Crete) – M/s Shaival Reality Pvt. Ltd., Bharuch (Gujarat)
- Walltec Hollowcore Concrete Walls – M/s B N Precast Pvt. Ltd., Gandhinagar
- Plastic Honeycomb Toilet structure – M/s Anjani Technoplast Pvt. Ltd., Greater Noida

- Reinforced EPS Core Panel System – M/s Jindal Steel & Power Ltd. Angul, (Odisha)

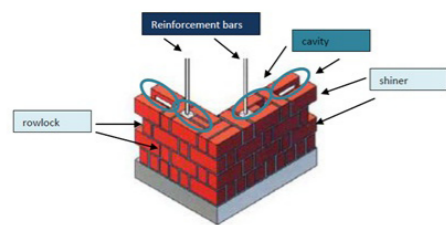
In addition, PACs for the following products/systems manufactured by M/s Sintex Industries, Kalol have been renewed:

- Underground Water Storage Tank
- Insulated Roof Panel
- Plastocrete Panel
- PVC Profile Door
- Formwork for Monolithic Concrete Construction

## Alternate Building Materials & Technologies

### Rat Trap Bond for Walling: An alternate to English and Flemish Brick Bonds

A "Rat-Trap Bond" is a type of wall brick masonry bond in which bricks are laid on edge (i.e. the height of each course in case of a brick size 230x110x75 mm, will be 110 mm plus mortar thickness) such that the shinner and rowlock are visible on the face of masonry as shown below.



This gives the wall with an internal cavity bridged by the rowlock. This is the major reason where virgin materials like brick clay and cement can be considerably saved. This adds this technology to the list of Green building technologies and sustainability for an appropriate option as against conventional solid brick wall masonry.

Bricks should be of good quality with consistent size and straight edges. First layer, last layer of the wall and layers at sill and lintel levels of opening and sides of opening should be solid (without cavity). Reinforcement bars can be put in vertical cavities at corners and around openings and horizontally at lintel to improve earthquake resistance.

The Rat trap bond construction is a modular type of masonry construction. Due care must be taken while designing the wall lengths and heights for a structure. The openings and wall dimensions to be in multiples of the module. Also the course below sill and lintel to be a solid course by placing bricks on edge. The masonry on the sides of the openings also to be solid as will help in fixing of the opening frame.

#### Advantages:

- By adopting this method, saving of approx. 20-35% less bricks and 30-50% less mortar; also reduces the cost of a 9 inch wall by 20-30% and enhances productivity.
- For 1 m<sup>3</sup> of rat trap bond, 470 bricks are required compared to conventional brick wall where a total of 550 bricks are required.
- Rat trap bond wall is a cavity wall construction with added advantage of thermal comfort. The interiors remain cooler in summer and warmer in winters.
- Rat-trap bond when kept exposed, create aesthetically pleasing wall surface and cost of plastering and painting also may be avoided.
- Rat trap bond can be used for load bearing as well as thick partition walls. All works such as pillars, sill bands, window and tie beams can be concealed.
- The walls have approx. 20% less dead weight
- In case for more structural safety, reinforcement bars can be inserted through the cavity till the foundation.

## Emerging Technologies for Building Construction

### Modular Tunnel Form

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.

#### Uses

Designed to cast concrete load-bearing walls and slabs in a single monolithic pour, tunnel forms are suited for the construction of Multiple residential dwellings, Housing projects, Garden apartments, Condomiums and Hotels etc.

#### Limitations

- The floor spans executed with movable forms shall not be more than 5.60 m, unless accessory units are used.
- The thickness of vertical in-situ walls shall not be more than 120 mm, unless justified by special provisions.

#### Materials Requirement

Hot dip galvanized steel sheet – 3 mm thick,  
Angle section – 80mm x 80mm x 6 mm and  
Cold rolled U-sections – 60mm x 30 mm

Performance Appraisal Certificate (No 1018-S/2015) has been awarded to Modular Tunnel Form System.



## Skill Development and Capacity Building

### Capacity Building Programmes on Good Construction Practices including Emerging Technologies for Housing

BMTPC organizes capacity building and training programmes, workshops, exhibition on regular basis in the areas of Sustainable Construction & Green Construction practices, Earthquake Resistant Design & Construction, Quality Control and Assurance, Repair, Rehabilitation and Seismic Retrofitting of Buildings, etc.

One of the recent initiative of BMTPC under Housing for All (Urban) Mission is to enhance the capacity of Engineers & Architects at ULB & State level in the area of "Quality Control and Good Construction Practices" in housing projects and to introduce emerging technologies for construction of houses which may be useful for mass housing projects in the States.

Two capacity Building Programmes on Good Construction Practices including Emerging Technologies for Housing were organized on October 8-9, 2015 at Jaipur and December 18, 2015 at Bhubaneswar. Around 60 participants from housing development agencies and State Governments participated in each programme.



## Recent Publications

### Third Edition of "IITK-BMTPC Earthquake Tips"



BMTPC has brought out the third edition of "IITK-BMTPC Earthquake Tips" jointly with IIT Kanpur. IITK-BMTPC series of Earthquake Tips were first launched in 2002 and express the fundamentals of earthquakes and its effect on structures and design & construction of earthquake resistant buildings in easy to understand language for the benefit of readers ranging from school kids, non-professionals to professionals.

### Schedule of Items & Rate Analysis for Glass Fibre Reinforced Gypsum (GFRG) Construction



BMTPC, in its pursuit to promote appropriate technological solutions for housing in different geo-climatic condition of India, has identified, evaluated and promoting GFRG technology along with IIT Madras and other R&D organizations. The document gives Specification and Rate Analysis for GFRG Construction for use of concerned agencies.

### Demonstrating Cost Effective Technologies – A Case Study of Bawana Industrial Workers Housing



The Bawana Industrial Workers Housing Project was undertaken by DSIIDC with the technical support of BMTPC and CBRI. The booklet "Demonstrating Cost Effective Technologies – A Case Study of Bawana Industrial Workers Housing" has been brought out to bring out the details of the use of cost effective, energy efficient and eco-friendly building materials & technologies in the mass housing project.