



## HIGHLIGHTS

- Vulnerability Atlas of India
- Seismic Strengthening of Lifeline Buildings
- Model Demonstration Housing Projects
- BMTPC's Role under JNNURM
- Forthcoming India-Africa Technical Cooperation Programme
- BMTPC's Participation in Important Events
- Performance Appraisal Certification Scheme
- Activities in the North Eastern Region
- New Technologies
- Forthcoming Events
- International Exhibition cum Seminar in Africa

## 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.

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From the Desk of the

## Executive Director



On the occasion of 18<sup>th</sup> foundation day i.e. 29<sup>th</sup> June, 2008 of BMTPC, it gives me immense gratification and pride to release the inaugural issue of BMTPC newsletter *Nirman Sarika*. It would be a quarterly newsletter through which we would reach out to the common people of the nation and endeavour to provide latest technological innovations in the field of housing for sustainable development. In today's fast changing technological world, it is of paramount importance that we keep ourselves abreast with the updated knowhow and constantly look for solutions to do away with the housing problem of our country and serve the nation. This was exactly in my mind, when I thought of starting the BMTPC newsletter. Through this letter, we will not only apprise the stakeholders of our latest activities but also collate information of budding building materials & construction technologies of the world. I hope, I will succeed in my step and the newsletter will go a long way in sensitizing construction industry to adopt cost-effective technologies and alternate building materials in harmony with nature. It will not be appropriate for me, if I do not dwell upon disaster resistant technologies. The vulnerability of Indian subcontinent to natural hazards has prompted BMTPC to work in the area of disaster mitigation and management. It is my firm belief that our construction sector should gear up to incorporate disaster resistant technologies even in normal construction work. BMTPC has been striving to create pool of experts in the field of disaster resistant technologies through capacity building programmes, training to artisans and on-site demonstrations. Our newsletter will also have a special section on natural hazards and related interventions so as to minimize the risk.

BMTPC is a unique organization which is serving the nation since 1990 and has distinction of bringing the alternate building materials & cost-effective construction technologies at the grass-root level through upscaling, machine development, training and publications. I invite all the stakeholders through our newsletter to join hands with us in any of the area which may contribute towards **Affordable Housing for All**.

I place on record my deep appreciation to our Hon'ble Minister Kumari Selja ji for her constant encouragement and giving meaningful guidance to us from time to time. Thanks to our mentors, Dr. Harjit S. Anand, Secretary and Shri S.K. Singh, Joint Secretary, Ministry of Housing & Urban Poverty Alleviation for their moral support and able maneuvering.

At last but not the least, I congratulate the BMTPC family for working positively towards the growth of the organization and taking it to such great heights in past 18 years. I expect the same cooperation and team spirit in years to follow.

  
(Dr. Shailesh Kr. Agrawal)

## Vulnerability Atlas of India

Vulnerability Atlas of India was published first in 1997 by BMTPC as a part of Report by an Expert Group set up by the then Ministry of Urban Development, Govt. of India with following broad objectives:



- Need to identify vulnerability area with reference to natural hazards such as earthquakes, cyclones, flood etc. having a potential of damaging housing stock and related infrastructure.
- Preparation of vulnerability Atlas showing areas vulnerable to natural disaster and determination of risk levels of houses.
- Formulation of a strategy for setting up Techno-legal regimes for enforcing disaster resistant construction and planning practices in natural hazard prone human settlements.

Since then, it has served as a useful tool for proactive, pre-disaster management planning in the country.

The Atlas was again revised bringing all the latest hazard maps related to earthquakes, cyclones and flood including districtwise – tables on the basis of census 2001 Data.

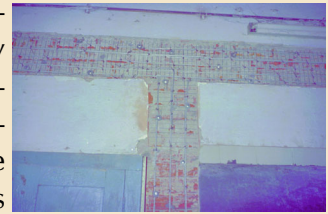
### Special features in Revised Atlas

- Digitization of all data sets in the various maps including boundaries of the States and Districts according to the Survey of India Maps as well as the boundaries of the various hazard zones, thus improving their accuracy.
- The Vulnerability and Risk Tables of Housing Data in each district is now based on wall types and roof types as per 2001 census data. The district names and reference numbers are taken according to 2001 census for ease of cross reference.
- Inclusion of a note on Tsunami wave effects in coastal regions of the country.
- Inclusion of Landslide Hazard Zones.

State Atlases are now being prepared to give data upto Taluka Level with Actionable points for disaster Mitigation and management.

## Seismic Strengthening of Lifeline Buildings

The recent past earthquakes in the country has exposed the vulnerability of our constructions including lifeline buildings, such as schools, hospitals, etc. In order to make them safe against future earthquakes, it is essential to carry out vulnerability assessment of buildings at first instance and then perform seismic strengthening through technological interventions, for which sufficient know-how is available in the country.



BMTPC in its endeavour of disaster mitigation and management has taken several initiatives to showcase the pragmatic retrofitting techniques by seismic strengthening of a few structures.



The Council has carried out seismic retrofitting of Kupwara Sub-Divisional Hospital in J&K. In the capital, the Council has planned to demonstrate the retrofitting techniques in 12 zones of MCD by carrying out assessment and retrofitting of MCD schools. So far five schools have been retrofitted. Work has been initiated in two more schools.

It is hoped that these demonstrations will help local authorities to initiate retrofitting of lifeline buildings on larger scale.





## Model Demonstration Housing Projects

*Under Valmiki Ambedkar Awas Yojana (VAMBAY)  
(Now subsumed in IHSDP under JNNURM)*

The Building Materials & Technology Promotion Council has been actively involved in promotion, development and dissemination of environment-friendly, innovative building materials and disaster resistant construction technologies for low cost housing. In its endeavour to demonstrate field level application of these technologies in the mass housing projects, the Council implemented its first such model demonstration housing project at Laggarie, Bangalore, wherein 252 houses were constructed involving use of cost effective technologies under the erstwhile scheme of VAMBAY of M/o HUPA. Subsequent to its successful implementation, M/o HUPA entrusted BMTPC with the construction of Model Demonstration Housing Projects in Nagpur, Maharashtra (70 nos.), Dehradun, Uttarakhand (100 nos.), Bilaspur, Chhatisgarh (100 nos.), Kudalu, Karnataka (70 nos.) and Trichy, Tamil Nadu (100 nos.).

The project in the States of Uttarakhand and Maharashtra has already been completed, while the projects in Tamil Nadu and Karnataka are nearly completion as the finishing work is in the final stage. The project in Chhatisgarh is expected to be completed by August 2008.



Demonstration Houses at Dehradun, Uttarakhand



Demonstration Houses at Nagpur, Maharashtra



Demonstration Houses at Kudalu, Karnataka

The salient features of these Model Demonstration Housing Projects are as under:

Location	Unit covered area (sft.)	Cost per Unit (Rs.)
Nagpur	181	40,000
Dehradun	181	45,000
Kudalu	201	60,000
Trichy	172	40,000
Bilaspur	181	40,000

### Technology Options Used:

#### Foundation

- Under-reamed piles for foundation
- RR masonry in foundation and plinth
- Step footing in concrete blocks

#### Walling

- Solid/Hollow blocks using flyash/gypsum for Masonry
- Flyash Bricks for walling

#### Roof/Floor

- Filler slab
- Precast RCC planks and joists
- Precast RCC Beam and curved planks
- IPS flooring

#### Doors/Windows

- Precast RCC door frames
- Door shutters from wood substitutes

#### Others

- RCC plinth, lintel and roof bands for earthquake resistance
- Precast elements like Chajjas, shelves etc.
- Ferrocement Stair Case.



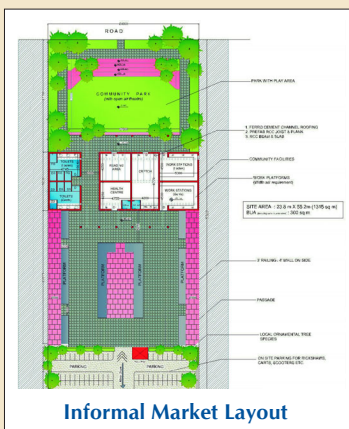
Demonstration Houses at Trichy, Tamil Nadu

## BMTPC's Role under JNNURM

Jawaharlal Nehru National Urban Renewal Mission (JNNURM) is an important initiative of the Government of India for fast track urban renewal of various categories of cities, all across the country. The Mission has two sub-components which include Urban Infrastructure & Governance as one part. The other part has two sub-components viz. Basic Services for the Urban Poor (BSUP) and Integrated Housing and Slum Development Programme (IHSDP). The second sub-component is being implemented by the Ministry of HUPA.

BMTPC has been designated as the Appraising Agency for the BSUP projects by the M/o HUPA. Its role is largely related to appraisal of the projects received from various States under BSUP. The Council has appraised 92 such projects amounting to Rs. 5,83,982.00 lakhs till date.

BMTPC has also been actively associated with the various Capacity Building Programmes organized by M/o HUPA at various locations across the country. Under these Capacity Building Programmes, detailed presentations outlining



Informal Market Layout

the intricacies involved in the preparation of Detailed Project Reports, Project Management and the options for Housing Design, Community Centres, Informal Markets, etc. were made for the municipal functionaries, engineers, architects, policy-makers of ULBs.

Ministry of HUPA has also selected BMTPC for undertaking Monitoring of implementation of BSUP and IHSDP projects. An agreement between M/o HUPA & BMTPC has been signed. This agreement entails a detailed comprehensive monitoring of implementation of BSUP and IHSDP projects. BMTPC is in the process of the establishing Project Monitoring Cell for monitoring of these projects.

## Forthcoming India Africa Technical Cooperation Programme

To strengthen the South-South cooperation, a Project Proposal for India Africa Technical Cooperation Programme in the field of Housing and Human Settlements was prepared and submitted to Ministry of External Affairs by Ministry of HUPA.

The Cabinet has approved the proposal for implementation. The five years project is envisaged to be the initiating point for the implementation of a wider programme designated as Human Settlements Programme addressing the shelter needs of the lower income group of the African region having prime focus towards low cost housing, technology promotion, dissemination and transfer of technology from India. The major components of the project are:

- Establishment of Human Settlement Centres in Mozambique, Botswana, Zambia, Ethiopia and Namibia.
- Establishment of Technology Demonstration and Diffusion Centres in Mozambique, Botswana, Zambia, Ethiopia and Namibia.
- Adaptation of technologies, R&D for adaptation, testing, certification, prototype development and batch production
- Facilitation for technology transfer including support to the professionals, students, delegations for training
- Organisation of Seminars/Exhibitions across the region including public private partnership
- Construction of 40 demonstration houses each at five locations
- Construction of 400 houses each at five locations with the funding support of Govt. of India's contribution of 10% and 90% by the host country
- Training of engineers, skilled & semi-skilled workers, small entrepreneurs, project managers both in India and host country.




## BMTPC's Participation in Important Events

### International


- Participated in 6<sup>th</sup> World Alliance of Cities against Poverty, 26-28<sup>th</sup> March, 2008 as a member of the Indian Delegation led by Hon'ble Minister of State (I/C) for M/o HUPA to Greece, Athens. 
- Participated and coordinated the CLGF India Conference on Inclusive City : Urban Strategies to Promote Social Cohesion and Inclusiveness, on 16<sup>th</sup> April, 2008 at New Delhi.
- Participated in the 2<sup>nd</sup> Asia Pacific Ministers Conference on Housing & Urban Development from 12 to 14<sup>th</sup> May, 2008 at Tehran, Iran. The delegation was led by Hon'ble Minister of State (I/C) for M/o HUPA. 

### National

- BMTPC in collaboration with Entrepreneurship Development Institute, Lucknow organized two weeks Entrepreneurship Development Training Programme in the field of low cost housing technologies at Gorakhpur, U.P. w.e.f 10<sup>th</sup> March, 2008. 
- Organised a Residential Training Programme on Modern Bamboo Structures and Housing with Cane & Bamboo Technology Centre

(CBTC), Guwahati at Kaziranga, Assam, from 6-8<sup>th</sup> March, 2008. About 45 participants attended the Training Programme.



- Training Programme on "Disaster Resistant and Quality Construction Practices" for masons was organized with Kesarjan Building Centre, Ahmedabad from 8-12<sup>th</sup> March, 2008 in village Kerala, District Ahmedabad, Gujarat. 18 Masons were trained during the programme.
- Training Course on "Seismic Resistant Design & Rehabilitation of Structures" at Roorkee from 22-25<sup>th</sup> April, 2008 organised with Institution of Engineers (I), Roorkee Centre and CBRI, Roorkee. The Executive Director, BMTPC was facilitated with a citation on the occasion. 

## Performance Appraisal Certification Scheme

*(An Effective Tool for Transfer of Innovative Technologies)*

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 system etc. after due process of assessment.

Performance Appraisal Certification Scheme helps construction industry in bringing innovation and new development to field application with a sense of confidence in the minds of all concerned. It promotes use of newly developed materials for cost reduction, faster construction, improved quality and environmental protection. It also encourages R&D efforts, promotes transfer of technology from Lab to Field, and generates necessary data for standardization. The third party assessment with the involvement of experts from different organizations helps the common user to make informed choices.

## Activities in the North Eastern Region

### Bamboo Mat Production Centres

The Council has completed establishment of Bamboo Mat Production Centres at Kowaifung (Tripura), Sairang and Bualpui (Mizoram) while the Centre at Sohkarongtluh, Meghalaya is in advanced stage of establishment.



The Council also initiated a project for establishment of Bamboo Mat Production Centre in Arunachal Pradesh. State Government has already identified the site.

### Construction of Demonstration Structures

The Council completed construction of 6 demonstration structures using bamboo based technologies in Tripura and handed over to the State Government. In addition, the Council has completed construction of 4 more structures in Agartala, Ambasa and Kaila Shahar, Tripura.



The Council has also completed construction of two demonstration structures using bamboo based technologies in Kohima, Nagaland through Nagaland Bamboo Development Agency, Government of Nagaland.



A Technology Demonstration cum Production Centre in Agartala is in advanced stages of establishment.

## New Technologies

### Two storey Bamboo Housing System

Development of technology for construction of two storey bamboo housing system has been completed. A demonstration house has been constructed at the campus of IPIRTI Bangalore. At each stage of house construction, various elements were tested and models of such elements were made before the actual construction was carried out.



### Pre-fabricated Modular Housing System using Bamboo

Design and Development of pre-fabricated modular housing system using bamboo and bamboo based composites has also been completed. A model design of pre-fab double walled bamboo composite house with attached bath and kitchen having size 20' x 24' x 8' was developed. This system will enable application of bamboo composite building materials in pre-fabricated houses. These types of houses can be constructed quite quickly for immediate and long term rehabilitation for post disaster relief.



### Bamboo Mat Ridge Cap

The technology for production of Bamboo Mat Ridge Cap using bamboo has been developed at IPIRTI Bangalore. Dies to be fixed to a Hydraulic hot press has also been developed. With the success of development of ridge cap at laboratory level, further work on upscaling of the process for commercialization has been initiated.



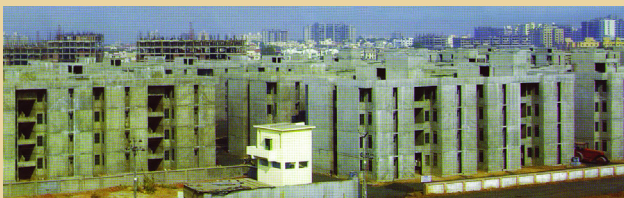


## Monolithic Concrete Construction

In Monolithic Concrete Construction technology walls and slabs are constructed together giving the structure a box (cubicle) shape. Cement concrete is poured directly in lightweight form work system while using nominal reinforcement bars for needed strength. The method may be one of the alternatives for multistoried construction. Flyash may also be utilized in concrete. Monolithic Concrete Construction technology is being used by many agencies for mass housing.

Technology though has the advantage of bringing speed and quality in construction, pre-planning of services are essential for effective functional utility. Post construction alterations are not possible in the structure. Being 100 mm thick walling system, orientation and other architectural design are required to be judicially planned to have good thermal behaviour in hot climate.

Delhi State Industrial and Infrastructure Development Corporation (DSIIDC), Delhi, Ahmedabad Municipal Corporation, Ahmedabad and Pimpri Chinchwad Municipal Corporation, Pune are constructing houses using this technology. The technology is being evaluated by BMTPC with the help of experts.



## Large Panel Construction Technologies using Phosphogypsum and Micro Strand Glass Rovings

Rashtriya Chemicals and Fertilizers Ltd. (RCF) and the Fertilizers and Chemicals Travancore Ltd. (FACT), both Government of India enterprises engaged in the manufacture of chemical fertilizers and industrial chemical, produce phosphogypsum as by-product from their Phosphoric Acid Plant. These organizations have joined with an Australian firm for production of large load bearing panels manufactured using phosphogypsum and micro strand glass rovings with special emulsion and chemicals.

As reported, phosphogypsum of both RCF and

FACT were extensively tested in Australia to establish their suitability for the product.

The panel with Modular cavities is designed as per the loading requirements. Materials have been subjected to extensive testing by Structural Engineering Research centre (a CSIR lab), Chennai and Indian institute of Technology Chennai including against earthquake forces. Design manuals have also been prepared by IIT Chennai.

This technology brings out high-speed of construction. Being factory made, quality can also be controlled well. Depending upon the availability of panels from the plants, which are being set up, this technology, can be a viable alternative for mass housing. Huge stock of wastes (phosphogypsum) lying with fertilizer companies will also have gainful utilization. The technology is being evaluated by BMTPC for its performance and cost-effectiveness.



## Forthcoming Events

- Workshop on Field level Application of Appropriate Building Materials and Construction Technologies at TMM Nirmithi Kendra, Rohtas – 15-17 July, 2008
- Quarterly Round Table Meet with PWDs, CPWD and other related agencies on Use of Innovative Building Materials and Technologies at New Delhi – 29 July, 2008
- Foundation Laying of Demonstration Housing Project at Amethi, Distt. Sultanpur, UP – July, 2008
- Signing of MoU between BMTPC and Ordinance Factory Institute of Learning (OFIL), Ministry of Defence for cooperation in the field of training and capacity building of construction professionals and Inauguration of BMTPC's Permanent Display Centre at OFIL premises – August, 2008
- International Workshop on Emerging Technologies at New Delhi – 6-7 August, 2008
- International Summit on Emerging Trends in Construction Technologies at Bodh Gaya – 27-28 August, 2008.
- One day Conclave on Building Centres at New Delhi – August, 2008.



# International Exhibition cum Seminar

on Innovative Building Materials and Construction Technologies for Sustainable Housing in Africa

BMTPC under the guidance of the M/oHUPA, organized “International Exhibition cum Seminar on Innovative Building Materials and Construction Technologies for Sustainable Housing in Africa” in **Mozambique, Zambia, Botswana and Ethiopia** in the month of April 2008. These events received overwhelming response towards adopting Indian technologies for construction of cost effective housing in their respective countries.



Maputo, Mozambique – 3 April, 2008



Lusaka, Zambia – 9-10 April, 2008



Gaborone, Botswana – 14 April, 2008



Addis Ababa, Ethiopia – 15-16 April, 2008



**For further details, please contact:**



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