

# वार्षिक रिपोर्ट Annual Report

2007-2008



## बनापट

निर्माण सामग्री एवं प्रौद्योगिकी संवर्द्धन परिषद्

आवास एवं शहरी गरीबी उपशमन मंत्रालय, भारत सरकार

**Building Materials and Technology Promotion Council**

Ministry of Housing & Urban Poverty Alleviation, Govt. of India



# **Annual Report 2007-2008**



**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

Annual Report  
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## FOREWORD

I take pleasure in presenting the eighteenth Annual Report of the Building Materials & Technology Promotion Council for the year 2007-08. Responding to the problems confronted by the building materials and construction sector, the Council, during the year, laid emphasis in its activities on identifying the gaps for sustainable development of building materials & construction sector and coordinated its efforts with concerned agencies for developing appropriate strategies for creating better acceptability of proven innovative technologies.

The field level application of innovative and disaster resistant construction technologies has been demonstrated through Demonstration Housing Projects in the States of Maharashtra, Uttarakhand, Tamil Nadu, Karnataka and Chhatisgarh. The projects in Uttarakhand (100 units) and Maharashtra (70 units) have been completed and handed over to respective State Governments. The projects in Chhatisgarh, Tamil Nadu and Karnataka are at various finishing stages. The Council initiated these projects for construction of demonstration houses in different regions with the twin objectives of creating awareness and large scale dissemination of innovative, cost effective, green and disaster resistant construction technologies. During the year, the Council also embarked upon a project on preparation of templates for well ventilated houses with earthquake resistant features as per the Indian Standards for different regions in a cost effective manner.

The Council through its multi-pronged approach within its core mandate of promotion, development and application of innovative and disaster resistant building technologies continued its involvement in the implementation of Jawaharlal Nehru National Urban Renewal Mission (JNNURM) by way of appraising the Detailed Project Reports (DPRs) received from various State/UT Governments. In order to improve the quality of the DPRs, the Council developed various design options for internal house design, cluster housing, neighbourhood colony layouts, provision of separate informal sector market and livelihood centre, community Centre etc. The Council has also been designated as Monitoring Agency for undertaking monitoring of projects under BSUP and IHSDP. An Agreement has been entered in this regard with JNNURM Directorate, M/oHUPA, GoI. Under the scope of the services to be provided by the Council, a dedicated Monitoring Cell is being set up in BMTPC. The Council also involved itself in capacity building of the municipal functionaries of ULBs in Project Development for BSUP and IHSDP under JNNURM.

The Council could match the expectations of the stakeholders by its proactive approach towards disaster mitigation and management. The Council has continued as an important resource institution to the Ministry of Home Affairs for dissemination on the Model Building Bye-laws and the subsequent revision of the Building Bye-laws by various State Governments. With the objective of demonstrating retrofitting technologies, BMTPC has completed the seismic strengthening of four MCD school buildings in Delhi. Besides working on the CD version of the Vulnerability Atlas of India, the Council is also preparing State/UT-wise Vulnerability Atlases under the guidance of the Peer Group.

During the year, the Council continued its thrust on promotion of bamboo based building technologies by construction of demonstration structures in Tripura, Nagaland and Meghalaya. The Council has established one more Bamboo Mat Production Centre at Bualpui (Mizoram), whereas the Centre at Sohkaongtluh, Meghalaya is in advanced stage of establishment. The Council has also initiated the process of establishment of Bamboo Mat Production Centres in Arunachal Pradesh and Kerala during the year.

On the occasion of World Habitat Day, the Council brought out the Special Issue of "Building Material News" on the theme "A Safe City is a Just City" as chosen by the UN-Habitat. Like preceding years, the Council organized a painting competition for Differently Abled Children and the winners were felicitated during the World Habitat Day celebrations. With regular



updatation, the website of the Council is being visited frequently by professionals of various disciplines globally and is being used as a reference source in the area of innovative building materials and construction technologies.

In order to disseminate the knowledge about the cost effective and waste based building materials and technologies all over India particularly for the students of architectural and engineering colleges, the Council has been establishing Permanent Display Centres in different parts of the country. During the year, Permanent Display Centres were established at Samrat Ashok Technological Institute, Vidisha, Madhya Pradesh and School of Planning & Architecture, New Delhi. With the emergence of new building materials, advancement of technologies and the need for disaster resistant construction to mitigate the effect of natural disasters, it is important that working professionals regularly update their knowledge and the construction workforce is provided hands-on training. BMTPC continued its efforts in organizing structured training programmes on subjects related to advancement in the area of building materials for working professionals and construction workforce on regular basis.

The Council gave adequate importance to the activities in the area of international cooperation by hosting the visits of foreign delegations from various countries. Besides holding number of international workshops on innovative cost effective technologies in India, the Council has planned to organize series of International Exhibitions cum Seminars on Innovative Building Materials & Construction Technologies for Sustainable Housing in Africa. These events will be organized during next financial year. The Ministry of Housing & Urban Poverty Alleviation has also asked the Council to formulate a detailed proposal for India-Africa Technical Cooperation Programme.

With a focus on developing innovative building technologies, specific projects have been completed such as "Development of Technology for Construction of Two Storeyed Bamboo House", "Development of Bamboo Mat Ridge Cap for Roofing", "Development of Prefabricated Modular Houses using Bamboo based Composites", "Development of Floor/Wall Tiles and Pavers from Granite Slurry Waste", etc. The Council has also initiated a project for development of technology for construction and demolition waste recycling besides preparation of compendium of cost effective technologies for common man.

It is my privilege to place on record the valuable guidance, support and encouragement received from the President, Members of the Board of Management, the Chairman, Members of the Executive Committee and Ministry of Housing & Urban Poverty Alleviation for various programmes undertaken and executed by the Council. Special thanks are due to Planning Commission, Parliamentary Standing Committee on Urban Development, JNNURM Mission Directorate MoHUPA, various State Govts., Municipal Corporations and Urban Local Bodies, Ministry of Home Affairs, Ministry of DONER, Ministry of Agriculture, NDMA, NIDM, MOS&PI, DST, CSIR, IITs, CEPT, IPIRTI, CBTC, CBRI, SERC, SPA, HUDCO, BIS, NHB, CPWD, NSIC, CIDC, UNIDO and UN-Habitat for their continued support and interest in strengthening the efforts of the Council over successive years.

I would also like to place on record my deep appreciation of the cooperation of our officers and staff members in implementing 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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## **BMTPC's New Vision & Mission**

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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."**

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### **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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## INTRODUCTION

The Building Materials and Technology Promotion Council (BMTPC), established in 1990, is an apex level autonomous organisation under the aegis of the Ministry of Housing & Urban Poverty Alleviation, Govt. of India with the prime objective of bridging gap between the laboratory development and large scale field application of cost effective, environment-friendly and energy-efficient innovative building materials and disaster resistant construction technologies.

BMTPC in its endeavour to promote the use of innovative and environment-friendly building materials and construction technologies, has initiated series of activities for the accomplishment of multi-faceted objectives, enshrined in the mandate of the Council.

Over the years, the Council has focused on the promotion and development of the innovative, cost-effective, environment-friendly and energy-efficient building materials and technologies. With the active support of Ministry of Housing & Urban Poverty Alleviation, the Council has also undertaken a number of projects for the field level application of innovative building materials and technologies. In its technology development, promotion and dissemination efforts, the Council developed technologies for use of bamboo in housing and building construction and constructing demonstration structure in the North Eastern Region including setting up of Bamboo Mat Production Centres. For strengthening techno-legal regime for safety against natural hazards, the Council, based on the Model Byelaws prepared with Council's support, is also assisting the State Governments in modifying their Building Bye-laws for safety against natural hazards.

The Council is actively involved in the implementation of Jawaharlal Nehru National Urban Renewal Mission (JNNURM). It has been designated as one of the Appraisal Agencies for appraisal of Detailed Project Reports received under BSUP and IHSDP from identified Mission Cities under JNNURM. The Council has also been assigned the task of monitoring these projects.

Apart from bringing out the first ever Vulnerability Atlas of India, the Council has also undertaken retrofitting of public utility buildings in different parts of country. The Council in recent years has

reoriented its approach towards promotion and marketing of technologies through intensive evaluation, dissemination and demonstration of cost effective building materials and construction techniques.

### **Objectives**

- To promote development, production, standardization and large-scale application of cost-effective innovative building materials and construction technologies in housing and building sectors.
- To promote manufacturing of new waste-based building materials and components through technical support, facilitating fiscal concessions and encouraging entrepreneurs to set up production units in different urban and rural regions.
- To develop and promote methodologies and technologies for natural disaster mitigation, vulnerability and risk reduction and retrofitting/reconstruction of buildings and disaster resistant design and planning practices in human settlements.
- To provide support services to professionals, construction agencies and entrepreneurs in selection, evaluation, upscaling, design engineering, skill upgradation and marketing for technology transfer, from lab to land, in the area of building materials and construction.

### **Thrust Areas**

- Improving the policy environment for sustained growth of cost-effective building materials, production and availability.
- Promotion of production units of building materials/components based on Flyash, Redmud, Phosphogypsum, agricultural residues and other wastes and by-products.
- Modernisation of small scale and village level building materials production units in rural and urban areas.
- Promoting economy in construction costs.
- Formulation of standards for local building materials.
- Strengthening industrial extension services for attracting more investment in building materials sector by working with national and international agencies.

- Upscaling of technologies, know-how acquisition, absorption and dissemination.
- Assessing vulnerability and risk in natural disaster, prone areas.
- Promoting disaster resistant construction technologies.
- Global technology search and encouraging joint ventures in building materials and construction sector.

## MAJOR INITIATIVES AND ACTIVITIES DURING THE YEAR 2007-2008

### I. DEMONSTRATION BUILDINGS USING COST-EFFECTIVE TECHNOLOGIES

#### 1. Construction of Demonstration Houses under VAMBAY

The Ministry of Housing & Urban Poverty Alleviation had assigned BMTPC the task of construction of demonstration houses using cost effective technologies within the ceiling limit prescribed under VAMBAY Scheme [now subsumed under Integrated Housing and Slum Development Programme (IHSDP) of JNNURM]. These demonstration houses are aimed to showcase the field level applications of various cost effective building materials and technologies. The salient features and status on various projects undertaken by BMTPC are as under:

##### ***Nagpur (Maharashtra)***

The duly completed 70 demonstration houses have been handed over to the Nagpur Improvement Trust, the nodal agency of the State Government. The Demonstration Housing Project at Nagpur, Maharashtra comprises 70 dwelling units having Ground+1 structure with built up area of each unit as 181 sqft. and future expandable area of 88sqft. The project consists of 10 blocks, each block having 7 dwelling units. There are 4 dwelling units on ground floor and 3 dwelling units on first floor. USP of the project is that all the occupants on the first floor will also get future expandable area in the form of open terrace. The cost of model unit is Rs.275 per sq.ft.

The major technologies used are:

- i) Under-reamed piles for foundation
- ii) Solid/Hollow blocks using flyash/gypsum for Masonry
- iii) Filler slab for floor/roof
- iv) Precast RCC door frames
- v) Door shutters from wood substitutes
- vi) RCC lintel and tie beams at ground level for earthquake resistance

##### ***Dehradun (Uttarakhand)***

The construction of 100 houses has been completed in all respect at three locations. The houses constructed at three different locations are 28 units, 38 units and 34 units respectively. This project is special in a way that these demonstration houses were constructed for lepers who were living in dilapidated kuccha houses at the same location. The area of each DU is 181 sqft. and the cost per sq.ft. is Rs.250/-. Cost effective technologies which have been used in this project are:

- i) Precast RCC planks and joists for roofing.
- ii) Solid concrete blocks for walling

- iii) RCC door frames
- iv) Precast elements like Chajjas, shelves etc.

#### ***Kudalu (Karnataka)***

There are 70 Dwelling Units having G+2 structure. Finishing work of all 70 dwelling units is nearing completion. The area of each DU is 201 sqft. and the cost per sq.ft. is Rs.298/-. Cost effective technologies which are being used in this project are:

- i) RR masonry in foundation and plinth
- ii) Solid concrete block masonry using flyash bricks in superstructure
- iii) Precast R.C. planks and joist system for ground and first floor slab
- iv) RCC door frames

#### ***Bilaspur (Chattisgarh)***

In Bilaspur, 100 houses are being constructed for slum dwellers. The masonry work of 1<sup>st</sup> floor level in all 8 blocks consisting of total 100 dwelling units is nearing completion. By selecting this design, open expandable space has been provided to occupants on First Floor. The area of each DU is 181 sqft. and the cost per sq.ft. is Rs.222/-. Technologies and building components used in this project are:

- i) Flyash Bricks for walling
- ii) Precast RCC Beam and curved planks for roofing.
- iii) Ferrocement Stair Case
- iv) RCC Door Frames
- v) Precast RCC chajjas etc.

#### ***Trichi (Tamilnadu)***

There are 100 dwelling units of single storey designed in cluster approach. Finishing work of the 100 houses is nearing completion. The area of each DU is 172 sqft. and the cost per sq.ft. is Rs.232/-. Cost effective technologies which have been used in this project are:

- i) RR masonry in foundation and plinth
- ii) Concrete block masonry using Flyash in superstructure
- iii) Filler slabs
- iv) RCC door frames

## **2. Construction of Demonstration Structures using Bamboo Based Technologies in North Eastern Region**

BMTPC has undertaken construction of 10 demonstration structures, each in Mizoram and Tripura using bamboo based technologies. These include Houses, OPD buildings, Library buildings, Picnic huts, Schools, etc. The specifications used are:

- (a) Treated bamboo columns and beams,
- (b) Ferrocement walls on bamboo grid reinforcement,





**Demonstration Houses under VAMBAY constructed by BMTPC at Nagpur, Maharashtra.**



**Demonstration Houses under VAMBAY constructed by BMTPC at Dehradun, Uttarakhand.**





**Demonstration Houses under VAMBAY being constructed by BMTPC at Kudalu,  
Karnataka**



**Demonstration Houses under VAMBAY being constructed by BMTPC at Bilaspur,  
Chhatisgarh**







**Demonstration Houses under VAMBAY being constructed by BMTPC at Trichi, Tamil Nadu**



**On-site production of Flyash Blocks during the construction of Demonstration Houses under VAMBAY at Trichi, Tamil Nadu**







**Demonstration Building at Kailashahar, Tripura using bamboo based technologies.**



**Demonstration School Building at Agartala, Tripura being constructed by BMTPC using bamboo based technologies.**



- (c) Treated bamboo trusses, rafters and purlins,
- (d) Bamboo mat board in wooden frames for door shutters,
- (e) Bamboo Mat Corrugated Roofing Sheets,
- (f) IPS flooring, etc.

All the ten structures in Mizoram and six structures in Tripura were completed during last year and handed over to the State Govts. During the year, the Council has completed construction of 3 more structures in Agartala, Ambasa and Kaila Shahar, Tripura. The work on last structure i.e. school building in Tripura has reached upto roof level.

The cost of construction using conventional materials of bricks and concrete in these areas is around Rs. 800/- per sq ft. This is considerably reduced using bamboo based technologies and the cost of construction achieved is Rs.315 to Rs.622 per sq.ft. for different types of structures. The saving in cost of construction is 25% to 30% depending upon the carpet area for different types of structures as compared to conventional construction. During constructing various types of structures local contractors, masons, artisans were provided training on use of bamboo in building construction.

### **3. Construction of Demonstration Houses using Innovative, Green and Disaster Resistant Technologies**

The Council has initiated a project for construction of demonstration houses in Haryana, West Bengal, Uttar Pradesh using innovative, green and disaster resistant technologies at four places in different regions with the twin objectives of creating awareness and large scale dissemination of innovative, cost effective, green and disaster resistant construction technologies.

The respective State Governments were approached for identification of suitable land for construction of demonstration houses. The land has been identified for Rai Bareilly and Amethi (UP). The drawings and estimates have been prepared for undertaking the project. Regarding the other two locations i.e. Haryana and West Bengal, respective State Governments have been requested for early identification of suitable land.

### **4. Preparation of Templates for Low Cost Housing**

The Council undertook a project for preparation of templates for well ventilated houses with earthquake resistant features as per Indian Standard Code, for different regions in a cost effective manner, with following details:

Minimum carpet area 25 sqm. with two habitable rooms, separate kitchen, bathroom and toilet.

6 different options were prepared with carpet area/ plinth area of:

**Carpet Area/Plinth Area**

24.9/ 32.20 sqm.

25.22/ 33.11 sqm.

25.73/34.41 sqm.

25.47/34.41 sqm.

26.52/33.79 sqm.

25.10/32.59 sqm.

Different structural arrangements were considered for costing. Load Bearing structure were found to be cheaper by 15% compared to RC frame structure. Load bearing structure with precast RC Plank and joist system of roofing, ferrocement slabs, sunshades, precast RC door windows were found to be cheaper than that of load bearing structure with RC Cast-in-situ solid slab, RC Lintels, shelves, stairs, sunshades. Based on Schedules of Rates with Cost Index of North Zone (Delhi), South Zone (Vishakapatnam), East Zone (Orissa, Bhubneshwar), West Zone (Daman, Gujarat) and North-East Zone (Arunachal Pradesh) costing for following option:

- a) Load bearing with cast-in-situ RC slab 100mm thick with full wall bearing in M 20 cement.
- b) Load bearing wall with precast RC Plank and joist for roofing with seismic resistant features

and other common features as follows:

- No ceiling plaster
- Ferrocement stair steps, shelves, sunshades
- Precast RC door/ window frames using 1:1:2
- Step footing for load bearing walls
- Both side wall plasters
- GI pipes for water supply

The indicative costs of houses in different regions are:

North Zone Rs.1,58,000/- to Rs.1,91,000/-

East Zone Rs.1,48,000/- to Rs.1,82,700/-

West Zone Rs.1,27,300/- to Rs.1,53,700/-

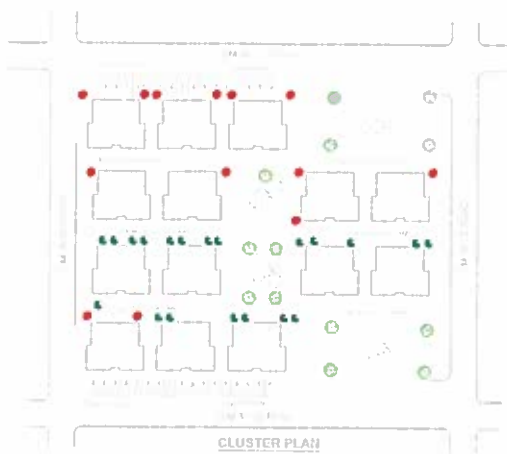
South Zone Rs.1,44,400/- to Rs.1,75,000/-

## **5. Preparation of Model Housing Unit Plan and Design layout for Integrated Informal Market**

The Council is actively involved in the implementation of Jawaharlal Nehru National Urban Renewal Mission



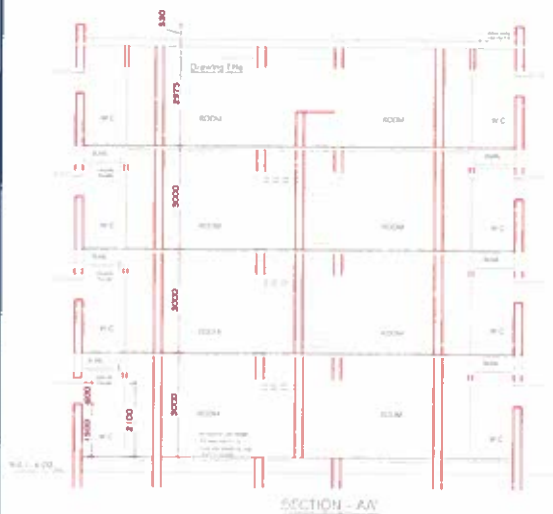
BLOCK PLAN (TYPICAL FLOOR PLAN)



CLUSTER PLAN



ELEVATION - A



SECTION - AA

#### SPECIFICATIONS:

FOUNDATION  
OPEN STEPS TO FLOORING BY BRICK MASONRY LINED CO. 18 BURST  
CLAY BRICKS (1/2) PLACEMENT HIGH SALES OVER A BASE OF 4" C.G. 15 TO

#### BUILDING STRUCTURE

1. EXTERIOR BRICK THICK WALLS WITH BURST (1/2) AT WINDOWS OF  
CO. 15 IN GROUND FLOOR 1/8  
2. INTERIOR WALLS MEASURES FOR BEARING FORCES AS  
PER THE LOCAL CODES IN PLACE  
3. WALLS NOT TO BE PLASTERED WITH 1/2 IN MORTAR 1/8  
4. WALLS OR 1/2 IN THICK AS PER REQUIREMENT  
ROOF: PRECAST R.C. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR INTERMEDIATE FLOORS AND ROOF SLAB ON LAST FLOOR R.C. SLAB

#### SAFETY

WATER SUPPLY: SANITARY: BRICK & STACK SYSTEM OF  
PLASTERED (1/2) C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

PLUMBING: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

1. EXTERIOR BRICK THICK WALLS WITH BURST (1/2) AT WINDOWS OF  
CO. 15 IN GROUND FLOOR 1/8

2. INTERIOR WALLS MEASURES FOR BEARING FORCES AS  
PER THE LOCAL CODES IN PLACE

3. WALLS NOT TO BE PLASTERED WITH 1/2 IN MORTAR 1/8

4. WALLS OR 1/2 IN THICK AS PER REQUIREMENT

ROOF: PRECAST R.C. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR INTERMEDIATE FLOORS AND ROOF SLAB ON LAST FLOOR R.C. SLAB

SAFETY: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

PLUMBING: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

1. EXTERIOR BRICK THICK WALLS WITH BURST (1/2) AT WINDOWS OF  
CO. 15 IN GROUND FLOOR 1/8

2. INTERIOR WALLS MEASURES FOR BEARING FORCES AS  
PER THE LOCAL CODES IN PLACE

3. WALLS NOT TO BE PLASTERED WITH 1/2 IN MORTAR 1/8

4. WALLS OR 1/2 IN THICK AS PER REQUIREMENT

DOOR & WINDOW SCHEDULE									
S. NO.	TYPE	WIDTH	HEIGHT	NO. OF GLASS	NO. OF GLASS	NO. OF GLASS	NO. OF GLASS	NO. OF GLASS	NO. OF GLASS
1	DOOR	2100	2100	1	1	1	1	1	1
2	DOOR	2100	2100	1	1	1	1	1	1
3	DOOR	2100	2100	1	1	1	1	1	1
4	DOOR	2100	2100	1	1	1	1	1	1
5	DOOR	2100	2100	1	1	1	1	1	1
6	DOOR	2100	2100	1	1	1	1	1	1
7	DOOR	2100	2100	1	1	1	1	1	1
8	DOOR	2100	2100	1	1	1	1	1	1
9	DOOR	2100	2100	1	1	1	1	1	1
10	DOOR	2100	2100	1	1	1	1	1	1

PROXIMATE COST: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR INTERMEDIATE FLOORS AND ROOF SLAB ON LAST FLOOR R.C. SLAB

SAFETY: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

PLUMBING: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

1. EXTERIOR BRICK THICK WALLS WITH BURST (1/2) AT WINDOWS OF  
CO. 15 IN GROUND FLOOR 1/8

2. INTERIOR WALLS MEASURES FOR BEARING FORCES AS  
PER THE LOCAL CODES IN PLACE

3. WALLS NOT TO BE PLASTERED WITH 1/2 IN MORTAR 1/8

4. WALLS OR 1/2 IN THICK AS PER REQUIREMENT

ROOF: PRECAST R.C. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR INTERMEDIATE FLOORS AND ROOF SLAB ON LAST FLOOR R.C. SLAB

SAFETY: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
FOR WATER SUPPLY

PLUMBING: 1/2 IN C.G. PLANKS AND JOIST SYSTEM PLANKS CONCRETE  
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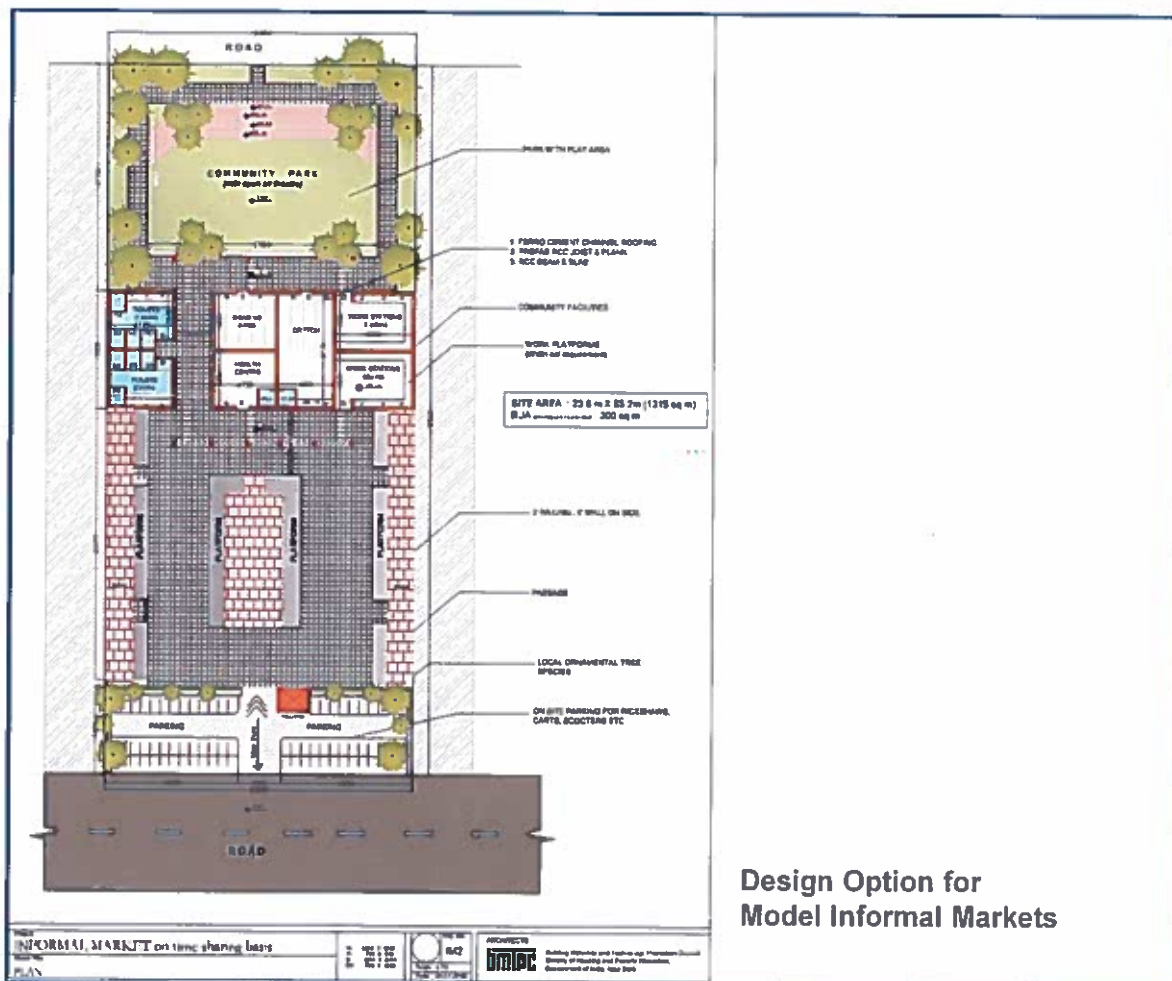
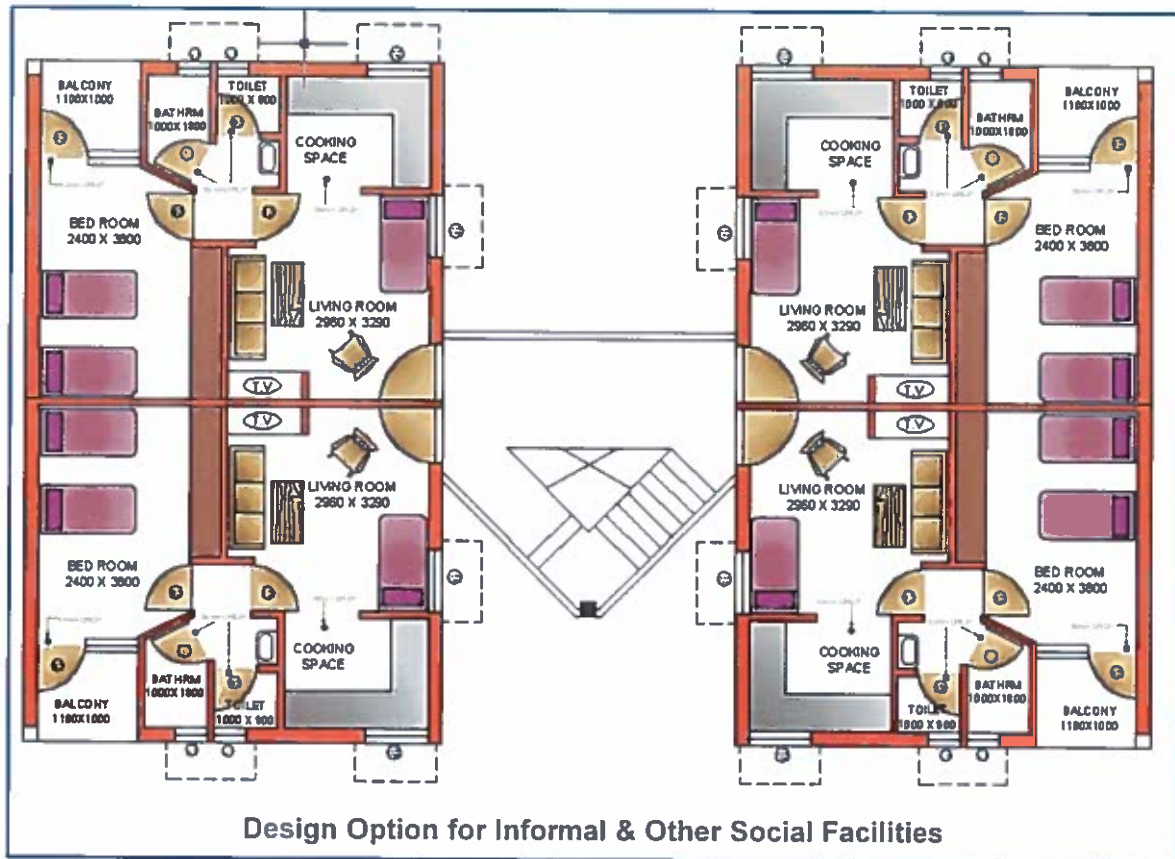
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## Templates for Low Cost Housing – One of the Options









(JNNURM) by way of appraising the Detailed Project Reports (DPRs) received from various State Governments. In order to improve the quality of the DPRs, the Council developed well designed options of various components of DPRs particularly based on the observations of Project Sanctioning Committee of JNNURM. These components along with some of its features are enumerated below;

- **Internal house design;** Ensuring privacy for occupants of both rooms, adequate lighting and ventilation, etc
- **Layout of cluster housing;** ensuring social cohesion, common green area (CGA) for the occupants, common walls etc.
- **Neighborhood colony layouts** controlled entry/ exit to the colony, restricted vehicular movement along arterial road, etc.
- **Provision of separate informal sector market and livelihood centre** distinguishing between production and selling activities and based on socio economic survey of beneficiaries.
- **Community Centre** having provision of multi purpose hall, crèche, health centre etc.
- **Infrastructure promoting physical fitness;** ensuring 15% organized green area, jogging tracks, tree guards etc.

The design options prepared by the Council were included as standardized designs in the Booklet published by JNNURM Directorate entitled "**Habitat for Urban Poor: the Design Perspective – Inclusive Planning & Architecture**". The design options also recommend use of innovative and low cost building technologies to ensure eco-friendly habitat and cost effectiveness. The standardized designs of the booklet have been used extensively by State Government Agencies while formulating new DPRs.

## **II. DISASTER MITIGATION - REPAIR, RECONSTRUCTION AND RETROFITTING**

### **1. Retrofitting of MCD School Buildings in Delhi**

In its efforts to demonstrate the retrofitting techniques for seismic strengthening, the Council undertook the project of retrofitting of MCD school buildings in Delhi so that the awareness could be generated among the people as well as various government agencies about the need and techniques of retrofitting. In the series of seismic strengthening and retrofitting of MCD School buildings in Delhi, retrofitting of following 4 more MCD School Buildings were carried out successfully during the year:

- Rana Pratap Bagh (Civil Lines Zone),
- Ramesh Nagar, No. 1, Girls (West Zone),
- Ahata Thakur Dass, Girls (Karol Bagh Zone)
- Ram Nagar Bhawan (Sadar Paharganj Zone)

The retrofitting work was done based on Indian Standard "IS 13935:1993 Repair and Seismic Strengthening of Buildings – Guidelines", under the overall guidance of expert members in the field.

The experience on these buildings would help people at large and the policy makers in working towards reducing the vulnerability of lakhs of existing buildings through retrofitting of public and private buildings, thus protecting most number of people in case of future earthquakes.

## **2. Training Programme for Field Engineers of Municipal Corporation of Delhi (MCD)**

During the course of retrofitting work in MCD schools, it was felt appropriate to organize training programme for Field Engineers on the need and techniques of seismic retrofitting of masonry buildings. Accordingly, a Training Programme for Field Engineers of MCD was organized on "Retrofitting of Masonry Buildings - Theory & Practice", in association with Municipal Corporation of Delhi on August, 18, 2007, at Town Hall, MCD, Delhi.

The Training Programme was attended by about 250 MCD Engineers of all levels. Presentations were made by the experts on theoretical and practical aspects of assessment and Retrofitting of Masonry Buildings for improving Earthquake Resistance and Vulnerability Atlas of India.

## **3. CD Version of the Vulnerability Atlas of India – First Revision (2006)**

The 2006 version of Vulnerability Atlas of India, published by the Council, provides latest information on degree of Vulnerability of existing housing stock in the country, as per Census 2001 data against natural hazards i.e. earthquake, wind & cyclone and flood. The latest hazard maps, based on information from the concerned agencies, have been drawn first time in a digitized form in the Vulnerability Atlas of India. It is being used as a valuable tool to understand the damage scenario and vulnerability of existing housing stock in a particular region so as to draw exhaustive pro-active disaster management plan by central, state and district administration.





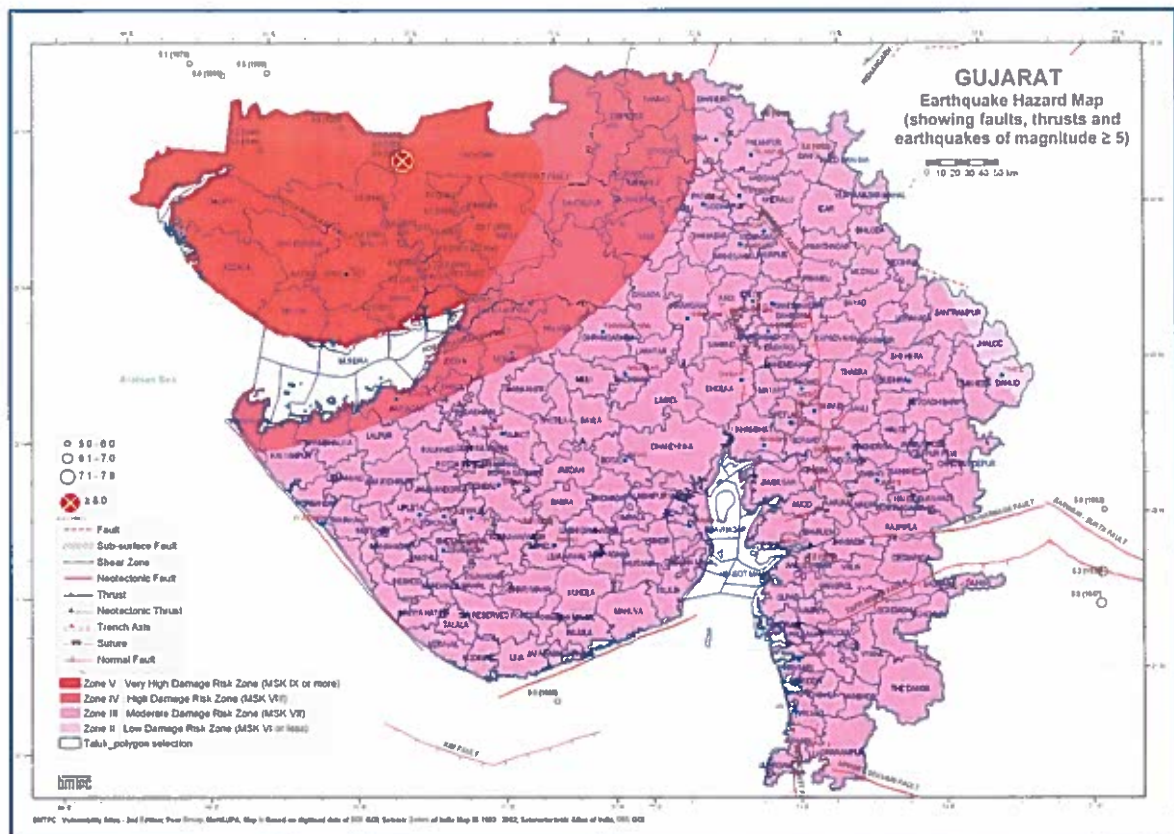
**MCD School Buildings retrofitted by BMTPC for seismic strengthening.**



**MCD School Buildings retrofitted by BMTPC for seismic strengthening.**







Model Map prepared for Vulnerability Atlas of States/UTs



Training Programme for Field Engineers on the Need and Techniques of Seismic Retrofitting of Masonry Buildings organised by BMTPC on August, 18, 2007 at Delhi.



The Vulnerability Atlas of India was recognized as "GOOD PRACTICE" amongst the cases received for Best Practices by the UN-HABITAT under Dubai International Awards for the year 2006.

There has always been a demand by users to make Atlas available in soft version for easy reference and use. Therefore, the Council has taken a initiative to prepare CD version of Atlas which will have all the details and can be accessed in an interactive user friendly mode. All the maps of the States with district boundaries will be linked with the respective risk tables. The user can select particular hazard map of a district with associated risk tables. The soft version of the Atlas in CD, will have wider distribution and would be useful for formulating disaster management plans by State and district authorities. This CD, on finalization, will be provided as adjunct to the hard copy of the Atlas for convenience of cross reference.

#### **4. Preparation of State/UT-wise Vulnerability Atlases**

The Council is preparing State/UT-wise Vulnerability Atlases upto Taluka level on the basis of the revised digitized Atlas of India. Taluka-wise risk tables are under preparation. Survey of India has been approached to provide digitized boundary data for making hazard maps. The new State/UT-wise Atlases are being prepared in digitized format with the following contents:

- Taluka level data of existing housing data for Risk Tables - Distribution of Houses by Predominant Materials of Roof and Wall and level of Damage
- Hazard Maps on 1:2 million scale with administrative boundary upto taluka level
- List of Earthquakes occurred in and around the State/UT
- List of Cyclones occurred in coastal parts of India
- List of Talukas of the State with Latitude and Longitude for easy reference
- Chapter on State-specific hazard scenario & action points.

The Draft of the State Atlas for Gujarat has been prepared which will serve as a model for preparation of Atlases for rest of the country. It is under active consideration of the Peer Group.

**5. Technical Workshop on Amendment in Town & Country Planning Act, Zoning Regulations, Development & Control Regulations and Building Regulations – sponsored by MHA**

The Council has been organizing a series of one-day Technical Workshops on Model Amendments in Town and Country Planning Act, Zoning Regulation, Development & Control Regulation and Building Regulation for safety against natural hazards, as a joint activity with the Ministry of Home Affairs so as to help the States/UTs revise their Bye-laws, Acts vis-à-vis Provisions given in Model Byelaws prepared by the Expert Committee set up by the Ministry of Home Affairs. During the year BMTPC organized workshops in the following States:

- a. Chandigarh, June 7, 2007
- b. Srinagar, Jammu and Kashmir, June 13, 2007

Officials from various state Govt. departments including engineers and architects attended these workshops. Some of the State Governments have initiated actions to modify their respective bye-laws on the basis of specific modifications suggested. By March 2008, the Council had organized technical workshops in 17 States and UT's.

**6. Technical Support to National Disaster Management Authority**

The Council is actively associating with the National Disaster Management Authority for strengthening the capacity of the country in disaster management and prevention.

A presentation on revised Vulnerability Atlas of India was made before the Vice Chairman and other Members of National Disaster Management Authority. It was subsequently also presented during two days National Workshop on "Science and Technology in Disaster Management, Earthquake Landslide and Tsunami" organized by NDMA.

Two sets of display panels on four Hazard Maps viz. earthquake, wind & cyclone, flood and landslides have been provided on request to NDMA. On their request, BMTPC also prepared proforma for collection of data for vulnerability and risk assessment for their consideration.

The Council was represented as Core Group Member set up for Preparation of Guidelines for Tsunami Mitigation by NDMA. The Council also prepared list of multi-hazard districts alongwith sample maps for consideration of Steering Committee of NDMA.





**Technical Workshop on Model Amendments in Town & Country Planning Act, Zoning Regulations, Development Control Regulations/Byelaws organised by BMTPC on June 7, 2007, Chandigarh**



**Distribution of Posters and Booklets on retrofitting techniques for Jammu & Kashmir in English and Urdu languages in villages and remote areas of Uri and Tangdhar for wider dissemination of such techniques amongst the masses.**



## **7. BMTPC's Initiatives after Earthquake in J&K**

After the earthquake of magnitude 7.6 (Richter Scale) struck on 8<sup>th</sup> October, 2005 with epicenter located at Muzzafarabad in Pakistan, just near the LOC, only 140 km from Srinagar, the Council undertook various activities in the earthquake affected area including preparation of a set of 10 posters describing techniques of retrofitting and booklet titled "Simple ways to Earthquake Safety" for earthquake resistant construction of houses using local materials in Jammu & Kashmir region, both in Urdu and English language.

More than 1000 Booklets on retrofitting techniques to be adopted in Jammu & Kashmir in English and Urdu languages were distributed in villages and remote areas of Uri and Tangdhar for wider dissemination of such techniques amongst the masses.

## **III. ACTIVITIES IN NORTH-EASTERN REGION**

### **1. Important Activities in North-Eastern Region to Promote Use of Local Resources and Disaster Resistant Construction Practices**

Apart from construction of demonstration structures in the North Eastern Region using bamboo based technologies, the Council is actively involved in developing bamboo based technologies and to promote these technologies in the North-Eastern Region and other bamboo growing areas. The Council initiatives includes setting up of Bamboo Mat Production Centres for processing of bamboo, encouraging commercial production of bamboo based products, construction of demonstration houses and providing training to the local artisans in processing of bamboo.

#### ***Construction of Demonstration Structures using Bamboo based Technologies***

The Council is constructing two demonstration structures using bamboo based technologies in Kohima, Nagaland through Nagaland Bamboo Development Agency, Government of Nagaland. The work upto plinth level has been completed in both the buildings.

The Council has also undertaken a project for construction of following demonstration structures in Shillong, Meghalaya:

- a. Bamboo Demonstration Structure at Indian Army Holiday Home, Eastern Command Shillong (250 sq.ft.)



- b. Multipurpose Facilitation Centre at Sri Aurobindo Art & Cultural Institute Shillong (3200 sq.ft.)
- c. Eco-Bamboo Cottage at Barapani Lake, Shillong (800 sq.ft.)

The State nodal agencies have been requested to provide suitable land for construction of these structures.

***Establishment of Bamboo Mat Production Centres under 10% provision of North Eastern States***

BMTPC, in cooperation with Cane & Bamboo Technology Centre (CBTC), Guwahati and State Governments, is establishing two Bamboo Mat Production Centres each in the States of Assam, Tripura, Mizoram and Meghalaya. The main objectives of Bamboo Mat Production Centres are to provide uninterrupted supply of bamboo mats to the manufacturing units of bamboo based building components for increasing the productivity, quality, to provide training in mat production process and to create employment opportunities in the North Eastern region.

In the first phase, the Council is setting up Bamboo Mat Product Centres (BMPC) at Kowaifung, Tripura; Sairang and Bualpui, Mizoram and Sokhar Nongtluh Village, Meghalaya.

The Council has earlier completed establishment of Bamboo Mat Production Centres at Kowaifung (Tripura), Sairang (Mizoram). During the year, the Council has established one more Centre at Bualpui (Mizoram) and the Centre at Sohkar Nongtluh, Meghalaya is in advanced stage of establishment. The Council has also initiated the process of establishment of 4 more Bamboo Mat Production Centres in Assam (2 nos.), Tripura (1 no.) and Meghalaya (1 no.) in 2<sup>nd</sup> phase.

The Council in cooperation with CBTC is also providing training on bamboo mat production to the artisans from each Bamboo Mat Production Centres.

***Establishment of Technology Demonstration cum Production Centre***

The Council is also establishing a Demonstration-cum-Production Centre for promoting cost effective innovative building materials near Agartala for which State Govt. has provided the land. The Office building, Cement Store, Boundary Wall, Toilet for Labour, Security Room, Machine Shed, Water Storage Tank, Raw Material Stacking Yard and Platform for egg laying machine have already been completed. The machines are being installed shortly.



**Bamboo Mat Production Centre established by BMTPC at Sairang, Mizoram.**



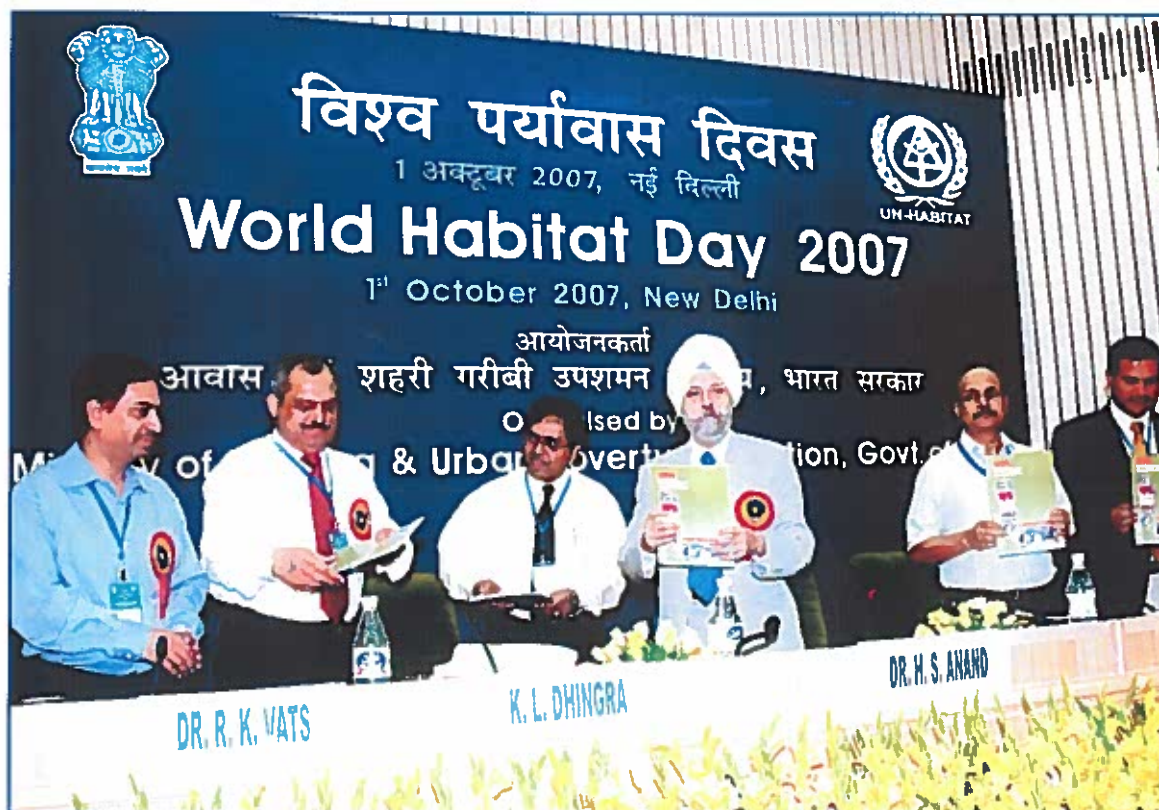
**Bamboo Mat Production Centre established by BMTPC at Bualpui, Mizoram.**







Training Programme on "Modern Bamboo Structures and Housing" at Kaziranga, Assam from 6- 8 March, 2008



Dr. Harjit S. Anand, Secretary, MoHUPA releasing the "Building Materials News - A safe city is a just city" brought out by BMTPC on the occasion of World Habitat Day 2007.



### ***Establishment of Bamboo Mat Production Centre in Arunachal Pradesh***

The Council has initiated a project for establishment of Bamboo Mat Production Centre in Arunachal Pradesh. The State Government of Arunachal Pradesh has identified the site at Mopaya Village and has agreed to provide shed and infrastructure facility for the Centre. The Centre will be managed by the village community who are using bamboo for livelihood and establishment of such a Centre will enhance their livelihood income from value addition through simple mechanization and processing at various levels.

### ***Five Days Residential Training Programme on "Modern Bamboo Structures and Housing"***

The Council in collaboration with Cane & Bamboo Technology Centre (CBTC), Guwahati organized a three days Residential Training Programme on "Modern Bamboo Structures and Housing" at IORA, Kohra, Kaziranga from 6-8 March, 2008. Bamboo, the Green Gold not only has the potential for generating sustainable income & livelihood for the rural and urban poor but also bears lot of significance in construction of affordable and durable bamboo housing. Moreover, Bamboo is an ideal construction material for earth quake prone areas like N.E. Region due to its high tensile strength. The main objective of organizing this training programme was to provide technical know how on the use of the Bamboo Technology as a whole and particularly in the housing sector as well as in varied structural applications. The programme was attended by 32 participants consisting of Civil Engineers, Architects, Builders, Consultants, Entrepreneurs, NGOs etc. from N.E. India and neighboring country Nepal. The programme was inaugurated by Hon'ble Member, North Eastern Council.

## **IV. STRENGTHENING THE INFORMATION AND DATABASE IN THE CONSTRUCTION SECTOR**

### **1. Publication of the Special Issue of Newsletter on the theme "A Safe City is a Just City" on the occasion of World Habitat Day, 2007**

Like previous years, a Special Issue of Building Materials News was brought out by the Council on the theme of the World Habitat Day "A Safe City is a Just City". The Building Materials News was released by Dr.H.S.Anand, Secretary, Ministry of Housing and Urban Poverty Alleviation, on the occasion of the World Habitat Day on 1 October, 2007 at New Delhi. The publication contains articles on different



aspects related to the theme. This publication has been very widely circulated to all those interested in the subject.

## **2. Preparation of Booklet titled” Disaster Prevention and Mitigation – Major Initiatives of BMTPC”**

One of the objectives of the Council is to develop and promote methodologies and technologies for natural disaster mitigation, vulnerability and risk reduction and retrofitting/reconstruction of buildings and disaster resistant design and planning practices in human settlements. The Council’ efforts has gained the status of knowledge centre in the field of disaster prevention and mitigation. In order to disseminate the information about the various activities undertaken by the Council in this area, a booklet titled “Disaster Prevention and Mitigation – Major Initiatives by BMTPC was brought out. The booklet gives insights of the various activities such as preparation of Atlases, Earthquake Tips, capacity building programmes, Retrofitting work and other initiatives.

## **3. Information Dissemination through Website of the Council**

The Website of the Council ([www.bmtpc.org](http://www.bmtpc.org)) is being visited by professionals of various disciplines globally. It is being used as a reference source in the area of innovative building materials and construction technologies. The amount of traffic received and queries received by users to various contents of our website is enormous. Further the publications which are available on the website are frequently being downloaded. The website receives average hits of 1.5 lakhs per month (900 hits/hr, 6700 hits/day).

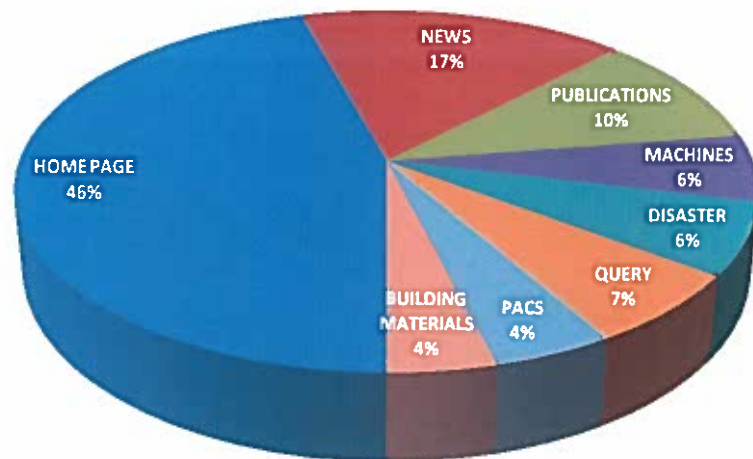
### ***Visitor analysis***



***Following are the some countries, which have shown interest in Council's website and its contents :***

USA, United Kingdom, United Arab Emirates, Trinidad and Tobago, Tanzania, Singapore, Philippines, Pakistan, New Zealand, Netherlands, Mexico, Malaysia, Japan, Italy, Indonesia, Greece, Germany, France, Denmark, Canada, Brazil, Belgium, Australia and Yugoslavia.

### ***Analysis of visits to various sections of bmtpc.org***



The website of the Council is regularly updated to effect latest information such as hire and purchase requirements, Tender Notices, training programmes, Right to Information Act and others as required from time to time.

On seeing the impressive response on website in the form of general enquiry about product and services, now a section called compendium of technologies for common man is being developed. This section will have the details and usage of different building materials & construction technologies, including disaster resistant construction.

#### **4. Standardization and Product Evaluation**

##### ***Performance Appraisal Certification Scheme (PACS)***

The Council is implementing a Third Party Assessment Scheme namely Performance Appraisal Certification Scheme (PACS) for providing Performance Appraisal Certificate to manufacturers/suppliers/installers of a product which includes building materials, products, components, elements, systems etc. after due process of assessment.

During the period of reporting, a various companies/ manufacturers have applied and shown their interest for procuring the Performance Appraisal Certificate under the Scheme for a number of products.

M/s Sintex Industries Ltd. had submitted detailed application forms for Performance Appraisal Certification for following items:

1. Doors (Five types – Endura, Formura, Flush, PVC Profile, Frontura)
2. Under Ground Septic Tank

3. Under Ground Water storage tank
4. Plastocrete Panels

The inspection team visited their works at Kalol (Gujarat) and collected samples for all items which were sent for testing at the following laboratories:

1. IPIRTI, Bangalore
2. CIPET, Chennai
3. CBRI, Roorkee

Testing reports from M/s CIPET, Chennai and CBRI have been received. However, results from IPIRTI for five types of doors are awaited. After receiving the test reports, brief for certification of the product would be prepared for circulation among the technical expert group for suggestions/ comments and after incorporation of the facts, it will be put up to the TAC for approval.

On the detailed application form received from M/s Riya Enterprises and inspection of the works done by BMTPC at Gujarat, the test result of the samples of Finger Jointed Solid Wooden Door from IPIRTI, Bangalore were received and Draft for certification of PACS for Finger Jointed Solid Wooden doors were prepared and circulated to the group of experts for comments before meeting of the Technical Assessment Committee (TAC). The certification for Finger Jointed Solid Wooden Door would be awarded after consideration of TAC.

Preliminary applications have been received for Doors, HDPE Cover Blocks, Heat Proof Terrace Tiles, Polymerised Wetmix Self Coating Material, Dispersable Polymer Powder, etc.

#### ***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 Building Lime and Gypsum Products; Cement and Concrete; Construction management; Flooring, Wall Furnishing and Roofing Materials; Earthquake Engineering; Housing Prefabricated Construction; Hill Area Development; etc.

#### **5. Revision of Book titled "Standards & Specifications for Cost-effective Building Materials and Components"**

The scarcity, frequent non-availability, constantly rising costs of building materials and declining quality of housing

construction have been causing concern to Central and State Governments. Despite a number of innovative energy efficient and low cost building materials and construction techniques developed by R&D institutions, these technologies have not been adopted in common construction practice. Lack of standards and specifications has been generally mentioned as the main factor coming in the way of wide scale adoption of these innovative technologies.

BMTPC took up the task of formulating specifications on identified cost-effective building materials, components and construction techniques which have potential for large scale adoption and bringing down the cost of housing and building construction. The Council published a book titled "Standards and Specifications for Cost-Effective Innovative Building Materials and Techniques" in 1996. Several of these items were not so far covered by Indian standards and codes of practice. After the specifications were formulated by BMTPC, formulation of Indian standards and codes was taken up by the Sectional Committee CED 51 of the Bureau of Indian Standards (BIS). The CPWD has also incorporated majority of these items in their schedules of specifications.

As few more building components and technologies were developed during the period, the Council has revised the book on "Standards and Specifications on Cost Effective Building Materials and Technologies". The book now also includes analysis of rates for these technologies.

#### **6. Preparation of Techno-economic Feasibility Reports on various Technologies**

The Council has been promoting innovative construction materials & technologies to encourage the entrepreneurs to set up their manufacturing units in the past. The Council has also embarked upon the field level application of innovative building materials and technologies. Under the Action Plan for the year 2007-08 of the Council was structured in such a manner that it not only focuses on the various operational areas of the Council but also leads to the tangible results with societal benefits by way of providing technological options on Disaster Mitigation, Technical Services, Networking of Technology Transfer, Technology Development, Standardization and Product Evaluation. To propagate knowledge on innovative cost effective and disaster resistant technologies being promoted by BMTPC, it was felt necessary to generate awareness among Entrepreneurs, Building Centres etc. who may like to establish manufacturing unit on such technologies for their application at the local level. To begin with, the Council

short-listed few technologies for developing techno-economic feasibility report.

The Council jointly with Jamia Millia Islamia University, Delhi and Indian Plywood Industries Research & Training Institute (IPIRTI), Bangalore prepared "Techno Economic Feasibility Reports" on following items:

- i. Concrete Hollow & Solid Block.
- ii. Flyash Lime Bonded Brick
- iii. Flyash brick
- iv. Rubber-wood Door Shutters
- v. Mosaic Tiles using Industrial Wastes.
- vi. Bamboo Mat Corrugated Roofing sheets
- vii. Bamboo Mat Ridge Cap.
- viii. Cement based Bamboo Composite Walling System.

The Council is in the process of publishing a few reports for possible dissemination and commercialization of these technologies.

## **V. PROMOTIONAL AND CAPACITY BUILDING ACTIVITIES AT NATIONAL AND INTERNATIONAL LEVEL**

### **1. International Workshop on "Emerging Trends in the Cost-effective Housing technologies" at Bangalore**

BMTPC in cooperation with International Centre for Advancement of Manufacturing Technologies, (ICAMT-UNIDO) Bangalore organized a three day International Workshop on "Emerging Trends in the Cost Effective Housing Technologies", from 23-25<sup>th</sup> May 2007, at Bangalore, Karnataka.

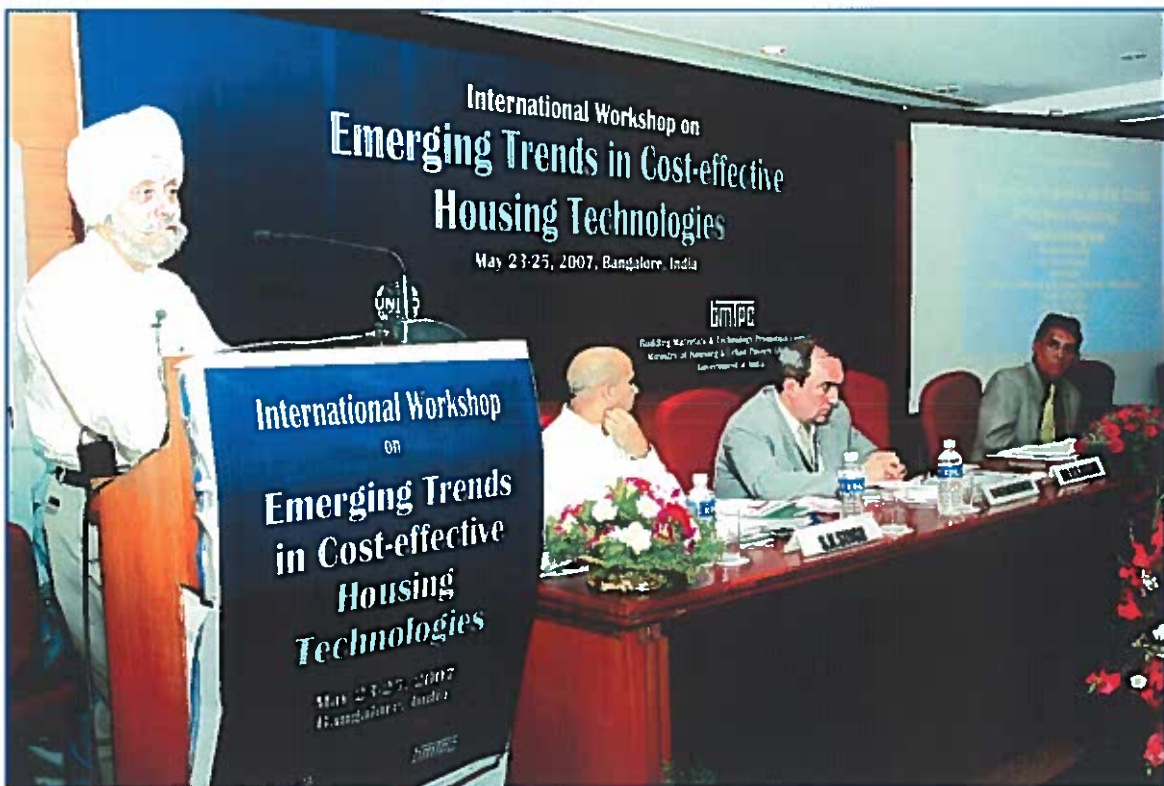
The event was attended by 61 delegates from Sri Lanka, Bhutan, Maldives, Nepal, China, U.K. besides India comprising of policy-makers, professionals, experts, scientists, entrepreneurs, etc. in the field of Housing and Building Technologies.

The Address of the Hon'ble Minister of HUPA was read out by Shri S.K. Singh, Joint Secretary (Housing), MoHUPA. The Workshop was inaugurated by Shri D.T. Jayakumar, Hon'ble Minister of Housing, Govt. of Karnataka. Dr. H.S. Anand, Secretary (HUPA) delivered the Keynote Address which set the agenda for the deliberations for three days International workshop. Shri S.K. Singh, Jt. Secretary gave the Welcome Address and presented a broad overview of the Workshop. Dr. P.K. Mohanty, Joint Secretary (JNNURM), MoHUPA, Shri Subir Hari Singh, Principal Secretary (Housing), Govt. of Karnataka and Shri Ashok,





**International Workshop on "Emerging Trends in the Cost Effective Housing Technologies", 23-25 May 2007, Bangalore, Karnataka.**



**Dr. Harjit S. Anand, Secretary, MoHUPA delivering the keynote address during the International Workshop on "Emerging Trends in the Cost Effective Housing Technologies", 23-25 May 2007, Bangalore, Karnataka.**







**Kumari Selja, Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation delivering the inaugural address during the "Roundtable Meeting on Innovations in Building Technologies" on 21 August 2007 at New Delhi**



**Shri S.K.Singh, Joint Secretary (Housing), MoHUPA, addressing the gathering during the International Technology Workshop on "Innovations in Cost-Effective Construction Technologies" with specific focus on appropriate and affordable housing technologies on 27-28 December 2007 at Patna, Bihar.**



Commissioner, KSCB also attended the Inaugural Session of the Workshop.

On this occasion, an exhibition on innovative technologies was also organized and delegates showed keen interest in the Indian technologies.

## **2. Round Table Meeting on “Innovations in Building Technologies” at New Delhi**

BMTPC is working for promotion and transfer of new innovative building materials and technologies from lab to field. Since its inception, the Council has built up close relation with CSIR labs and related institutions. With the challenge of fulfilling the need of shelter for all, specially for economically weaker section of the society and those below poverty line and protecting environment from global warming and green house effect, it was felt that to take stock of the innovations going on at R&D stage with different institutions, the Council should organise a “Round Table Meeting on Innovations in Building Technologies”, The meeting was organised on 21<sup>st</sup> August 2007 at New Delhi.

The meeting was inaugurated by Kumari Selja, Hon'ble Minister of State (Independent Charge) for HUPA. The Keynote Address was delivered by Dr. H.S.Anand, Secretary (HUPA) and Shri S.K. Singh, Jt. Secretary (H) also addressed the august gathering. The meeting was attended by representatives of 24 institutions comprising different R&D institutions, private sector organizations etc. Day long meeting covered various aspects of innovations in building materials sector. Based on the meeting, recommendations were framed for planning of BMTPC's future Action Plan.

## **3. International Technology Workshop on “Innovative Cost-effective Construction Technologies” at Patna**

BMTPC in cooperation with International Centre for Advancement of Manufacturing Technologies (ICAMT-UNIDO) organized two days International Technology Workshop on “Innovations in Cost-Effective Construction Technologies” with specific focus on appropriate and affordable housing technologies on 27-28th December 2007 at Patna, Bihar, India.

The Workshop was inaugurated by the Shri S.K. Singh, Joint Secretary (Housing), Ministry of Housing & Urban Poverty Alleviation. This workshop focused on the various

cost-effective, environment friendly and alternative building materials and housing technologies.

The two days programme was attended by more than 100 delegates and was addressed by eminent national and international experts, technologists and product manufacturers. Representatives from Bhutan and Canada also participated in the International Workshop.

On this occasion, an exhibition on innovative technologies was also organized. About 10 Agencies exhibited various alternative building products & housing technologies which provided a perfect opportunity to the participants, users, technocrats, architects, policy-makers on the latest innovations in cost-effective construction technologies.

#### **4. Setting up of Community Mat Weaving Centre at Nattinampilly, Kerala**

The Council is undertaking a project for setting up of a Community Bamboo Mat Weaving Centre at Nattinampilly, Wayandu, a backward and tribal district in the State of Kerala, with Kerala State Bamboo Corporation, a Govt. of Kerala Undertaking. The land and infrastructure has been provided by the Kerala State Bamboo Corporation and order for procurement of machines have been placed with the manufacturer.

#### **5. Establishment of Technology Demonstration cum Production Centre in GyclozHING, Mongar, Bhutan**

As reported earlier, a Memorandum of Understanding was signed between the Secretary, Ministry of Urban Employment & Poverty Alleviation, GOI and the Secretary, Ministry of Works & Human Settlement, Govt. of Bhutan for establishing a Technology Demonstration cum Production Centre in GyclozHING, District Mongar, Bhutan with the technical assistance from BMTPC. The establishment of Technology Demonstration cum Production Centre is envisaged to fulfill the demand of the cost effective and innovative building materials in the housing and building sector in Bhutan. The nodal agency for operationalising the Centre in Bhutan is Standards and Quality Control Authority (SQCA) under the Ministry of Works & Human Settlements, Royal Government of Bhutan. In this connection, following machines were finalized for establishment of Centre in close collaboration with the SQCA:

1. RCC Door/Window Frames making Machine with Ventilator and Extra Mould
2. RCC Plank Casting machine to Cast four Planks at a time with Extra Mould
3. RCC Joist Making Machines with Extra Mould

4. Solid/Hollow Concrete Block making machine
5. Bi-Directional Vibro Press for making bricks, blocks and pavers.
6. Accessories & Tools for above

The machines have been fabricated and will be dispatched shortly. It is also proposed to conduct hands-on Training Programme for the local technicians and supervisors, to be identified by Govt. of Bhutan, for operation of the machines for manufacturing of building components. The Training Programme will be jointly organized by SQCA and BMTPC wherein experts from BMTPC will participate after the installation of the machines at the Centre in Bhutan.

**6. Preliminary Preparation for Organization of International Exhibitions cum Seminars on Innovative Building Materials & Construction Technologies for Sustainable Housing in Africa**

The Council received a request from High Commissioner of Mozambique in India to organize International Exhibition cum Workshop on Innovative Housing Technologies in Maputo, Mozambique. The matter was placed before the Ministry of Housing & Urban Poverty Alleviation and Ministry of External Affairs. The Ministry of External Affairs intimated that the Indian Missions in Ethiopia, Tanzania, Zambia, Botswana, besides Mozambique have evinced keen interest in holding such event in their respective countries.

Keeping in view the requests received from the Indian High Commission in respective countries, the Ministry of Housing & Urban Poverty Alleviation designated BMTPC as a nodal agency for organization of International Exhibitions cum Seminars in the following countries, which have been planned to be organized in the month of April, 2008:

1. Mozambique
2. Botswana
3. Zambia
4. Tanzania
5. Ethiopia

Necessary preliminary preparations have been undertaken to put up exhibition depicting various innovative building materials, disaster resistant construction technologies, utilization of agro-industrial wastes in production of building materials, demonstration housing projects implemented by Council and the initiatives of the Council at international level. The necessary brochures, reading-materials, publications, display panels and samples have been prepared.

One day seminar at each locations is envisaged to highlight policy level initiatives of Govt. of India for Housing Sector,



as also presentations on innovative building materials, disaster resistant constructions technologies, and case studies of the demonstration housing projects.

The Indian High Commissioners in Ethiopia, Tanzania, Zambia, Botswana and Mozambique have been requested to identify and nominate a local nodal agency in the respective countries who can be contacted for logistic & other requirement for organizing such prestigious events.

Meanwhile, a Concept Note on areas of cooperation between India and Africa in housing and human settlements have been prepared by the Council for consideration by the Government of India.

#### **7. Establishment of Permanent Display Centre of Cost-effective Technologies in different parts of country**

The cost effective building materials and housing technologies is the subject of continuous interest for the researcher, technologists, scientists and users. Increasing demand of traditional building materials such as stone, steel, wood, bricks and cement and over use of natural resources for development and production of these traditional building materials has resulted in the environmental imbalances. On the other side the awareness about the various health hazards due to increasing industrial wastes and shortage of land for dumping of these waste materials has resulted in the development and promotion of various cost effective waste based building materials and technologies. In last few decades, large number of building materials and technologies has been developed by the various researchers and research institutions/organizations at laboratory level. Out of it, large number of building materials and technologies were commercialized and transferred to land and also adopted in various housing projects. BMTPC has played an important role for development and promotion of these cost effective waste based building materials and technologies at various levels. The Council with the support of technical experts has also published large number of technical documents for disaster resistant building materials and technologies.

In spite of very sincere efforts by promoting and implementing agencies including BMTPC, actively working in the area of building materials and housing technologies, these building materials and technologies are not adopted and utilized in various housing projects and schemes, as it was expected. The main reasons for non-adoption of these technologies are less awareness about these technologies among implementing agencies, practicing engineers, budding engineers and users. To fulfill these gaps and to



**Community Mat Weaving Centre being established at Nattinampilly, Kerala**



**Training Programme for Construction Workforce at Srinagar, Garhwal from 12-18 August, 2007.**



disseminate the knowledge about the cost effective and waste based building materials and technologies all over the India, the Council is establishing Permanent Display Centres (PDC) in different parts of the country. These PDC act as a knowledge resource centre and disseminate the knowledge by organization of seminars, training courses and field studies for the students, engineers, architects and academicians to share the research and development in the area of cost effective building materials and technologies. BMTPC has already established such PDCs at BVB College of Engineering & Technology, Hubli, Karnataka, Centre for Planning & Technology, Ahmedabad, Gujarat, During the year, Permanent Display Centres were established at Samrat Ashok Technological Institute, Vidisha, Madhya Pradesh and School of Planning & Architecture, New Delhi.

## **8. Capacity Building Programmes**

With the emergence of new building materials, advancement of technologies and the need for disaster resistant construction to mitigate the effect of natural disasters, it is important that working professionals regularly update their knowledge and understanding of subjects and hands-on training is provided to the construction workforce. BMTPC has continued its efforts in organizing structured training programmes on subjects related to advancement in the area of building materials for working professionals and construction workforce on regular basis. Brief on the Training Programme organized during the year are as follows:

### ***Training Programme for Capacity Building of 30 Masons from Rural Areas near Raipur, Chhatisgarh***

The Council organized a Training Programme for capacity building of masons from rural areas jointly with Nirman Vikas Anushandhan Sansthan, Raipur near Raipur, Chhatisgarh from 23<sup>rd</sup> March to 22<sup>nd</sup> April, 2007. Thirty masons from rural areas participated in the training programme. This training programme was in two parts:

#### Indoor training

25 working days training at the Building Centre, which involve theory, demo and basic work training using actual building materials. A training kit having note book, pencil and printed leaflets in the language was provided to the trainees.

#### Actual onsite experience

Trainees were placed under the supervision of a master trainer in a batch of 6 masons each. Trainees were sent to various construction sites of NGO and different activities

were assigned to the trainees to develop their skills. Constant monitoring and quality check were exercised by the site engineers of the NGO.

The focus of training programme will be on the following topics:

- Good construction practices
- Reinforcements in building
- Various types of cement mortars
- Walling options
- RCC work, lintel and shuttering
- Ferro-Cement products
- RCC filler slab

***Five Days Training Programme on Disaster Resistant and Quality Construction Practices at Village Kerala, Ahmedabad, Gujarat***

In continuation of the BMTPC's efforts for dissemination of information and technologies for disaster resistant construction, the Council organized a five days Training Programme for Masons on Disaster Resistant and Quality Construction Practices was organized by BMTPC jointly with Kesarjan Building Center at Village Kerala, Ahmedabad from 8<sup>th</sup> to 12<sup>th</sup> March 2008.

The primary objective the training programme was:

- i. To work towards skill upgradation and specialized trainings of the workers and artisans engaged in construction industry with emphasize on safe (Disaster Resistant) and cost effective, environment friendly technologies.
- ii. With a focus on technology transfer and skill upgradation, we develop available and new technical materials in vernacular languages, (both for engineers and masons).
- iii. To work on livelihood support and enterprise development in construction industry.

18 masons were selected from the nearby area (Taluka Bavala) and given detailed theory and practical sessions. The main objective of the programme was not to give them the basic training on masonry work but to refine their skills for disaster resistant construction.

Main contents of the Programme were as follows:

- Why Structure Fails?
- Understanding Earthquake and Tsunami – Why and how they occur?
- Understanding the language of Drawing i.e. Plan / Elevation and Section
- Lay out and Site selection



- Excavation and Foundation PCC
- Various types of Masonry units and quality check
- First Aid and Basic Health Training
- Understanding Cement and various binding materials
- Making of mortar and Concrete
- Basic of Formwork
- Basics of Reinforcement and role of reinforcement in RCC
- Reinforcement Detailing for DRCP
- Aspects of Rate analysis and construction management
- Retrofitting – An overview
- Cube testing

***Three Days Training Programme for Construction Workers on Innovative Techniques at Jaipur***

A three day Training Programme from 22<sup>nd</sup> – 24<sup>th</sup> September 2007 for 30 construction workers on Innovative Techniques was organized jointly by BMTPC and Awas Vikas Ltd. Jaipur. The Training Programme was inaugurated by Jt. Secretary (Housing), Ministry of Housing & Urban Poverty Alleviation. Theoretical and practical training sessions were organized for production of various walling, roofing and flooring building components.

***Seven Days Training Programme for Construction Workforce at Srinagar, Garhwal***

The Council jointly with Uttarakhand Building Centre organized a 7-days training programme for construction workforce at Srinagar, Garhwal from 12-18 August, 2007 wherein 20 masons were imparted training on use of low cost housing technologies and hands-on training on various machines for production of pre-fab components.

***Training Programme on “Codal Practices on Earthquake Resistant Design and Construction”***

In the series of Short Term Training Courses with IIT Roorkee, a Training Programme on “Codal Practices on Earthquake Resistant Design and Construction” was organized from December 6-8, 2007 at New Delhi. The delegates included representatives from prestigious Organizations like CPWD, NTPC, NHPC, State PWDs, etc. The sub-theme covered during the Training Programme were:

- Historical Development of Codes on Earthquake Resistant Design
- Construction practices in India

- Philosophy and Principles of Earthquake Resistant Design and Construction
- Earthquake Resistant Design of Structures, IS:1893(Part 1): 2002
- Earthquake Resistance Measures in Masonry Buildings; IS: 4326, IS 13828
- Performance of R.C. buildings during earthquakes
- Ductility Provision for Better Seismic Performance; IS: 13920: 1993
- Earthquake Resistant Design of Steel Frame Buildings
- Seismic Analysis and Design of a Multi-storeyed Buildings
- Liquid Retaining Structures
- Industrial Structures Including Stack-Like Structures: IS: 1893 (Part 4): 2005
- Repair and Seismic Strengthening of Buildings, IS: 13935: 1993
- Future Codal Developments.

***Training Programmes on “Retrofitting of Buildings and their Foundation-Slope System in Earthquake and Landslide Prone Areas”***

The Council organized a Crash Training Programme on “Retrofitting of Buildings and their Foundation-Slope System in Earthquake and Landslide Prone Areas” jointly with Vellore Institute of Technology (VIT), Vellore from 8-10 October, 2007. Prof. N.V.C Menon, Hon’ble Member, NDMA, GOI inaugurated the three day Training Programme. 35 professionals and M.Tech. students participated in the programme.

Another Training Programme on “Retrofitting of Buildings and their Foundation-Slope Systems in Earthquake and Landslide” was also organized in New Delhi jointly with VIT Vellore from 28-30 November, 2007. About 15 professionals participated in the programme. The objectives of the Training Programme were to:

1. Train middle level professional civil, structural, geotechnical and construction engineers, and architects and builders in scientific approaches to retrofitting of buildings and their foundation-slope systems in earthquake and landslide prone areas, as a matter of urgency.
2. Promote the culture of training and retraining by the example of a state-of-the-art training programme on retrofitting of buildings in earthquake prone hilly areas, sensitive to integration of slope-foundation-super structure concerns in design engineering.



**Training Programme on Disaster Resistant and Quality Construction Practices for Construction Workforce at Village Kerala, Ahmedabad, Gujarat from 8-12 March, 2008**



**Two-weeks Entrepreneurship Development Programme in the field of low cost housing technologies at Gorakhpur, U.P.**







**Training Programme on "Retrofitting of Buildings and their Foundation-Slope Systems in Earthquake and Landslide Prone Areas" from 8-10 October, 2007 at Vellore, Tamil Nadu**



**Training Programme on "Retrofitting of Buildings and their Foundation-Slope Systems in Earthquake and Landslide" from 28-30 November, 2007 at New Delhi**







**Shri S.K.Singh, Joint Secretary (Housing), MoHUPA addressing the participants during Training Programme on “Codal Practices on Earthquake Resistant Design and Construction” from December 6-8, 2007 at New Delhi.**



**Training Programme on “Codal Practices on Earthquake Resistant Design and Construction” from December 6-8, 2007 at New Delhi.**



#### Novel Features of the Training Programme:

- Training fashioned to highlight live problems and case records of earthquakes and landslides towards safety of buildings and slopes in the hilly areas
- Emphasis on multi-disciplinary and composite approach to investigation, analyses, design and retrofitting of buildings in earthquake prone hilly areas.
- In-depth treatment of uncertainties in investigation, diagnosis, design and construction with added emphasis on landslides, slope engineering and site effects.
- Familiarization with latest equipment, techniques and procedures for mapping of earthquake and landslide hazards and assessment of vulnerability and risk.
- Familiarization with advanced methods of condition assessment and retrofitting buildings and foundations.
- Techniques of Slope Strengthening
- Management including cost-effectiveness of retrofitting programmes.

#### **9. Two-weeks Entrepreneurship Development Programme in the field of low cost housing technologies at Gorakhpur, U.P.**

BMTPC in collaboration with Entrepreneurship Development Institute (EDI), Lucknow organized Two-weeks Entrepreneurship Development Programme in the field of low cost housing technologies at Gorakhpur, U.P. from 10<sup>th</sup> March 2008 onwards. This programme was organized with a view to inculcate spirit of entrepreneurship in the unemployed youth of the Gorakhpur region and to expose them to the available opportunities in the field of manufacturing of various precast building components for application in the housing and building sector.

The programme was inaugurated by Joint Secretary (Housing), Ministry of Housing & Urban Poverty Alleviation, Govt. of India. 30 participants attended the Training Programme. The event was widely covered by the local media.

#### **10. Setting up of a “Demonstration and Training Incubation Centre for Mechanized Bamboo Mat Production – A National Facility” at the Composites Technology Park, Bangalore**

The Council undertook a project for establishment of a Demonstration & Training Incubation Centre for Mechanised Bamboo Mat Production at the Composites Technology Park, Bangalore, jointly with Society for Development of Composites (SDC), Bangalore with the main objective of

providing demonstration, training, incubation and other facilities to potential industries so as to enable them to set up their own industries for large scale production and supply of quality bamboo mats to meet the increasing demands of the bamboo manufacturing industries. This Centre will function as a national facility and initiate all necessary activities to promote bamboo technology and applications in the country. The Centre will perform following functions:

1. Study and evaluation of suitable bamboo species among the various species available in India for final selection and use in the mechanized bamboo mat production centers;
2. Study and evaluation of mechanized techniques for harvesting of bamboo, cutting of bamboo, trimming and cleaning of bamboo surface growths, such as, siblings, thorns, rings etc., cutting of bamboo culms into standard lengths for convenient transportation to the production units;
3. Identification, evaluation, selection, purchase and installation of suitable bamboo machinery of Indian and Chinese origin for automated processing, weaving and production of quality bamboo mats;
4. Carrying out various experimental operations, namely, cross cutting, splitting of bamboo, knot removal, trimming of edges, making strips of required thickness and sizes so as to evolve and arrive at uniform and standardized processes and techniques for demonstration and training purposes;
5. Study and evaluation of suitable techniques for slicing of bamboo strips into thin uniform slivers for weaving high quality bamboo mats, conforming to standard technical specifications;
6. Standardization, Testing & Quality Control of bamboo strips, slivers and bamboo mats.
7. Preparation of Detailed Project Report (DPR).

All the required machinery and necessary tools have been installed at the Centre.

#### **11. Painting Competition on the occasion of World Habitat Day 2007**

To mark the occasion of World Habitat Day, BMTPC organized Painting Competition for Differently Abled Children. More than 250 children from 13 schools under 3 different categories namely Mentally Challenged, Visually Impaired and Hearing Impaired, participated in this competition. The best paintings were awarded cash prize and certificates during the celebration of World Habitat Day on October 1, 2007, by Dr.H.S.Anand, Secretary, Ministry of Housing & Urban Poverty Alleviation, distributed prizes to winners of the competition.





**Dr. Harjit S. Anand, Secretary, MoHUPA giving away the prizes to the award winners of Painting Competition for Differently Abled Children organised by BMTPC during World Habitat Day 2007.**



**Exhibition of Winning Entries of Painting Competition for Differently Abled Children organised by BMTPC during World Habitat Day 2007.**



## **12. Visit of Foreign Delegations to BMTPC**

A 3-member delegation from Mozambique visited BMTPC on 2.4.2007 to have discussion on the Technical Cooperation in the field of Low Cost Housing. A detailed presentation on the multi-faceted activities of BMTPC was made before the visiting delegation.

A delegation from Higher Polytechnic Institute of Manica, Mozambique visited BMTPC for exploring the possibilities of mutual cooperation in the area of low cost housing, disaster preparedness and capacity building.

Detailed discussions were held with the Nepalese Delegation on April 30, 2007 for Technical Cooperation in the field of low cost housing, organized by NCHF.

Mr. Kassu Yilala, Hon'ble Minister, Ministry of Works and Urban Development, Federal Democratic Republic of Ethiopia visited the Council. A visit to the housing projects for industrial workers in Delhi was also organized on 31st May 2007. The Hon'ble Minister showed keen interest in the Indian low cost housing technologies.

## **13. Participation in India International Trade Fair, 2007, Pragati Maidan, New Delhi from 14-27 November 2007**

Like earlier years, BMTPC participated in Techmart pavilions during India International Trade Fair (IITF) from 14-27 November, 2007. BMTPC stalls in Techmart 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. Large number of foreign delegations also visited BMTPC stall.

## **14. Visit of Parliamentary Standing Committees on Urban Development**

The Parliamentary Standing Committee on Urban Development visited Ahmedabad, Surat and Daman to review the activities undertaken by BMTPC in these cities and review implementation of various centrally sponsored schemes during 27<sup>th</sup> June-2<sup>nd</sup> July, 2007.

Attended On-the-Spot Study visit of the Standing Committee on Urban Development to Bhubaneshwar, Puri, Chennai & Visakhapatnam with other agencies from 6th to 11th February 2008.

## **15. Comprehensive Guidelines for Green Habitat**

The Council is preparing Guidelines for Green Habitat under the guidance of Task Force constituted by the Ministry of Housing & Urban Poverty Alleviation, Govt. of India for formulation of Guidelines for Green Habitat.

Four Meetings of Technical Group set up by the Task Force have been held during the period. Matrixes of various components of Green Habitat Guidelines have been prepared.

The overall aim of Guidelines for Green Habitat (GGH) would be to act as a tool for each stakeholder through better or new practices that must be adopted in order to realize these goals and achieve a higher degree of collaboration necessary to reach the targeted sustainable performance objectives. The Guidelines for Green Habitat would aim to instruct and facilitate input from public agency executives and staff; implementing agencies and elected officials; architects and engineers; contractors; building managers; and the public at large. The Guidelines would relate to and build upon the existing standards and codes and the buildings rating systems.

## **16. Production of Video Film on Demonstration Construction Projects**

The Council has successfully completed a number of demonstration housing project for field level application of cost-effective, energy efficient and environment friendly building materials and construction technologies. In order to replicate the success of the projects, the Council has prepared a video film titled "Asha aur Ashray" having duration of 11 minutes. The objective of the video films is to feature the demonstration projects executed or being executed by BMTPC covering application of innovative, cost-effective, energy efficient and environment friendly building materials and technologies in order to garner large-scale public interest and promote fairly good understanding of the Council. This film would be used at various exhibition/trade fairs, public functions and national and international Road Shows.

## **VI. TECHNOLOGY DEVELOPMENT, DIFFUSION AND TRANSFER**

### **1. Development of Floor/Wall Tiles and Pavers from Granite Slurry**

The Council partnering with Andhra Pradesh Technology Development and Promotion Centre has developed granite slurry blended floor tiles and paver blocks from granite industry waste. The products have been developed after conducting field experiments by substituting sand with

granite slurry. The samples of granite slurry based tiles & blocks have been tested with encouraging results. Presently entrepreneurs are being identified for transfer of technology.

India is endowed with one of the best granite deposit in the world having excellent varieties comprising over 200 shades. India accounts for over 20% of the world resources in granite. Granite reserves in India have now been estimated by Indian Bureau of mines at over 42,916 million cubic metres. Varieties of granites are available in the state of Karnataka, Andhra Pradesh, Tamil Nadu and Uttar Pradesh.

Karnataka State boasts of good deposits of Granite and has been in the forefront in meeting the in-house demands of our country as well as export of unfinished and polished granite as well. There are more than 1000 granite processing industries in small scale sector apart from about 500 Nos. of medium and large scale industries spread over various districts. Major granite processing units are located in Mysore, Tumkur Bellary, Hospet, Hikal, Hassan, Mangalore and Udupi regions. However, these units are also generating large quantity of granite slurry. The disposal and utilization of this waste is an ever increasing problem for the Granite Industries all over the India.

In order to develop a value added product utilizing Granite slurry waste, BMTPC has undertaken a project on Gainful Utilization of Granite Slurry jointly with Andhra Pradesh Technology Development Centre (APTDC), Hyderabad. The technology has been developed for production of cement based floor tiles/wall tiles/pavers blocks from granite slurry. The products were also tested as per Indian Standards and found comparable to the other conventional flooring and walling building materials.

BMTPC and APTDC have jointly filed a patent application on the developed technology in June 2008. Now, the Council along with APTDC has identified a Granite industry cluster having 600 small units for cutting and polishing of Granite and also producing slurry as waste in Ongole district of Andhra Pradesh. One of the industries in this cluster has shown interest towards providing land and infrastructure for setting up a demonstration unit. This demonstration unit will be starting point for dissemination and training on the technology among the other Granite waste producing industries in this district.

## **2. Development of Technology for Construction of Two Storeyed Bamboo Housing System**

The main objectives of the project were to develop an architectural design of a two-storey house with bamboo;



design and development of various housing components including jointing system from bamboo to construct two-storey building and develop technology for construction of the two storey house with components.

Design and development of the two-storeyed bamboo house 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.

### **3. Development of Bamboo Mat Ridge Cap for Roofing with Bamboo Mat Corrugated Sheets**

The Council, earlier, developed and commercialized a technology for manufacture of Bamboo Mat Corrugated Sheets (BMCS). One such unit in Meghalaya is presently manufacturing BMCS. Since use of BMCS have already started in the housing activities as roofing material, it has become very much necessary to develop Ridge cap for covering the top/comers of roof made out of BMCS. The objectives of the project were to design and development of appropriate profile and size for Ridge Cap to be produced with BMB out of Bamboo Mats; Fabrication of suitable dies which are to be fixed to a Hydraulic hot press of platen size 1450 mm X 650 mm; Trial runs to produce the Ridge Cap and to carry out improvements and modifications if necessary and Testing and performance evaluation.

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 of has 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.

### **4. Development of Prefabricated Modular Houses using Bamboo based Composites**

BMTPC undertook a project to develop the application of bamboo composite building materials in prefabricated houses alongwith their advantages over the conventional materials. These types of houses can be constructed quite quickly for immediate and long term rehabilitation for post disaster relief.

The project on Design and Development of pre-fabricated modular housing system using bamboo and bamboo based composites has been completed. A model design of pre-fab double walled bamboo composite house attached bath and kitchen having size 20' x 24' x 8' was developed. This



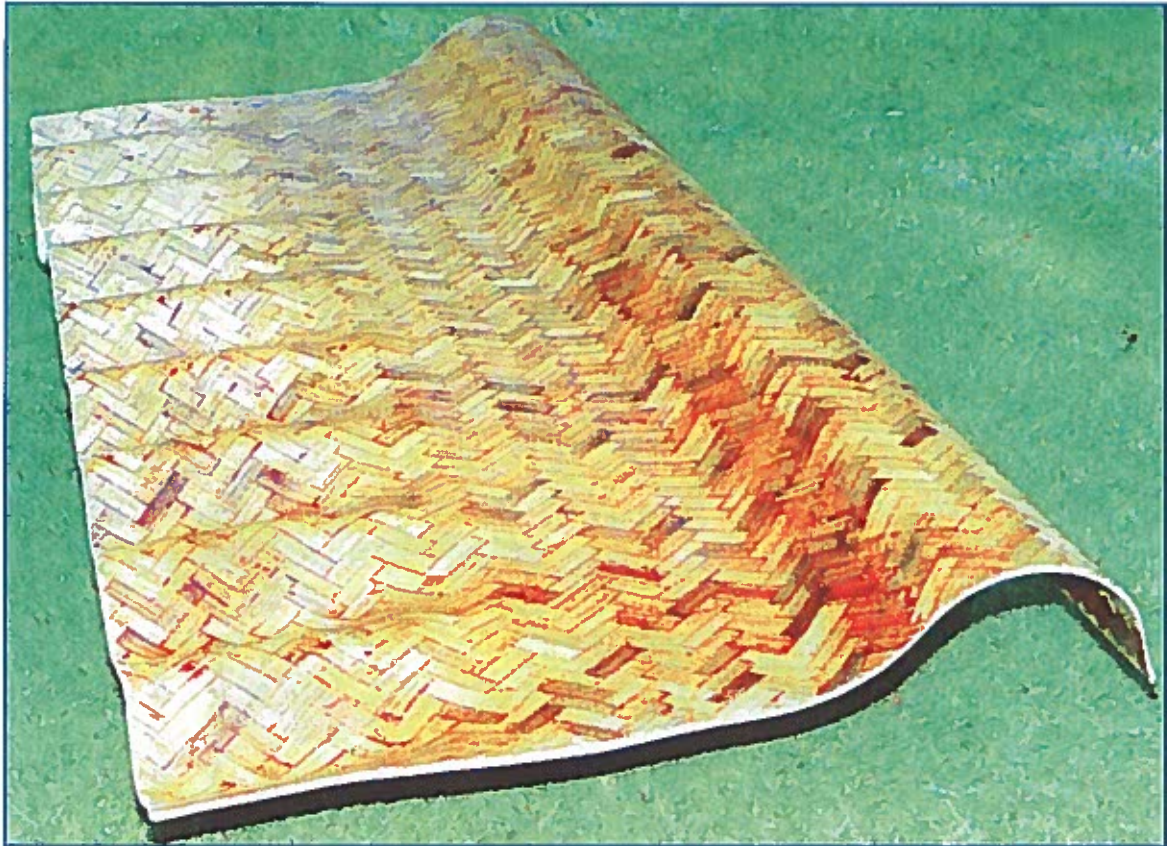
**Development of Floor/Wall Tiles and Pavers from Granite Slurry**



**BMTPC developed a Technology for construction of two storey bamboo housing system at IPIRTI Bangalore.**







**Development of Bamboo Mat Ridge Cap for Roofing  
with Bamboo Mats**



**BMTPC designed and developed a pre-fabricated modular housing system using  
bamboo and bamboo based composites at IPIRTI Bangalore.**





system will enable application of bamboo composite building materials in pre-fabricated houses.

#### **5. Development of Technology for Utilization of Marble Slurry in Self Compacting Concrete**

Marble reserves in India are estimated at twelve hundred million tones with Rajasthan accounting for ninety one percent of the reserves. A significant amount of this valuable mineral resource gets wasted due to non-upgradation of technology in mining, processing and polishing. The processing waste is normally being dumped on the low lying areas, which is threatening the porosity of aquifer zones. A substantive quantity of waste is generated in the marble industry in various forms. Marble Rock waste, Marble Slurry and Dust, Polishing Slurry are the main form of Marble waste generation. Disposal and utilization of marble dust is one of the major problem of this industry.

In order to provide a environment friendly solution for marble slurry utilization a project was undertaken jointly with IIT Delhi for utilization of marble slurry in self compacting concrete. Marble Powder was used in self compacting concrete as fine filler. Two different approaches were adopted. In first fly ash was replaced upto 20% by volume with marble and secondly sand was replaced by marble powder. The preliminary results show that:

1. Dry marble powder should not be used as marble powder absorbs water form concrete and affects workability and strength. Marble powder should be soaked in water for at least 24 hours in water.
2. Flowability (Workability) decreases with addition of marble powder replacing fly ash.
3. Segregation Resistance of self compacting concrete increased with marble powder on replacing fly ash. This was due to the fact that marble powder being heavier increases the density of mortar.
4. Slight decrease in strength (upto 3 MPa) was observed when fly ash was replaced with marble powder. Over all not much change in strength was observed.
5. Cohesiveness and Viscosity of the concrete increased with addition of marble powder.
6. Flow increased when marble powder was added in partial replacement of sand upto 20%.
7. Segregation index decreased with higher percentage of marble powder. Marble powder upto 10% is recommended limit of replacing sand. Above this segregation resistance decreases drastically.
8. Passability (V-funnel) of self compacting concrete increased when sand was replaced by marble

- powder.
9. Strength of SCC was observed to decrease by 5MPa max.

## **6. Evaluation of Monolithic Construction Technology**

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 judiciously 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 the experts.

## **7. Upgradation of Machines for Production of Precast Building Components**

In order to enhance the production capacity, efficiency, durability, etc. the Council has upgraded following machines:

### ***Precast RCC Plank Casting Machine***

Increased the production capacity of the machine to 4 planks per cycle from the current 2 planks per cycle. The design has also been changed to solve the problem of leakage of slurry during the production process.

### ***Precast RCC Joist Casting Machine***

The machine has been upgraded for production of Tapered Joists in addition to plane RCC Joists produced by the machine earlier. The de-moulding process in the machine has also been improved.

### ***Precast Door/Window Frame Machine***

The machine is now capable of producing ventilator frames

in addition to concrete door/window frames made by the machine earlier.

In addition to the above, all the machines have stronger frames, new rubber mouldings and overall better fittings and finish.

#### **8. Development of Flattened Bamboo Composites and Laminated Bamboo Lumber Products**

In the year 2006-07, the Council undertook a project for development of Flattened Bamboo Composites and Laminated Bamboo Lumber Products jointly with IPIRTI Bangalore with the objectives of Optimization of processing parameters viz. machinery, preservation & drying parameters for making flattened bamboo; Development of suitable adhesive system for bonding flattened bamboo and bamboo mats; Standardization of process parameters for the manufacture of flattened bamboo boards; Standardization of process parameters for the manufacture of laminated bamboo lumber; Evaluation of strength properties; and Study on the suitability of the products developed as a housing component.

The process parameters for manufacture of flattened bamboo composites have studied at the laboratory level. The equipment required for the above are being procured. The flattened bamboo board will be an alternative to the existing Bamboo Mat Boards and Bamboo Mat Veneer Composite for structural applications. Lumber would find a place as a substitute for high quality timber now being used for structural purposes. Also wherever laminated veneer lumbers are being used, they can be replaced by bamboo lumber. Bamboo lumber would be cheaper than the class I timber used for structural purpose and that of veneer lumbers.

#### **9. Fiscal Incentives**

In order to improve the investment climate for production of cost-effective, eco-friendly and energy efficient building materials based on agro-industrial wastes, the Department of Revenue, Govt. of India was persuaded through the Ministry of Housing & Urban Poverty Alleviation for providing fiscal incentives like excise duty and custom duty exemptions for several items. Based on the recommendations of BMTPC the following Excise and Custom duty concessions/exemptions have been granted in the Union Budget for the year 2008-09. These concessions have greatly helped wide scale commercialization of innovative material technologies developed in India and abroad.

- Goods in which more than 25% by weight of Red mud or Press mud or blast furnace slag or all is used
- Good in which not less than 25% by weight flyash or phosphogypsum or both is used,
- Ready Mixed Concrete,
- Clay bricks other than fire-clay bricks
- Sand Lime bricks
- Roofing tiles
- Burnt clay tiles
- Good Manufactured at the site of construction of building for use at such site
- Cement bonded Particle Boards
- Jute Particle Board
- Rice Husk Board
- Glass Fibre Reinforced Gypsum Board
- Sisal Fibre Board
- Baggage Board

The above incentives particularly granted at the Central Government level has created a confidence amongst the entrepreneurs and investors at the national level. This has further given a boost to higher investments for setting up production units of new materials in different states.

## **VII. JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION (JNNURM)**

### **1. BMTPC's Role in Implementation of JNNURM**

The Ministry of Housing & Urban Poverty Alleviation, Govt. of India, is implementing Basic Services to Urban Poor (BSUP), sub-component of recently launched Jawaharlal Nehru National Urban Renewal Mission (JNNURM).

#### ***Appraisal of DPRs***

BMTPC has been involved in JNNURM – Basic Services to Urban Poor (BSUP) sub component right from the beginning as an Appraisal Agency. During the year, twenty three number of Central Sanctioning & Maintaining Committee (CSMC) meeting took place to consider the sanction of Detailed Project Reports under BSUP. Total 46 numbers of proposals from 13 States appraised by BMTPC were sanctioned in these meetings. The proposals were worth 2513.48 crores having Govt of India (GoI) share of 1221.52 crores & covered 97121 DUs. The state wise break up of these projects are as follows:

<b>State</b>	<b>No. of Projects</b>
Andhra Pradesh	4
Bihar	9

Delhi	9
Gujarat	3
Himachal Pradesh	1
Karnataka	2
Madhya Pradesh	1
Meghalaya	2
Mizoram	2
Punjab	2
J&K	2
Sikkim	1
Tripura	1
Uttarakhand	4
Uttar Pradesh	3
Total	46

The Council also appraised 5 Integrated Housing & Slum Development Programme (IHSDP) proposals received from Mizoram (1 no.), Manipur (2 nos.) and Uttarakhand (2). The proposals were worth 30.63 crores with Gol share of 21.49 crores and covered 1834 DUs.

The appraisal activity also included framing of Administrative & Technical Check lists, DPR Preparation formats etc and extensive discussion/ interaction with State Govt. Officials on regular basis to ensure that the DPRs submitted were in compliance with Mission Guideline.

### ***Monitoring of Projects***

The Council has also been designated as Monitoring Agency for undertaking monitoring of projects under BSUP and IHSDP. An Agreement has been entered in this regard between JNNURM Directorate, M/oHUPA, Gol with the Council on 14<sup>th</sup> December, 2007. The scope of the services to be provided by the Council includes setting up a separate Monitoring Cell comprising of professionals from various streams, analysis of Quarterly Progress Report submitted by State Agencies, actual physical inspection of project sites and monitoring of the reforms being undertaken at State and ULB level.

### ***Capacity Building under JNNURM***

In order to improve the quality of DPR being received by the Ministry and to address to various project implementation issues, the Council's activity included organizing Capacity building programmes for State & Municipal Officials on various topics as preparation of DPR, Project management, Quality control of projects, etc.

The Council has actively taken part in the capacity building programmes organized by the Ministry of Housing & Urban



Poverty Alleviation for the capacity building of the municipal functionaries in preparation of DPRs for the BSUP and IHSDP projects. In addition, representatives of the Council regularly participated as resource persons in various workshops and programmes organized at State level and at designated resource institutions like YASHDA Pune, CGG Hyderabad etc. Presentations were made at following programmes:

- 7-8 May, 2007 at Amritsar
- 18-19 June, 2007 at Shimla
- 13-14 July, 2007 at Patna
- 3-4 August, 2007 at Guwahati
- 8 August, 2007 at Pune
- 17-18 August, 2007 at Haridwar
- 10-11 Sept., 2007 at Lucknow.
- 1-2 November, 2007 at Dehradun
- 22 January, 2008 at New Delhi
- 20-21 February, 2008 at Kolkata
- 28-29 March, 2008 at Pune.

Towards improvement in the quality of the DPR, the Council developed various well designed options of unit plan, cluster layout, neighbourhood colony lay out, community centre, informal market centre, livelihood centre etc. These standardized designs formed part of a Booklet published by JNNURM Directorate namely "Habitat for Urban Poor: The Design Perspective – Inclusive Planning & Architecture". These options have been used extensively by State Agencies while formulating new DPRs.

For generating JNNURM projects from Bihar, participated in the Ministry's visit to Bihar. A presentation was made on the preparation of DPRs under BSUP projects of JNNURM and also discussions were held with the Chief Secretary of the State.

Visited Chandigarh and had detailed discussions with the Govt. of Punjab for BSUP projects in the mission cities of Ludhiana and Amritsar. Various intricacies involved in the preparation of DPRs were deliberated in detail with Chief Town Planner, Govt. of Punjab, Chief Engineer JNNURM Cell and other senior officers of the LSG department of the Govt. of Punjab.

Assisted in preparation of DPR of Kanpur under BSUP, JNNURM. Site visits were also made by the BMTPC in Ludhiana and Surat in connection with JNNURM projects.

Visited Chandigarh alongwith Secretary (HUPA) on 24-25th September 2007 to discuss the preparation and submission of BSUP and IHSDP projects under JNNURM with the

Government of Punjab, Chandigarh.

The Council, with the support of Ministry of Housing & Urban Poverty Alleviation, organized a one day Workshop in Haridwar (U.P.) on 18.8.2007 on various aspects of DPRs under BSUP of JNNURM.. The workshop was attended by about 26 participants from IIT Roorkee, Central Building Research Institute Roorkee, Central Road Research Institute Delhi, NEERI, Sulabh International, HUDCO, NBCC etc.

Visited Srinagar (J&K) with regard to construction of low cost housing project under the Integrated Housing & Slum Dev. Program (IHSDP) of JNNURM convened by Economic Reconstruction Agency, Govt. of J&K at Srinagar.

A visit was made to Aizwal, Mizoram during 24-27<sup>th</sup> October 2007 to discuss the various aspects of preparation of DPR to be submitted under BSUP of JNNURM.

## **VIII. HIGHLIGHTS OF SOME OF THE PROJECTS/STUDIES DURING THE YEAR**

### **1. Estimation of the Demand for Important Construction Materials for the year 2003-2013**

The Council jointly with Construction Industry and Development Council (CIDC) undertook a Study on "Assessment of the Demand of Construction Material in India for the Period 2003-2013". The study was undertaken keeping in view that the construction sector now stands as 2<sup>nd</sup> largest employer next to agriculture employing about 32 million people and plays an important role in nation's Development plan. The implications of ever increasing demand in construction materials are wide & deep affecting the economy as well as other area such as environment, transportation, equipments etc.

The various segments of the industry, major constituents, types of contracts, specific activities in construction work, component of cost in construction etc. have been studied. The segment of the construction industry has been divided into four parts i.e. Infrastructure (Power, Ports, Urban Infrastructure, Airports, Roads and Bridges, Railways), Industrial Construction, Residential Construction and Commercial Construction accounting for 54%, 36%, 5% and 5% of the total construction work respectively. The various components of cost i.e. materials, labour, equipment, financing cost, enabling expenses, overhands and profit for important construction works like residential buildings, roads, bridges, railways etc have been covered under the project.

The turnover of the construction industry based on the consumption of cement of 130 million tons has been computed as 3,50,000 crores for the year 2005. Based on the weightage of various streams of construction i.e. building, road, bridges etc. & weightage of key construction materials for each stream, the construction materials have been estimated. As a finding of the report minimum 10% annual demand of construction materials for a period till 2017 has been projected. The some of the conclusion of the report are as follows:

- The continuous growth in construction industry has already resulted in shortage of key materials such as cement & steel.
- The price is also rising due to supply / demand mismatch.
- The ability to transport increasing amount of construction material will also have to be upgraded

accordingly.

- Following measure have been suggested under the project:
  - Reduce wastage in construction work
  - New & efficient technologies are needed in construction Industry
  - Better design & execution of work that would result in savings in cost
  - Alternate construction materials & technology

As per the study, demand of important construction material for the period 2003-2013 are as follows:

Sl. No	Item	Total 2003 - 2013	Unit
1	Cement	2229.4	million ton
2	A.C.Sheet	2794.5	million sqm
3	Iron & Steel	286.6	million tone
4	Bricks & Tiles	783.0	million 1000no
5	Sand	2625.7	million cum
6	Aggregate	3248.5	million cum
7	Timber	1179.2	million cft
8	Fittings & Fixtures	49650.5	crore Rs
9	Paints	59246.5	crore Rs
10	Earth	13206.2	million cum
11	Bitumen	43.2	billion ton

## 2. Preparation of Geo-Technical Guidelines for Disaster Resistant Structures

The Council has initiated a project for preparation of Geo-Technical Guidelines for Disaster Resistant Structures. Accordingly request for proposals were sent to expert Institutions such as IITs, VIT, Anna University. After scrutiny of the proposals received, the project is being undertaken jointly with Center for Disaster Mitigations & Management, Vellore Institute of Technology. Vellore.

### **Scope of Work:**

The scope of work for preparation of Guidelines is as follows:

- Importance of Geotechnical Studies in disaster prone areas and the price of neglect.
- Lessons from failures of buildings and building foundation in disasters
- Geotechnical considerations in the selection of site – a systematic approach.
- Subsoil Exploration and Geotechnical Investigations for disaster resistant new constructions in different geotechnical situations.
- Subsoil Exploration and Geotechnical Investigations

for existing structures subject to different types of hazards.

- Specialized field and laboratory tests for determination of design parameters and dealing with geotechnical uncertainties. Evaluation of site effects
- Liquefaction and slope failures
- Investigation of Foundation Failures – post mortem studies.
- Geotechnical behaviour and safety assessment of slope-foundation-building systems in landslide prone areas. Behaviour of existing foundations.
- Geotechnical behaviour and safety assessment of slope-foundation-building system in earthquake prone areas
- Factors influencing choice of foundations in different geotechnical situations.
- Observational method of design and construction, instrumentation and early warning.
- Dealing with liquefaction failures-ground improvement.
- Remedial underpinning and strengthening of foundations and foundation slopes.
- A critique on BIS Codes.

***Approach to be followed***

- Constitution of an Expert team of Authors.
- Development and Preparation of high quality illustrations, figures and diagrams.
- State-of-the-art review of literature vis-a-vis current practices and codal provisions.
- Selected Photography of specific sites for illustration.
- Continuous Peer Discussion for quality.

These guidelines will be useful in planning and designing of the housing/infrastructure projects.

### **3. Construction of Model Informal Market at Gumla, Jharkhand**

In view of the specific thrust of the Ministry of HUPA on integrating the community facilities such as community centres, schools, etc. with the overall livelihood issues under the JNNURM projects, the Council prepared two design layouts for Integrated Informal Markets on cost and time sharing basis. While discussing the DPRs with the State Govt. officials, the Government of Jharkhand shown keen interest in construction of a Model Informal Market.

The Deptt. of Urban Development, Govt. of Jharkhand sent a proposal for construction of Model informal market in Gumla, Jharkhand. Construction of demonstration structures is also being emphasized by our Ministry for propagation of technology and also the concept of informal



market and community centers etc. in different parts of the country.

Considering the proposal received from Urban Development Deptt. and recommendation of Project Screening Committee of the Council, the construction of model informal market in Gumla, Jharkhand have been initiated. Gumla Municipal Corporation has identified the suitable land for construction of informal market. The necessary infrastructure such as water supply, electricity and other public amenities required in the premises will be provided by the Gumla Municipal Corporation. Further, it has been informed that the site is surrounded by different colonies like Shantinagar and Jawaharnagar and other adjoining habitable areas covering a population of approx. 40,000 spread over an area of 11.50 sq.km. Many urban slum dwellers as well as inhabitants of nearby villages with hand made petty items, agriculture and forest products involve themselves in trading activities on time sharing basis at different locations near the proposed site and other areas of the city. The market will be a boon for these persons in addition to catering the need of local residents at a centralized place.

Two model designs of informal market earlier approved by the Ministry for JNNURM Projects were sent to Urban Development Department. They were requested to finalize one design based on the local requirements and prepare the detailed estimate based on locally available material and latest schedule of rates. As per the drawings submitted with detailed estimate, State Govt. has finalized design with provision of carts by excluding space for community park.

#### **4. Strengthening the Technological Base of Building Centres**

Strengthening of Technology Demonstration cum Production Units / Building Centre has been a major activity of BMTPC in past years under which many units/centers have been strengthened through assistance in the form of providing machines for production of cost effective building materials and components.

The Building Centers are playing an important role in transferring technologies from lab to land at grass-root level. It is one of the thrust areas of the Council to propagate innovative building materials & technologies so that it reaches to the masses especially in the remote areas of the country.

During the year, the Council strengthened the production base of J&K Building Centre, Srinagar by providing

machineries to widespread the awareness of Precast building components through their Building Centres. Keeping this in view and the active role being played by J&K Building Centre, Srinagar, the Council provided Hydraulic Block making machine with extra mould under its technology strengthening initiatives.

**5. Preparation of Compendium of Cost-effective Technologies for Common Man**

The Council has initiated a project for preparation of Compendium of Cost Effective Technologies for Common Man jointly with Civil Engineering Technology Development Centre, Samart Ashok Technological Institute, Vidisha. This compendium would be made available in the form of a publication in soft and hard copy. The compendium will cover the various options in the area of cost effective building materials and housing technologies.

The main objective of the project is to compile the various technologies developed and commercialized with the help of research and development institute and users agencies. Most of the technologies are available at various institutions but detailed information about the materials, products, specifications and technologies are not available at one place in the booklet form. The main objectives of this work is to compile all the information in the form of compendium in soft and hard form so that it can be uploaded on the Council's web site and publish for the use of common man.

**6. Organisation of Training Workshops on Field Level Applications of Appropriate Building Material & Construction Technologies at Rohtas, Bihar**

The Council is organizing a three days residential Training Workshop on Field Level Applications of Appropriate Building Material & Construction Technologies at Rohtas, Bihar jointly with TMM, Nirmithi Kendra, Indrapuri, District Rohtas, Bihar. The participant for the workshop will be Engineers, Policy makers, Decision makers, Government Officials and Decision Makers. Appropriate & Cost Effective Building Materials and Construction Technologies developed by Indian and International Research Bodies, premier Engineering Colleges and Institutes, and by private individuals like Laurie Baker and Ray Meeker would be explored during the workshop.

The Training Workshop is designed to find ways to tackle the explosive housing problem, rising costs of construction through improved construction techniques, and the application of local materials and local traditional technologies, changes in Schedule of Rates, and the

adoption of Appropriate Building Materials and Construction Technologies by the Public and Private Sector. The Workshop would also aims at promoting information dissemination to the grass root level. The lectures will be delivered by large number of experts in this area and practical training will also be provided. The three days residential Technical Workshop would be organized during the year 2008-09 at TMM, Nirmiti Kendra, Indrapuri, District Rohtas, Bihar.

## **7. Development of Technology for Construction and Demolition Wastes Recycling**

Construction and demolition waste is a significant component of the waste stream and most of the materials involved can be reused or recycled with the minimum of reprocessing. The technology for segregation and recovery of useful materials from demolition waste and its recycling has already been established in other countries, however, in India still lot of work is required to establish this technology for commercial application.

Due to the high weight : volume ratio of construction and demolition materials, there are substantial savings to be made in reusing materials already available on site, rather than transporting virgin materials from a distance. There are, of course, limitations on the reuse of these materials particularly in construction where some performance specifications can only be assured using virgin materials.

In India, most of the big cities are dominated by a large area in which the old buildings are being used by the citizens mostly for residential purpose. Large number of these buildings has completed its life and common man and municipal authority are demolishing and renovating these buildings for construction of new buildings and structures. Most of these buildings in all big cities in India are located in the heart of cities and dumping of debris coming out from the demolished structures is the biggest challenge today for municipal authorities. On the other side, due to large distances transportation of the building materials for construction of new buildings is also an expensive proposition. Therefore, recycling of the debris for generation of the basic building materials and its utilization for development of pre-fabricated building components is one of the options for suitable development. The technology may also be useful for rehabilitation work after occurrence of natural events such as earthquakes.

BMTPC in pursuit of development of debris recycling technology, jointly with CIDCO-YUVA Building Centre (CYBC), Mumbai, has initiated a project for development of

commercial level technology for recycling and utilization of debris for production of building components.

The Council in collaboration with CYBC is at present working on following issues.

- Plant and machinery having capacity to recycle 12 tonnes of debris per day.
- Standardization of the developed technologies and the products manufactured.
- Training Manual for recycling of construction and demolition waste.
- Training programme on the technology for construction workers.

## ORGANISATION

The Chart on the next page shows the organization of different functional units in the establishment of the Council. As on 31<sup>st</sup> March, 2008 BMTPC had a staff strength 45 comprising 20 officers and 25 support staff and technicians/professionals hired on contract.

With the opening of economy and consequent rising investments in industrial sector, building materials and construction industry has also gradually attracted investments both from Indian and foreign entrepreneurs higher than before during recent years. In keeping with the mandate of BMTPC to stimulate and facilitate action at various levels the Council has been learning from the rising demands on its tasks from different segments of users. Such tasks, interalia, include domestic and foreign investment, stimulating information flows and developing support functions and improving infrastructure to meet the changing needs of housing and building construction sector. On the pursuance of the Ministry, draft amendments in Bye-laws, delegation of powers have been proposed along with employees conduct rules and recruitments rules and have been sent to the controlling Ministry for consideration.



# BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL

## ORGANIZATIONAL STRUCTURE

### PRESIDENT

Minister of Housing & Urban Poverty Alleviation

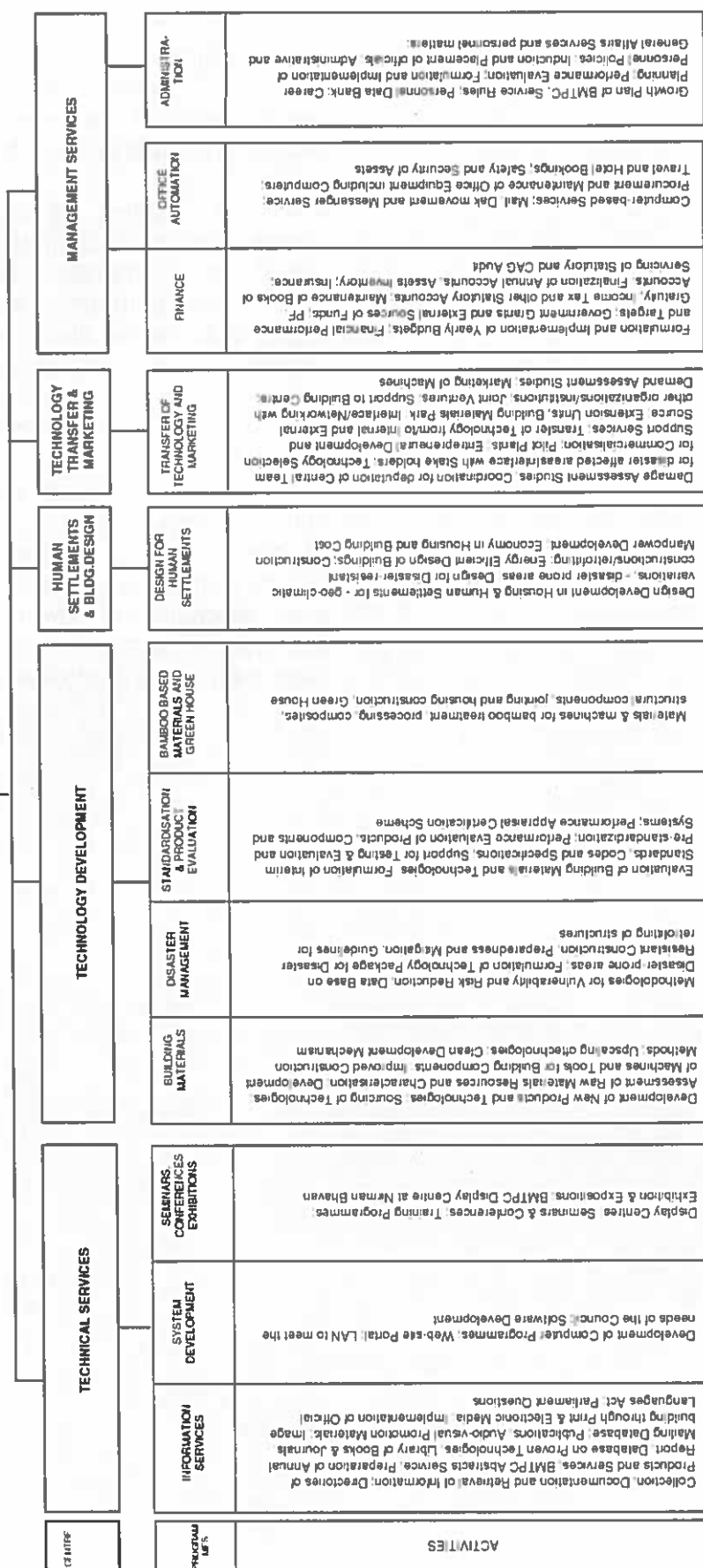
### VICE-PRESIDENTS

Minister of State and Secretary, Ministry of HUPA

### EXECUTIVE COMMITTEE

Chairman : Secretary, Ministry of HUPA

### EXECUTIVE DIRECTOR



**STAFF STRENGTH (as on 31.3.2008)**

<b><u>S.No.</u></b>	<b><u>Name &amp; Designation</u></b>	<b><u>Date of Joining</u></b>
1.	Dr. Shailesh Kr. Agrawal <i>Executive Director</i>	17.01.08
2.	S. Balasrinivasan <i>Chief-Finance</i>	08.04.92
3.	J.K. Prasad <i>Chief-Building Materials</i>	01.09.03
4.	I. J.S. Sidhu <i>Chief-Project Monitoring &amp; Training</i>	16.09.99
5.	S. K. Garg <i>Deputy Chief- Financial Planning (On lien to ICAI)</i>	24.03.92
6.	M. Ramesh Kumar <i>Deputy Chief-Management Information Systems</i>	01 .04.93
7.	Arun Kumar Tiwari <i>Deputy Chief-Standardization &amp; Product Development &amp; Administration</i>	22.07.03
8.	S. K. Gupta <i>Deputy Chief- Technology, Demonstration Extension &amp; International Cooperation</i>	26.10.93
9.	Arvind Kumar <i>Systems Manager</i>	15.04.99
10.	Dr. Amit Rai <i>Development Officer- Building Materials-Product Development</i>	05.11.98
11.	Chandi Nath Jha <i>Development Officer- Building Materials -Product Evaluation</i>	09.09.99
12.	Pankaj Gupta <i>Development Officer- Engineering Design &amp; Performance Evaluation</i>	14.10.99
13.	D. P. Singh <i>Development Officer – Demonstration, Construction &amp; Exhibition</i>	05.10.98
14.	Richpal Singh <i>Personnel Officer</i>	23.02.94
15.	Dalip Kumar <i>Systems Analyst</i>	04.03.91
16.	Alok Bhatnagar <i>Library Officer</i>	05.10.98
17.	Akash Kumar Mathur <i>Field Officer -Product Evaluation</i>	01.01.02
18.	S. M. Malhotra <i>Principal Private Secretary</i>	09.04.99
19.	Anita Kumar <i>Sr. Programmer</i>	03.10.96
20.	M. Krishna Reddy <i>Liason Officer (On deputation to Ministry of Coal)</i>	29.10.03

## ACCOUNTS

The Council received grants of Rs.700.00 Lakhs from Ministry of Housing & Urban Poverty Alleviation. The Council has also brought forwarded project funds to the tune of Rs. 480.57 lakhs from the previous year.

The total expenditure incurred during the period from April, 2007 to March, 2008 was Rs.5,28,86,906 as detailed below:-

Major Heads	Amount (In Rs.)
• Expenditure on Sponsored Studies	19,70,432
• Seminar, Conference, Workshop & Dissemination of Information expenses	52,71,624
• Purchase of Fixed Assets	10,55,220
• Expenditure on Financial Assistance for technology development/application	26,97,131
• Personnel Expenses	1,55,54,552
• Administration and Other Expenses	60,42,412
• Expenditure on construction of demonstration houses under Valmiki Ambedkar Awas Yojana	48,35,253
• Loan & Advances	85,98,685
• Establishment of Bamboo Mat Production Centres in North-Eastern States	16,74,114
• Expenditure on Model amendments in Town & Country Planning Act, Zoning Regulations, Ministry of Home Affairs, JNNURM & others	1891210
• Expenditure for Construction of Demonstration buildings with cost effective technologies & Demonstration-cum-Production Centre in Tripura	32,96,273
<b>TOTAL</b>	<b>5,28,86,906</b>

The Accounts have been audited by M/s M. S. Sekhon & Co., Chartered Accountants, the balance sheet and the statement of accounts of the year 2007-2008 is placed later in the report.

**M. S. SEKHON & CO.**  
CHARTERED ACCOUNTANTS  
170, MADHUVAN,  
DELHI-110092

**AUDITOR'S REPORT**

The Members  
Building Materials & Technology Promotion Council  
NEW DELHI

1. We have audited the annexed Balance Sheet of '**BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL**', a Society Registered under the Societies Registration Act, 1860, as on 31<sup>st</sup> March, 2008 together with the Income and Expenditure Account and Receipts and Payment Account for the year ended on that date. These financial statements are the responsibility of the Council's Management. Our responsibility is to express an opinion on these Financial Statements based on our audit.

We conducted our audit in accordance with the accounting standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

2. We further report that:
- (i) We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit;
  - (ii) In our opinion, proper books of account have been kept by the Council, so far as appears from our examination of the books of the Council;
  - (iii) The Balance Sheet, Income and Expenditure Account and the Receipts and Payment Account dealt with by this report are in agreement with the books of account;
3. In our opinion and to the best of our information and according to the explanations given to us, the said accounts read with the Accounting Policies and Notes forming part thereof give a true and fair view:
- (i) In the case of the Balance Sheet of the State of Affairs of the Council as on 31 March, 2008;
  - (ii) In the case of the Income And Expenditure Account of the excess of Income over Expenditure for the year ended on that date; and
  - (iii) In the case of the Receipts and Payment Account of the receipts and payments made during the year ended on that date.

PLACE: DELHI  
DATED: **20 AUG 2008**



FOR M.S. SEKHON & CO.  
CHARTERED ACCOUNTANTS

  
[RAJIV TANDON]  
PARTNER  
MEMBERSHIP NO. 87343

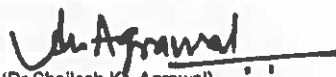


Building Materials & Technology Promotion Council  
Ministry of Housing & Urban Poverty Alleviation, Government of India

**BALANCE SHEET AS ON 31 MARCH 2008**

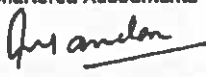
		Amount (Rs.)	
	Schedule	2007-2008	2006-2007
<b><u>CORPUS/CAPITAL FUND AND LIABILITIES</u></b>			
CORPUS/CAPITAL FUND	1	1,000,000	1,000,000
RESERVES AND SURPLUS	2	182,771,018	111,963,369
EARMARKED FUNDS	3	37,997,414	48,056,651
CURRENT LIABILITIES AND PROVISIONS	4	1,350,539	1,403,714
<b>TOTAL</b>		<b>223,118,971</b>	<b>162,423,734</b>
<b><u>ASSETS</u></b>			
FIXED ASSETS	5	41,087,808	41,356,516
CURRENT ASSETS, LOANS, ADVANCES ETC.	6	182,031,163	121,067,218
<b>TOTAL</b>		<b>223,118,971</b>	<b>162,423,734</b>
SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS	15		

S.B. Srinivasan  
(S. Balasrinivasan)  
Chief - Finance

  
(Dr. Shailesh K. Agrawal)  
Executive Director



As per our separate Report attached.  
for M.S. Sekhon & Co.,  
Chartered Accountants

  
(Rajiv Tandon)  
Partner

New Delhi

Date: **20 AUG 2008**

## INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 MARCH 2008

		Amount (Rs.)	
	Schedule	2007-2008	2006-2007
<b>INCOME</b>			
Grants / Subsidies	7	70,000,000	43,000,000
Fees/Subscriptions	8	18,670,829	14,416,838
Income from Royalty, Publication and Machines etc.	9	583,309	4,722,646
Interest Earned	10	13,392,894	6,203,095
<b>TOTAL (A)</b>		<b>102,647,032</b>	<b>68,342,579</b>
<b>EXPENDITURE</b>			
Establishment Expenses	11	15,125,186	14,515,169
Administrative Expenses etc.	12	6,329,995	7,594,526
Expenditure on Training Programmes, Seminars/Workshops etc.	13	5,300,753	10,360,456
Expenditure on Financial Assistance, Sponsored Studies etc.	14	4,692,563	11,845,116
Depreciation	5	1,323,928	1,526,046
<b>TOTAL (B)</b>		<b>32,772,425</b>	<b>45,841,313</b>
Balance being excess of Income over Expenditure (A-B)		69,874,607	22,501,266
Add: Prior period adjustments		933,042	1,828,875
<b>BALANCE BEING SURPLUS CARRIED TO BALANCE SHEET</b>		<b>70,807,649</b>	<b>24,330,141</b>

SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS 15

*S.B. Srinivasan*  
(S. Balasrinivasan)  
Chief - Finance

*Dr. Shailesh Kr. Agrawal*  
(Dr. Shailesh Kr. Agrawal)  
Executive Director

As per our separate Report on the Balance Sheet  
for M.S.Sekhon & Co.,  
Chartered Accountants



*Rajiv Tandon*  
(Rajiv Tandon)  
Partner

New Delhi  
Date : 20 AUG 2008



**RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 MARCH 2008**

Amount (Rs.)

	2007-2008	2006-2007
<b>RECEIPTS</b>		
1 Opening Balance		
Cash Balances in hand (including cheques/drafts and imprest)		
- Cash in hand	18,022	63,259
- Cheques in hand	114,800	132,822
Bank Balances		
With Scheduled Banks:		
- On Current Account with Canara Bank (Parliament Street)	140,656	140,656
- On Deposit Account with Canara Bank	100,126,514	94,488,602
On Savings Accounts:		
- Canara Bank (Parliament Street)	7,762,023	2,102,375
- Canara Bank (Hauzhas)	5,276,061	5,732,681
- Canara Bank, Bangalore	501,541	486,361
- Canara Bank Parliament Street (VAMBAY Project)	1,326,573	2,271,115
- Canara Bank, Tripura	266,485	115,399,853
2 Grants-in-aid from Central Government (Ministry of Housing & Urban Poverty Alleviation)	70,000,000	43,000,000
3 Receipts towards Fees/Subsorption/Consultancy & Training	19,814,077	14,416,838
4 Income from Royalty, Publication etc.	583,309	4,633,726
5 Prior period adjustments	933,042	1,828,875
6 Amount received towards Sale of Machines/Security Deposits etc.	1,016,500	553,372
7 Interest Earned	12,321,890	7,253,855
8 Loan & advances (Net)	-	188,837
<b>Total</b>	<b>220,203,493</b>	<b>177,182,999</b>
<b>PAYMENTS</b>		
1 Purchase of Fixed Assets	1,055,220	412,738
2 Establishment Expenses	15,554,552	14,515,169
3 Administrative Expenses, etc.	8,042,412	7,612,502
4 Expenditure on Training Programmes, Seminars/Workshops, etc.	5,271,824	10,374,476
5 Expenditure on Financial Assistance, Sponsored Studies, etc.	4,667,583	11,645,116
6 Staff Loan & Advances (Net)	8,598,685	-
7 earmarked funds		
Construction of Demonstration Buildings with cost effective technologies and technology Demonstration-cum-Production Centre in Tripura	3,296,273	2,804,139
Establishment of Bamboo Mat Production Centres in North-Eastern States	1,674,114	6,609,839
Construction of Demonstration Houses in Mizoram	-	400,000
Construction of Demonstration Houses Under Vaidiki Ambedkar Awas Yojana	4,835,253	5,377,440
Model amendments in Town and Country Planning Act., Zoning Regulations	229,224	10,034,864
8 Expenditure on other items	1,661,986	16,859,689
9 Closing Balance		
Cash Balances in hand		
- Cash in hand	212,304	18,022
- Cheques in hand	212,304	114,800
Bank Balances		
With Scheduled Banks:		
- On Current Account with Canara Bank (Parliament Street)	-	140,656
- On Deposit Account with Canara Bank	138,626,514	100,126,514
On Savings Accounts:		
- Canara Bank (Parliament Street)	17,566,142	7,762,023
- Canara Bank (Hauzhas)	440,675	5,276,061
- Canara Bank, Tripura	182,125	266,485
- Canara Bank, Bangalore	435,677	501,541
- Canara Bank Parliament Street (VAMBAY Project)	3,657,302	1,326,573
- State Bank Of Hyderabad (Scope Complex)	6,195,848	167,104,283
<b>Total</b>	<b>220,203,493</b>	<b>177,182,999</b>

S.B. Srinivasan  
 (S. Balasrinivasan)  
 Chief - Finance

*(Signature)*  
 (Dr. Shailesh Kr. Agrawal)  
 Executive Director

As per our separate Report on the Balance Sheet  
 for M.S. Sekhon & Co.,  
 Chartered Accountants



*(Signature)*  
 (Rajiv Tandon)  
 Partner

New Delhi  
 Date :

20 AUG 2008

**SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2008**

Amount (Rs.)

SCHEDULE 1- CORPUS/CAPITAL FUND	2007-2008	2006-2007
Balance as at the beginning of the year	1,000,000	1,000,000
<b>TOTAL</b>	<b>1,000,000</b>	<b>1,000,000</b>

SCHEDULE 2- RESERVES AND SURPLUS	2007-2008	2006-2007
<b>1. Capital Reserve</b>		
Opening Balance	78,036,580	77,823,842
Addition during the year	1,075,220	412,738
<b>2. Excess of Income over Expenditure</b>		
Opening Balance	33,926,789	10,009,386
Add: Excess of Income over expenditure transferred from Income and Expenditure Account	70,807,649	24,330,141
Less: Transferred to Capital Reserve	104,734,438	34,339,527
	1,075,220	412,738
<b>TOTAL</b>	<b>182,771,518</b>	<b>111,963,369</b>

SCHEDULE 3- EARMARKED FUNDS	2007-2008	2006-2007
<b>1 Construction of Demonstration Buildings with cost effective technologies and technology Demonstration-cum-Production Centre in Tripura</b>		
Opening Balance	7,073,884	9,878,023
Less : Utilisation/Expenditure during the year	3,320,646	2,804,139
<b>2 Establishment of Bamboo Mat Production Centres in North-Eastern States</b>		
Opening Balance	4,556,112	11,165,951
Less : Utilisation/Expenditure during the year	1,674,114	6,609,839
<b>3 Construction of Demonstration Houses in Mizoram</b>		
Opening Balance	314,343	714,343
Less : Utilisation/Expenditure during the year	-	400,000
<b>4 Construction of Demonstration Houses Under Valmiki Ambedkar Awas Yojana</b>		
Opening Balance	34,879,167	40,256,607
Less : Utilisation/Expenditure during the year	4,835,253	5,377,440
<b>5 Model amendments in Town and Country Planning Act., Zoning Regulations</b>		
Opening Balance	1,233,145	2,901,616
Less : Utilisation/Expenditure during the year	229,224	1,668,471
<b>TOTAL</b>	<b>37,997,414</b>	<b>48,958,651</b>

SCHEDULE 4- CURRENT LIABILITIES AND PROVISIONS	2007-2008	2006-2007
<b>CURRENT LIABILITIES</b>		
- Outstanding Liabilities	412,770	471,237
- Amount received for Indo Polish Project	60,600	60,600
- Security Deposit	851,065	851,065
- Balance of funds received for developing building bye-laws	20,812	20,812
- Advance against Machines	5,292	-
<b>TOTAL</b>	<b>1,350,539</b>	<b>1,403,714</b>



## Amount (Rs.)

**SCHEDULES FORMING PART OF BALANCE SHEET AS ON 31 MARCH 2008**

		Amount (Rs.)	
SCHEDULE 6 - CURRENT ASSETS, LOANS, ADVANCES ETC.		2007-2008	2006-2007
<b>A. CURRENT ASSETS:</b>			
1. Cash Balances in hand			
- Cash in hand	212,304		18,022
- Cheques in hand	-	212,304	114,800
			132,822
2. Bank Balances			
With Scheduled Banks:			
- On Current Account with Canara Bank (Parliament Street)	-		140,656
- On Deposit Account with Canara Bank	138,626,514		100,126,514
- On Savings Accounts:			
- Canara Bank (Parliament Street)	17,566,142		7,762,023
- Canara Bank (Hauzkhas)	440,675		5,276,061
- Canara Bank (Bangalore)	435,677		501,541
- Canara Bank (Tripura)	182,125		266,485
- Canara Bank Parliament Street (VAMBAY Project)	3,657,302		1,326,573
- State Bank of Hyderabad (Scope Complex )	6,195,848	167,104,283	-
			115,399,853
<b>B. LOANS, ADVANCES AND OTHER ASSETS</b>			
1. Loans to staff		8,580,820	3,258,881
2. Advances and other amounts recoverable in cash or in kind or value to be received			
a. Amount recoverable & other advances	3980202		790,595
b. Security Deposit (Rent)	420000		420,000
c. Tax deducted at source recoverable	122709	4,522,911	35,570
3. Advance for purchase of machines			489,656
4. Interest Accured on FDR's		1,610,845	539,841
<b>TOTAL (A + B)</b>		<b>182,031,163</b>	<b>121,067,218</b>





# Building Materials & Technology Promotion Council

Ministry of Housing & Urban Poverty Alleviation, Government of India

## SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON 31 MARCH 2008

	Amount (Rs.)	
	2007-2008	2006-2007
<b>SCHEDULE 7- GRANTS/SUBSIDIES</b> (Irrevocable Grants & Subsidies Received)		
Central Government (Ministry of Housing & Urban Poverty Alleviation, Government of India)	70,000,000	43,000,000
<b>TOTAL</b>	<b>70,000,000</b>	<b>43,000,000</b>

<b>SCHEDULE 8 - FEES/SUBSCRIPTIONS</b>		
1 Seminar/Programme Receipts	347,299	3,180,838
2 Consultancy Receipts	18,323,530	11,236,000
<b>TOTAL</b>	<b>18,670,829</b>	<b>14,416,838</b>

<b>SCHEDULE 9- INCOME FROM ROYALTY, PUBLICATION ETC.</b>		
1 Receipts towards sale of publications, Licence fee, PACS etc	583,309	4,722,646
<b>TOTAL</b>	<b>583,309</b>	<b>4,722,646</b>

<b>SCHEDULE 10- INTEREST EARNED</b>		
1 On Term Deposits With Scheduled Banks	12,855,379	5,867,500
2 On savings Accounts With Scheduled Banks	518,755	298,787
3 On Loans: Employees/Staff	18,760	36,808
<b>TOTAL</b>	<b>13,392,894</b>	<b>6,203,095</b>

<b>SCHEDULE 11- ESTABLISHMENT EXPENSES</b>		
1 Pay and Allowances	12,451,400	11,591,850
2 Contribution to Provident Fund	857,201	991,685
3 Contribution to LIC Group Gratuity Scheme	264,043	282,846
4 Leave Travel Concession	109,308	91,071
5 Contribution to LIC Group Leave Encashment Scheme	-	372,468
6 Medical Expenses	610,261	945,599
7 Consultancy/Retainership & Honorarium	832,973	239,650
<b>TOTAL</b>	<b>15,125,186</b>	<b>14,515,169</b>



## SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED AS ON 31 MARCH 2008

	Amount (Rs.)	
SCHEDULE 12- ADMINISTRATIVE EXPENSES, ETC.	2007-2008	2006-2007
1. Travel and Local transport	2,130,069	2,961,465
2. Postage, Telephone and Fax	671,168	834,334
3. Office Expenses	496,906	951,474
4. Printing and stationery	404,662	430,462
5. Office maintenance	1,760,432	1,413,050
6. Rates & Taxes	268,229	268,229
7. Professional charges	53,226	23,509
8. Membership Fee	21,829	23,394
9. Office rent	507,900	671,664
10. Audit Fee	12,360	14,591
11. Bank Charges	3,214	2,354
<b>TOTAL</b>	<b>6,329,995</b>	<b>7,594,526</b>

SCHEDULE 13 - EXPENDITURE ON DISSEMINATION / SEMINARS/WORKSHOPS, TRAINING PROGRAMMES ETC.		
1. Advertisement	197,340	290,150
2. Exhibition and publicity	488,212	2,037,154
3. Seminar and Conference Expenses	2,018,577	4,856,467
4. Printing & Publication	258,320	1,148,309
5. Books and Periodicals	106,859	107,283
6. Technology transfer	1,158,778	756,738
7. Training Programmes	1,072,667	1,164,355
<b>Total</b>	<b>5,300,753</b>	<b>10,360,456</b>





**SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE  
YEAR ENDED AS ON 31 MARCH 2008**

	Amount (Rs.)	
<b>SCHEDULE 14 - EXPENDITURE ON FINANCIAL ASSISTANCE, SPONSORED STUDIES ETC.</b>	<b>2007-2008</b>	<b>2006-2007</b>
<b>1 SPONSORED STUDIES</b>		
Upscaling and modernisation of indigeneous production technologies for wider application and commercialisation	151,500	1,688,000
Vulnerability reduction, risk assessment and disaster resistant construction technology activities	644,253	944,828
Development of technologies on use of bamboo in housing	585,000	2,041,000
Standardisation and product evaluation activities	14,162	24,004
Strengthening database, technology dissemination and demonstration capabilities	575,517	1,121,820
<b>Sub-Total</b>	<b>1,970,432</b>	<b>5,819,652</b>
<b>2 FINANCIAL ASSISTANCE FOR TECHNOLOGY DEMONSTRATION AND APPLICATION</b>		
Promotion of disaster resistant construction and seismic strengthening techniques	2,108,680	2,653,400
Promotion and application of bamboo based technoloiges in housing and building construction	100,000	1,644,006
Capacity building of construction professionals, workforce etc.	50,000	125,000
Dissemination and demonstration of cost effective technologies	463,451	1,603,058
<b>Sub-Total</b>	<b>2,722,131</b>	<b>6,025,464</b>
<b>Total</b>	<b>4,692,563</b>	<b>11,845,116</b>



**SCHEDULE 15 - SIGNIFICANT ACCOUNTING POLICIES AND NOTES TO THE ACCOUNTS****1 Significant Accounting Policies**

- a) **System of Accounting** - The financial statements are prepared on the basis of historical cost convention on accrual basis and are in accordance with generally accepted accounting practices.
- b) **Fixed Assets** - Fixed assets are stated at cost of acquisition and depreciation is provided at the rates and in the manner as specified in the Income Tax Act 1961
- c) **Retirement Benefits** -  
Liability in respect of gratuity to employees is provided for by way of premium paid to Life Insurance Corporation of India under Group Gratuity scheme.  
The council contributes to its own Provident Fund Trust which is recognised by the Income Tax authorities and the contributions paid during the year to Provident Fund Trust are charged to revenue.
- d) **Foreign Currency Transactions** - Transactions denominated in foreign currency are accounted at the exchange rate prevailing on the date of the transaction.
- e) **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 the opinion of the Management, the value 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 In view of there being no taxable income under the Income Tax Act, 1961, provision for Income Tax has not been made in the accounts.
- 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 Deposits with Banks include a fixed deposit of Rs. 76,514/- pledged with Canara Bank in connection with Bank Guarantee issued by it in favour of Department of Value Added Tax, Govt. of NCT of Delhi.
- 7 Figures have been rounded off to the nearest rupee.
- 8 Previous Year figures have been regrouped and rearranged whenever considered necessary to make them correspond to those of the current year.

*S. B. Srinivasan*

(S. Balasrinivasan)  
Chief - Finance

*Dr. Shailesh Kr. Agrawal*  
(Dr. Shailesh Kr. Agrawal)  
Executive Director

As per our separate Report on the Balance Sheet  
for M.S.Sekhon & Co.,  
Chartered Accountants



*Rajiv Tandon*  
(Rajiv Tandon)  
Partner

New Delhi -

Date : **20 AUG 2008**

**PARTICIPATION IN NATIONAL AND INTERNATIONAL EVENTS****I. EXHIBITIONS**

During the year, the Council has actively participated in the following exhibitions which have helped in popularizing cost effective, environment friendly and energy efficient building materials, construction technologies and simple machines for production of building components:

- Exhibition held from 28 July to 1 August 2007 at Narayangarh, Distt. Ambala, Haryana.
- 11<sup>th</sup> National Expo held from 7 to 14 September 2007 at Kolkata. The Expo was organized by Central Calcutta Science & Technology Organization for Youth (CCSTOY).
- Exhibition on the occasion of World Habitat Day 2007, 1 October 2007, Vigyan Bhawan, New Delhi.
- 'Enviro International' from 10-11 October 2007 in New Delhi.
- "Construe India 2007" from 12-14 October 2007 at MMRDA Ground, Bandra Kurla Complex, Mumbai. The event was organized by Indiatech Foundation, Mumbai.
- Exhibition during National Workshop on Quality Control in Construction through Precision Equipment – 2007" on 24 October 2007 at IIT Roorkee
- "World Toilet Summit" organized by Sulabh Social Service Organization, from 31 October – 3 November 2007, Delhi.
- "Techmart India" exhibition during India International Trade Fair 2007 from 14-27 November 2007 at Pragati Maidan New Delhi.
- 2<sup>nd</sup> Asian Ministerial Conference on Disaster Risk Reduction organized by Ministry of Home Affairs on 7-8 November 2007 at Hotel Ashok, New Delhi. A small exhibition displaying activities of BMTPC in the area of Disaster Management was put up during the event.
- International Exhibition "BMCT'08" from 21-23 January 2008 at Pragati Maidan, New Delhi.
- Participated in the International Seminar cum Exhibition on "Managing Earthquake Risk" organised by Construction Industry Development Council, New Delhi, 30-31 January 2008 at New Delhi.



**Exhibition during the International Technology Workshop on "Innovations in Cost-Effective Construction Technologies" organised by BMTPC on 27-28 December 2007 at Patna, Bihar.**



**BMTPC Display during 11th National Expo held from 7 to 14 September 2007 at Kolkata organized by Central Calcutta Science & Technology Organization for Youth.**



## **II SEMINARS/ CONFERENCES/ WORKHOPS/TRAINING PROGRAMMES**

- The Council jointly with Nirman Vikas Anushandhan Sansthan, Raipur organized a One Month Training Programme for Capacity Building of 30 masons from rural areas near Raipur, Chhatisgarh from 23 March to 22 April, 2007.
- National Workshop on Science & Technology held on 2 - 3 April, 2007 at NDMA, New Delhi.
- Chief Ministers' Conference organized by NAREDCO on 'Affordable Housing for All' on 4 April, 2007, New Delhi.
- Seminar on "Formation of Construction Law" by International Council of Consultants on 6-7 April 2007, New Delhi.
- 21<sup>st</sup> Session of the Governing Council of UN-HABITAT held at Nairobi, Kenya during 16-20 April, 2007 as a member of delegation led by Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 7-8 May 2007, Amritsar.
- Short term training course on "Earthquake Risk Management" for Engineers, organized by IIT Roorkee on 15 May 2007 at IIT Roorkee.
- 13<sup>th</sup> Annual Convention & National Seminar on "Integrated Developments of Towns as New Growth Centers" organized by Indian Building Congress on 17-19 May 2007, New Delhi.
- National Conference on "Tsunami Risk Management" organized by National Disaster Management Authority on 18 May 2007, New Delhi.
- Three Day International Workshop on "Emerging Trends in the Cost Effective Housing Technologies" from 23-25 May 2007, Bangalore.
- Training Programme for the officers of Indian Statistical Service at IIPA on the "Vulnerability & Risk Assessment of Housing", New Delhi.



- National Conference on "Affordable Housing for All" held on 2 June 2007 at Mumbai.
- One day Technical Workshops on "Building Bye-Laws for Safety against Natural Hazards" on 7 June 2007, Chandigarh.
- One day Technical Workshop on "Building Bye-Laws for Safety against Natural Hazards" on June 13, 2007, Srinagar.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 18-19 June 2007, Shimla.
- Hindi Karyashala for Council's officers & staff members on 29 June 2007, New Delhi.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 13-14 July 2007, Patna.
- Five-days Workshop on "Intellectual Property Right related Issues and WTO" organized by Administrative Staff College, Hyderabad, July 30-August 3, 2007, Hyderabad.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 3-4 August 2007, Guwahati.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 8 August 2007, Pune.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 17-18 August 2007, Haridwar.
- Training Programme on "Retrofitting of Masonry Buildings - Theory & Practice, jointly with Municipal Corporation Delhi on August, 18, 2007, at Town Hall, MCD, Delhi.
- Seven-days training programme for construction workforce from 12-18 August, 2007 at Srinagar, Uttarakhand.
- "Roundtable Meeting on Innovations in Building Technologies", on 21 August 2007 at India Habitat Centre, New Delhi.



**Kumari Selja, Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation and Indian delegation with Ms. Anna Tibaijuka, Under Secretary-General & Executive Director, UN-Habitat during the 21st Governing Council meeting of UN-Habitat at Nairobi, Kenya held from 16-20 April, 2007.**



**Indian Delegation led by Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation participating in the 'Sixth World Alliance of Cities against Poverty (WACAP)' from 26 - 28 March, 2008 in Athens, Greece.**



- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 10-11 September 2007, Lucknow.
- Engineers Day celebrated by Engineers Welfare Council, 14 September 2007, New Delhi.
- Three day Training Programme for 30 construction workers on Innovative Techniques from 22 – 24 September 2007, Jaipur.
- International Conference as a member of the delegation led by Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation on the 'State of Safety in World Cities' held from 1-5 October, 2007, at Monterrey, Mexico.
- Three day Training Programme on "Retrofitting of Buildings and their Foundation-Slope System in Earthquake and Landslide Prone Areas" from 8-10 October, 2007, Vellore, Tamil Nadu.
- Conference on Development of Housing, Urban Sector through New Materials & Technology organized by CIDC from 17-18 October 2007, at Pragati Maidan, New Delhi.
- National Seminar on Advances in Building Management System organized by Institute of Technology,irma University, 19-20 October, 2007, Ahmedabad.
- National Workshop on Quality Control in Construction through Precision Equipment – 2007" on 24 October 2007 at IIT Roorkee.
- Environment Summit 2007 on "Waste to Wealth through Innovative Technologies" organized by ASSOCHAM on 24<sup>th</sup> October 2007, New Delhi.
- World Toilet Summit organized by Sulabh International, 31 October to 3 November, 2007, New Delhi.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 1-2 November 2007, Dehradun.
- 2nd Asian Ministerial Conference on Disaster Risk Reduction, 7 – 8 November 2007, New Delhi.
- Bhartiya Vigyan Sammelan, 25 November, 2007, Bhopal.

- Training Programme on "Retrofitting of Buildings and their Foundation-Slope Systems in Earthquake and Landslide Prone Areas" from 28-30 November 2007 at CSIR Science Centre, New Delhi.
- Short Term Training Courses with IIT Roorkee, on "Codal Practices on Earthquake Resistant Design and Construction" from 6-8 December, 2007, Noida.
- International Technology Workshop on "Innovations in Cost-Effective Construction Technologies" with specific focus on appropriate and affordable housing technologies on 27-28 December 2007 at Patna, Bihar.
- Integrated Entrepreneurship Development Programme in the area of Alternative Low Cost Building Materials organised by EDI, Bhopal, 29 December 2007, Bhopal.
- SAARC Regional Workshop on Application Science & Technology for Disaster Risk Mitigation & Management on 21 January 2008, NIDM, New Delhi.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 22 January 2008, New Delhi.
- International Seminar cum Exhibition on "Managing Earthquake Risk" organised by Construction Industry Development Council, 30-31 January 2008 at New Delhi.
- Workshop on "Manual on Standards and Specifications for construction of general pool government accommodation" organized by IBC and CPWD, 2 February, 2008, New Delhi.
- Workshop on 'Development of Green Building Guidelines and Exploring Link of Green Buildings with Human Health Related Issues', organized by CIDC on 28 February 2008, New Delhi.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 20-21 February 2008, Kolkata.
- Training Programme on 'Right to Information Act' held on 21 – 22 February 2008 at New Delhi.
- Consultation of National Resource Centre under JNNURM at Centre for Good Governance, Hyderabad organized by MoHUPA in February 2008, Hyderabad.





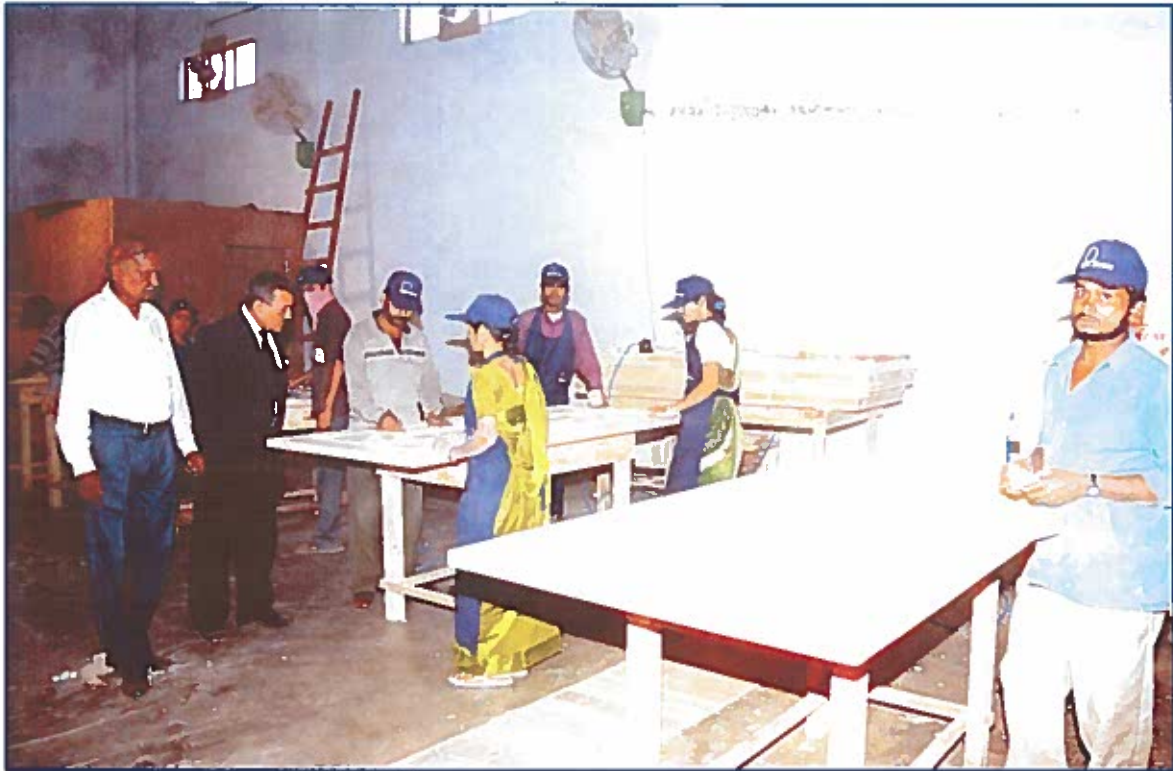
**Regional Workshop on Project Development under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) at Haridwar, Uttarakhand on 18 August, 2007.**



**Exhibition held from 28 July to 1 August 2007 at Narayangarh, Distt. Ambala, Haryana**







**Inspection of the works of M/s Riya Enterprises at Gandhidham, Gujarat under Performance Appraisal Certification Scheme**



**BMTPC's display during International Exhibition "BMCT'08" from 21-23 January 2008 at Pragati Maidan, New Delhi.**



- Residential Training Programme on "Modern Bamboo Structures and Housing" from 6-8 March 2008, Kaziranga, Assam.
- Two weeks Entrepreneurship Development Training Programme in the field of "low cost housing technologies" from 10 March 2008, Gorakhpur, U.P.
- Five day Training on "Disaster Resistant and Quality Construction Practices" for masons from 8-12 March 2008, Village Kerala, Distt. Ahmedabad.
- Workshop on "Trade & Investment Opportunities in Trinidad & Tobago" organized by High Commission of Trinidad & Tobago in India organized by PHDCCI on 28 March 2008, New Delhi.
- As Member of Indian Delegation led by Hon'ble Minister of State (Independent Charge) for Housing & Urban Poverty Alleviation for participation in the 'Sixth World Alliance of Cities against Poverty (WACAP)' from 26 – 28 March, 2008 in Athens, Greece.
- Capacity building of the municipal functionary in preparation of DPRs under JNNURM, 28-29 March 2008, Pune.

### **III BIS COMMITTEES**

- 11<sup>th</sup> meeting of Building Lime and Gypsum Products, Sectional Committee, CED4 of BIS on 17 April 2007.
- BIS Sectional Committee on Construction Management meeting held on 8<sup>th</sup> November 2007.
- 15<sup>th</sup> meeting of the Cement & Concrete Sectional Committee held on 11-12 December 2007.

### **IV TECHNICAL COMMITTEE/ WORKING GROUPS ETC.**

- 26<sup>th</sup> Meeting of the Executive Committee of BMTPC, 9 April 2007, New Delhi.
- Technical Committee meeting of Indian Building Congress for screening of Technical Papers for the forthcoming seminar on "Development of Integrated Cities" on 10 April 2007, New Delhi.
- Peer Group meeting for preparation of State Atlases and 63 cities under JNNURM, 19 April 2007, New Delhi.

- Series of meetings of Core Group for preparation of Guidelines for Tsunami Mitigation, setup by National Disaster Management Authority, New Delhi.
- Meeting with the Nepalese Delegation for Technical Cooperation in the field of Low Cost Housing, 30 April 2007, New Delhi.
- Series of meetings of National Steering Committee of National Bamboo Mission on behalf of Ministry of Housing & Urban Poverty Alleviation, New Delhi.
- Series of meetings of Technical Group set up by the Task Force constituted by the Ministry of HUPA for preparation of Guidelines for Green Habitat, New Delhi.
- Meeting of the National Disaster Management Authority held on 'Earthquake Awareness & Preparedness', 12 June, 2007, New Delhi.
- Meeting of the Research Council of Central Building Research Institute, Roorkee.
- Meeting of the Parliamentary Standing Committee on Urban Development, 27 June to 2 July 2007 at Ahmedabad, Surat and Daman.
- Series of meetings for finalizing the revise scheme of Building Centres organized by M/o HUPA, New Delhi.
- Meeting with the Punjab Cooperative Housing Federation on 5 July 2007, New Delhi.
- Meeting of the Monitoring Committee of the Fly Ash Mission in Deptt. of Science & Technology, July 2007, New Delhi.
- Series of meetings of the Central Sanctioning Committee (CSC) of JNNURM organized by M/o Housing & Urban Poverty Alleviation, New Delhi.
- Meeting with the Chief Secretary, Govt. of Bihar regarding progress of BSUP projects of JNNURM in the State in July 2007, Patna.
- 27<sup>th</sup> Meeting of the Executive Committee of BMTPC, 16 October 2007, New Delhi.
- Meeting with the delegation from Higher Polytechnic Institute of Manica, Mozambique, 13 November 2007, New Delhi.

- 28<sup>th</sup> Meeting of the Executive Committee of BMTPC, 27 November 2007, New Delhi.
- Meeting with UNIDO officials to review ongoing project, 16-20 December 2007, Vienna, Austria.
- Peer Group Meeting for Revision of Vulnerability Atlas of India, 8 January 2008, New Delhi.
- Meeting organised by National Housing Bank for draft Guidelines on Floor Resistant Houses for Bihar Government, New Delhi.
- Meeting of Nodal Officers of Indian Disaster Knowledge Network at National Institute of Disaster Management, Ministry of Home Affairs, on 18 January 2008, New Delhi.
- Meeting on Indian-Brazil-South Africa Technical Cooperation held on 22 January 2008, New Delhi.
- Meeting of the Parliamentary Standing Committee on Urban Development, 6-11 February 2008 at Bhubneswar, Puri, Chennai and Vishakhapatnam.
- Meeting with the State Govt. officials for promotion of bamboo based technologies in Arunachal Pradesh, 25-27 February 2008, Deomali.
- Series of meetings of Environment Impact Assessment Committee of Ministry of Environment and Forests.
- Series of meetings of Project Screening Committee of BMTPC.
- Series of meetings of BMTPC Project Monitoring Committee of VAMBAY.

## **V OTHER ACTIVITIES**

- Visited Ordinance Factories Institute of Learning (OFIL) Raipur, Dehradun for Establishment of Technology Demonstration Centre (TDC) in OFIL on 25 January 2008.
- Visited Jamia Millia Islamia University New Delhi to have a site visit and functioning of Techno Digester on 31 January 2008.
- Visited NIT, Trichy to finalise the space and other details for setting up Permanent Display Centre at NIT campus on 25 February 2008.



- A delegation of Architectural students from School of Planning & Architecture and other colleges visited BMTPC and had interaction on cost-effective Environment friendly technologies including Disaster Mitigation and Prevention measures required to be adopted for safety against natural hazards in February 2008.
- Draft of the Scheme were prepared after discussion with the representatives of HUDCO, HSMI and M/s Seeds for revival of the Building Centre Scheme under the guidance of the committee constituted by Ministry of HUPA with members from HUDCO and BMTPC.
- The Ministry of External Affairs, Govt. of India has requested BMTPC to prepare a Feasibility Report for manufacture of machine made bricks in Kenya. A proposal indicating the cost for preparation of detailed feasibility report has been sent and the same is under consideration of MEA.
- BMTPC made all arrangements for organization of World Habitat Day 2007 in Vigyan Bhawan, New Delhi. On this occasion, an exhibition was organized in which BMTPC, HUDCO and NBO displayed their activities. The Council also brought out a newsletter on the theme of the World Habitat Day 2007 i.e. "A safe city is a just city".

**SPONSORED STUDIES/PROJECTS/VIDEO FILMS COMPLETED DURING THE YEAR**

**A. SPONSORED STUDIES COMPLETED**

1. Estimate of the Demand for important construction materials for the period 2003-2013.
2. Development of Floor/Wall Tiles and Pavers from Granite Slurry.
3. Development of Technology for Construction of Two Storeyed Bamboo Housing System.
4. Development of Bamboo Mat Ridge Cap for Roofing with Bamboo Mat Corrugated Sheets.
5. Development of Prefabricated Modular Houses using Bamboo based Composites.
6. Upgradation of Machines for Production of Precast Building Components.
7. Preparation of Techno-Economic Feasibility Reports on various Technologies.

**B. PROJECTS COMPLETED**

1. Strengthening the Production Base of J&K Building Centre, Srinagar.
2. Retrofitting of four MCD school buildings in New Delhi.
3. Preparation of Templates for Low Cost Housing.
4. Preparation of Model Housing Unit Plan and Design Layout for Integrated Informal Market.
5. Setting up of a "Demonstration and Training Incubation Centre for Mechanized Bamboo Mat Production – A National Facility" at the Composites Technology Park, Bangalore.

**C. VIDEO FILMS**

1. Asha Aur Ashray – A film on demonstration housing projects undertaken by BMTPC.

**SPONSORED PROJECTS, STUDIES AND VIDEO FILMS INITIATED DURING THE YEAR**

**A. SPONSORED STUDIES INITIATED DURING THE YEAR**

1. Preparation of Compendium on cost effective technologies for common man
2. Preparation of handbook on the six prefabricated technologies.
3. Development of Technology for Construction and Demolition Wastes Recycling.
4. Setting up of Pilot Plant for manufacture of Flux bonded Flyash building components.
5. Preparation of Geo-technical Guidelines for disaster resistant structures.

**B. PROJECTS INITIATED WITH THE FINANCIAL ASSISTANCE FROM COUNCIL DURING THE YEAR**

1. Evaluation of Monolithic Construction Technology.
2. Construction of Model Informal Market at Gumla, Jharkhand.
3. Strengthening the production base of J&K Building Centre, Srinagar.
4. Organisation of Training Workshop on field level application of appropriate building materials and technologies at Rohtas, Bihar.
5. Construction of demonstration structures using bamboo based technologies in Shillong, Meghalaya.
6. Establishment of Bamboo Mat Production Centre in Mopaya village, Arunachal Pradesh.
7. Construction of Demonstration Houses using innovative, green and disaster resistant technologies.

## PRESENTATIONS/PAPERS PRESENTED/PUBLISHED

- i. Paper on "Green Building Technologies for Sustainable Habitat" published in the Times Journal of Construction and Design, April, 2007... *R.K.Celly, J.K.Prasad, S.K.Gupta*
- ii. Presentation on revised 'Vulnerability Atlas of India' during 2 days National Workshop on Science & Technology in Disaster Management, Earthquake Landslide and Tsunami organized by NDMA in April 2007... *J.K. Prasad*
- iii. Paper on "Prefabricated Construction – The Present Status and Future Needs", published in Buildo-Tech, May, 2007...*J.K.Prasad*
- iv. Article on "Every Penny Counts – Affordable Housing using Machine made Pre-fabricated Building Components", published in Times Journal of Construction & Design, May, 2007...*J.K.Prasad, Dr.Amit Rai*
- v. Article on "Performance Appraisal Certification Scheme – An Effective Tool for Transfer of Innovative Technologies", published in various journals such as Interiors Today, New Building Materials & Construction World, Civil Engineering & Construction Review, Construction World, Indian Construction, OPCAR, etc., May, 2007...*J.K.Prasad, A.K.Tiwari*
- vi. Lecture on "Vulnerability Atlas of India" during short term training course on earthquake risk management, organized by IIT Roorkee, 15 May, 2007...*J.K.Prasad*
- vii. Article on "Performance Appraisal Certification Scheme", published in Buildo-Tech, June, 2007...*J.K.Prasad*
- viii. Presentation on "Monitoring and Evaluation of BSUP & IHSDP projects" during 2 day Regional Consultation on Project Implementation, Quality Control, Monitoring & Evaluation at Amritsar, 7-8 May 2007....*I.S. Sidhu*
- ix. Presentation on "Preparation of DPR under BSUP & its Appraisal and Project Management" during the Training Programme for the students of P.G.

Diploma in Urban Management conducted by YASHADA, Pune on 30 May 2007.... *I.S. Sidhu*

- x. Presentation on "DPR Preparation & Appraisal" during Training Programme on JNNURM for ULB functionaries at Shimla, (H.P.) on 18-19 June 2007...*I.S. Sidhu*
- xi. Article on "Power of Building Better – Study of Green Building Technologies for Sustainable Habitat"...*J.K.Prasad*
- xii. Presentation on 'Capacity Building Programme' under BSUP of JNNURM for Municipal Functionaries at Guwahati, Assam on 3-4 August 2007....*I.S. Sidhu*
- xiii. Presentation on Capacity Building Programme under BSUP of JNNURM for Municipal Functionaries during the training programme at YASHADA, Pune on 8 August 2007....*I.S. Sidhu*
- xiv. Presentation on the 'Initiatives of BMTPC in the field of Innovative & Cost Effective Technologies' during International Conference organized by UNIDO Centre for South-South Industrial Cooperation at New Delhi on 12 September 2007...*R.K.Celly*
- xv. Presentation on the "Fast-track Technologies for Construction of Houses for Urban Slums" on the occasion of Engineers Day at New Delhi on 14 September 2007...*I.S. Sidhu*
- xvi. Paper on "Green Building Technologies for Sustainable Habitat" published in the Special Issue of Building Materials News on World Habitat Day 2007, October, 2007... *R.K.Celly, J.K.Prasad, S.K.Gupta*
- xvii. Presentation on the "Emerging Materials & Technologies" in the National Conference on Development of Housing, Urban Sector through New Materials & Technology at Pragati Maidan, New Delhi on 17-18 October 2007....*I.S. Sidhu*
- xviii. Lecture on "Strengthening the Technological Base of Housing and Human Settlement Sector" in National Seminar on Advances in Building Management System, organized by Institute of Technology, Nirma University, 19-20 October 2007...*D.P.Singh*
- xix. Presentation on "Project Development for BSUP & IHSDP of JNNURM" for Municipal Functionaries

during the training programme at Dehradun on 1 November 2007....*I.S. Sidhu*

- xx. Key Paper presented on 'Housing, Habitat, Architecture and Disaster Management' during Bhartiya Vigyan Sammelan in Bhopal on 25 November 2007....*J.K. Prasad*
- xxi. Lecture during Training Workshop on "Utilization of Flyash" at Paryavaran Parisar, Bhopal organized by Environmental Planning & Coordination Organization, on 29 November 2007...*J.K. Prasad*
- xxii. Lecture during Integrated Entrepreneurship Development Programme in the area of Alternative Low Cost Building Materials at Bhopal on 29 December 2007...*I.S. Sidhu*
- xxiii. Presentations during the Training Programmes organized by HSMI on "Poverty Alleviation" on January 21, 2008 and February 11, 2008. ... *I.S. Sidhu*
- xxiv. Lecture on "Housing & Infrastructure Needs of Poor – Insight Into IHSDP & BUSP projects" during the Consultation Workshop on Resource Mapping – An Approach to Poverty Alleviation" at HSMI, New Delhi on 22 January 2008.... *I.S. Sidhu*
- xxv. Paper titled "Retrofitting of Kupwara Hospital in J&K" during International Seminar on "Construction – Earthquake Risk Management" organized by CIDC on 30-31 January 2008... *J.K. Prasad, Pankaj Gupta*
- xxvi. Presentation on "Housing Needs of Urban Poor – Insight into BSUP & IHSDP" during the Training Programme organized by HSMI, HUDCO for Municipal Officers on 12 Feb.2008.... *I.S. Sidhu*
- xxvii. Presentation on "Housing Design Alternatives and Project Formulation of BSUP & IHSDP projects under JNNURM" during the workshop organized by MoHUPA and Govt. of West Bengal in Kolkata (West Bengal), 20-21 Feb. 2008. .... *I.S. Sidhu*
- xxviii. Presentation on "Preparation of CDP/DPR under BSUP of JNNURM" during Orientation Workshop on Urban Poverty Alleviation and Livelihood Cells at YADHDA, Pune during 28-29 March 2008.... *I.S. Sidhu*



**PUBLICATIONS BROUGHT OUT DURING THE YEAR**

- 1 Brochure titled "Disaster Prevention and Mitigation – Major Initiatives by BMTPC".
- 2 Revised the book on "Standards and Specifications on Cost Effective Building Materials and Technologies". This also includes analysis of rates for these technologies.
- 3 Special Issue of Building Materials News on the occasion of World Habitat Day on the theme "A Safe City is a Just City".
- 4 Updated Brochure on Bamboo in Housing& Building Construction – Initiatives of BMTPC.

**IMPORTANT VISITORS FROM OTHER COUNTRIES**

1. Three-member delegation from Mozambique.
2. Delegation from Nepal.
3. Delegation from Ethiopia, led by Mr. Kassu Yilala, Hon'ble Minister, Ministry of Works & Urban Development, Federal Democratic Republic of Ethiopia.
4. Mr. Carlos Agostinho Do Rosario, High Comission of Republic of Mozambique in India.
5. Delegation from Mozambique led by Ms. Zelia Menete from Higher Polytechnic Institute of Manica, Govt. of Mozambique.

**ACTION PLAN FOR THE YEAR 2008-09**

BMTPC in its endeavour to promote the use of innovative and environment-friendly building materials and construction technologies has initiated series of activities for the accomplishment of multi-faceted objects, enshrined in the mandate of the Council. Over the years, the Council has focused on the development, promotion and dissemination of innovative, cost-effective, environment-friendly and energy-efficient building materials and technologies based on agro-industrial wastes. However, off late with the active support of Ministry of Housing & Urban Poverty Alleviation, Council has also embarked upon the field level application of innovative building materials and technologies.

The Council, in its efforts to promote use of local resources in the North Eastern Region, is striving to develop and promote bamboo based technologies by way of development of bamboo based building material technologies, construction of demonstration structures and establishing Bamboo Mat Production Centres. The Action Plan for the year 2008-09 of the Council is structured in such a manner that it not only focuses on the various operational areas of the Council but also leads to the tangible results with societal benefits.

The various activities which the Council envisages to undertake during 2008-09 are classified under the operational areas of Disaster Resistant Technologies; Technology Development/Promotion; and Technology Demonstration, Construction & Dissemination.

**TECHNOLOGY DEVELOPMENT/PROMOTION****1 Development of Training Manuals/Publications**

The Council is proposing to bring out following Training Manuals/publications for capacity building of construction workers and professionals:

- (i) Masons, Carpenters, construction workforce etc.
- (ii) Construction Technologies for common man,
- (iii) Disaster Resistant Technologies,
- (iv) Quality control manual for the JNNURM projects
- (v) Construction Guide for common man,

The above manuals/publications will be developed in simple and easy-to-understand language with the help of illustrations and design drawings.

**2 Preparation of Interactive Database on Innovative Building Materials and Construction Technologies**

The Council organizes a number of exhibitions, seminars, workshops at national and international level on use of cost effective, environment-friendly, energy-efficient and disaster resistant construction technologies. In order to provide up-to-date information on the innovative and cost effective technologies, it is proposed to develop an interactive database on the same. The database will have information on the manufacturers, properties of the products, possible use, raw materials, machine and equipment, project cost etc. The database will be made accessible to the common man through touch-screen kiosk in various fora.

**3 Development of Machines/Technology for Recycling of Construction and Demolition Waste**

A lot of construction and demolition waste is generated while reconstructing and aftermath of natural and man-made disasters which causes serious problem of disposal of these wastes. The technology for recycling of construction and demolition waste is available in European countries. In order to indigenize the technologies, the Council proposes to develop suitable machines for recycling of these wastes.

**4 Identification and Evaluation of Emerging Technologies from other countries for adoption in India**

It is proposed to identify and select innovative technologies developed worldwide for adaptation in India, after due evaluation. A technology transfer mechanism will be worked out for further dissemination.

**5 Development of Technology for Reinforced Interlocking Hollow Blocks for Walling**

The Council proposes to develop a technology for Reinforced Interlocking Hollow Blocks for walling suitable for earthquake resistant housing.

Development of reinforced interlocking hollow block system would be more rapid and less labour intensive building system which can be laid without mortar. The use of interlocking load bearing hollow blocks in building construction would speed up the construction process as a result of the elimination of mortar layers. Further, due to the self-aligning features of the interlocking hollow blocks, the walls can be assembled at much faster speed compared to mortared masonry construction.

#### **6 Demonstration facility for dissemination of Granite Slurry waste Utilization**

The Council has developed a technology for manufacture of tiles from granite industry waste in collaboration with Andhra Pradesh Technology Development Corporation. The technology has shown encouraging results at the laboratory scale. In order to commercialize the technology, it is proposed to set up a demonstration facility for manufacture of tiles from granite industry waste. After the development of commercial parameters, the technology will be ready for transfer to interested entrepreneurs.

### **DEMONSTRATION CONSTRUCTIONS**

#### **1 Construction of Demonstration Houses using Innovative, Green and Disaster Resistant Technologies in different region**

It is proposed to construct few Demonstration Houses using innovative, green and disaster resistant technologies at 3/4 places in different regions with the twin objectives of creating awareness and large scale dissemination of innovative, cost effective, green and disaster resistant construction technologies. During the construction of buildings, the training will also be provided to local artisans, engineers etc. The State Govts. will be requested to provide land and other infrastructure.

#### **2 Construction of Model Informal Markets at two locations using Cost Effective Technologies**

It is also proposed to construct two Integrated Informal Markets for street vendors on cost-sharing and time-sharing basis in the selected State(s) based on the design layout prepared by BMTPC. The Informal Market will have facilities like meeting rooms for men and women, cretch, primary health centre,

reading room and a playground. The innovative and disaster resistant technologies will be used in construction of these markets. The State Governments will be requested to provide suitable land for the purpose.

**3 Construction of Demonstration Community Building at Mopaya Village, Arunachal Pradesh using bamboo based technologies**

It is proposed to construct a community building having an area of 150 to 200 sqm. in Mopaya village, Arunachal Pradesh using bamboo based technologies. The land for construction of community building has already been identified by the State Govt.

**4 Construction of Demonstration Houses using Bamboo based Technologies in North Eastern States**

In order to demonstrate the use of bamboo based technologies in more bamboo growing states, it is proposed to take up construction of demonstration structures like house, picnic hut, OPD building and a school buildings in the North Eastern Region. Ten demonstration structures will be taken up in identified State(s). The main objective of the project is to create and enhance social and professional acceptance and to upgrade skills of local artisans in improvised house construction using bamboo & bamboo based products.

**5 Demonstration of Retrofitting Techniques by Seismic Strengthening of Public Utility Buildings**

In the past decade and a half BMTPC has been at forefront in taking up post earthquake vulnerability studies and in promoting the earthquake resistant building technologies, with a special focus on the seismic retrofitting of the existing masonry buildings. With the Council's efforts 445 public buildings in Gujarat, 1 hospital building at Kupwara, J&K and 5 school buildings of MCD were retrofitting during the recent past.

In the series of retrofitting of MCD school buildings in Delhi, the Council during the year proposes to retrofit 5 to 7 more MCD school buildings to cover the other regions of the MCD.



## **TECHNOLOGY DIFFUSION AND DISSEMINATION**

### **1 Training Programme for Construction Workers such as Master Masons, Carpenters, Supervisors**

To achieve a comprehensive approach for adopting new and innovative technologies alongwith disaster resistant technologies there is a need to train the master masons, carpenters, supervisors and local artisans for adoption of these technologies in the field atleast at block/taluka level. The masons in the field may not be able to use new technologies in construction due to lack of knowledge. It is therefore proposed to organize training programmes on cost-effective & disaster resistant construction in various States.

### **2 Dissemination of Information through Seminars/Workshops /Exhibitions**

For large scale dissemination of cost effective, environment friendly building materials & technologies, it is proposed to organize and participate in the seminars/workshops and exhibitions in different parts of the country. It is also proposed to prepare and telecast a TV show on cost effective technologies. The Council will also prepare quarterly newsletters/journals including publishing of technical articles for promotion and dissemination of innovative technologies.

### **3 Strengthening of Technology Demonstration cum Production Centres**

The Council will be strengthening few Technology Demonstration-cum-Production Centres on cost and profit sharing basis with construction agencies in public and private sector to reach large construction organizations on demand basis for promoting innovative and cost effective building materials and technologies. It is also proposed to upgrade few machines for production of prefab building components.

### **4 Implementation of Performance Appraisal Certification Scheme**

BMTPC is operating Performance Appraisal Certification Scheme as a continuous activity to evaluate the performance of the new, innovative

building materials and systems on which Indian Standards are not available. In order to create wider awareness about the scheme it is also proposed to organize a workshop on the subject.

**5 Establishment of Permanent Display Centres at 4 Engineering/ Architectural Colleges**

In order to create awareness of the innovative building materials and construction technologies among engineering/architecture students fraternity, Council proposes to set up four permanent Display Centre in engineering /architecture colleges, so that the students not only get exposure to these materials and technologies but it also commands their confidence to adopt these technologies in the field projects.

**6 Updating of Display Panels, Exhibits, Models and Publications of Council**

In order to increase awareness on latest cost effective building materials and technologies, it is proposed to develop various information in print and electronic forms.

**7 Organization of International Workshop on Emerging Building Technologies at New Delhi**

It is proposed to organize an International Workshop on Emerging Building Technologies at New Delhi for identification, selection and information collation of new emerging technologies amongst various countries.

**8 One day Conclave on Building Centres at New Delhi**

Under the guidance of the Ministry of Housing & Urban Poverty Alleviation, the Council has prepared scheme for strengthening of National Network of Building Centres. In order to popularize the proposed revised scheme and to know the difficulties being faced by the existing Building Centres, the Council proposes to organize a 1-day conclave on Building Centres at New Delhi.

**9 Preparation of Handbook on Low Cost, Environment-friendly Housing Technologies for Developing Countries**

It is proposed to prepare handbook on low cost, environment-friendly housing technologies suitable for the developing countries.

**10 Preparation of video films**

The Council proposes to bring out following video films during the year:

- (i) Innovative Building Material Technologies
- (ii) Corporate Film on BMTPC
- (iii) Retrofitting of Buildings
- (iv) Bamboo based Technologies

The above films will be useful in dissemination of information on the activities being undertaken by the Council.

**11 Setting up of National Technology Demonstration and Training Centre in NCR region**

Construction plays a pivotal role in the development of all socio-economic sectors. Fast expanding development programmes, housing and building activities, continue to exert tremendous pressure on the construction industry for raising its efficiency and productivity. Technology is a crucial component for improving both and provides significant inputs for strengthening and growth of construction industry. Construction sector has major linkages with the building material industry since materials account for sizeable share of the construction cost. As a result of scientific and technological achievements, emerging new materials and state-of-the-art technologies both at national and global level offer a variety of options to meet fast expanding demand from development projects in different sectors and among large number of user groups. Keeping this in view, the Council plans to establish a mechanism and a platform that will provide a holistic exposure of the conventional, developing, developed and futuristic building material and construction technology options available nationally and globally.

The council proposes to establish, operationalise and maintain a state-of-the-art National Technology Demonstration and Training Centre for innovative building materials & technologies in NCR region. The Centre will be utilised for dissemination of information

of development of new construction technologies and building materials by organising exhibitions, conferences, seminars, workshops and training programmes for construction agencies, professionals, workers and artisans. The Council also proposes to start Professional course in the fields of construction and new materials & technologies at this centre. This centre will also be useful for promotion of investment, technology sharing, joint ventures and entrepreneurial activity in the area of building materials. Demonstration houses using new building materials and technologies will be constructed at this centre for propagation of cost effective technologies in a big way.

The National Technology Demonstration Centre will have the following facilities:

- Building for Display Centre
- Lecture Theatre
- Computerised Information and Documentation Centre
- Performance Evaluation Unit
- Shed for live demonstration of machines
- Yard for Demonstration/Prototype Buildings
- Casting/ curing yard, water tank storage, parking, etc.

Cost of land for establishment of the proposed centre will be met by the Council with the funds already available. The cost of setting up the Centre will be incurred out of the grants from the Ministry. In the long run, the centre will operate in a self financing manner with no additional requirement of funds for the same.

## **12 Quarterly Round Table Meetings with PWDs, CPWD, State Housing Agencies on Use of Innovative Building Materials Technologies**

In order to promote the use of innovative building materials and construction technologies in government construction agencies and to assess the problem being faced by them in adoption of these technologies, the Council proposes to hold constant interaction by organizing quarterly Round Table Meetings with PWDs, CPWD, State Housing Agencies, etc.

**13 Bi-annual Meet with Private Entrepreneurs, NGOs and other related agencies on Emerging Trends in Building Materials Industry**

To carry forward the core mandate of the Council in bridging the gap between lab to land, it is proposed to embark upon and endeavor to identify the new technologies which can be promoted and/or requiring further development for application in the sustainable development of housing sector.

**14 Capacity Building Programme for professionals on Innovative and Disaster Resistant Technologies**

It is proposed to organize a series of training programmes at different places on various topics during the year for development authorities, architects, engineers, planners, developers, etc. The themes of the training programmes will be selected to cover the wide spectrum of environment-friendly, energy efficient building materials, green technologies, and disaster resistant technologies. It is also proposed to organize a training programme on "Performance based Design & Retrofitting of Buildings against Earthquakes for SAARC Region" in New Delhi. The proposal has already been sent to SAARC Secretariat.

**15 Documentation of Best Practices on the JNNURM Projects**

The Council has appraised about 140 BSUP projects under JNNURM and also assisted the State Govts. in project formulation by undertaking capacity building programme for the municipal functionaries. In the process, the Council has been able to standardize the formats for DPR, technical and administrative checklists and housing designs. Some of the projects appraised by the Council have incorporated innovative building materials and construction technologies, design parameters, asset management on sustainable basis and community participation in project formulation and implementation. It is proposed to document these innovative concepts adopted by the ULBs in the form of best practices on the JNNURM projects.

## **16 Preparation of Model Building Byelaws**

Different amendments are proposed by different ministries and departments in Development Control Rules and Building Byelaws. Implementation of such amendments in generally isolation is problematic for state governments. It is therefore proposed to prepare model building byelaws incorporating all the amendments suggested keeping in view the latest codal provisions till date.

## **DISASTER RESISTANT TECHNOLOGIES**

### **1 Seismic Vulnerability Analysis of Brick Masonry Buildings**

It is proposed to undertake a study of Seismic Vulnerability Analysis of Brick Masonry Buildings. The scope & objectives of the study are:

- Review of literature on seismic vulnerability analysis of unreinforced and marginally reinforced brick masonry buildings.
- Identification/development of a procedure for seismic vulnerability analysis of brick masonry buildings with marginal reinforcement and demonstration of the procedure with respect to a building conforming to IS 1905 : Code of Practice for Structural Use of Unreinforced Masonry..
- Development of guidelines for seismic retrofitting of unreinforced brick masonry buildings.

The vulnerability analysis of existing marginally reinforced masonry structures would be useful in assessing the extent of possible damage to the structure when subjected to an earthquake. Predicting the possible damage to a structure helps in deciding the required repair/retrofit measures.

### **2 Preparation of Earthquake Tips**

In view of the tremendous success of the earlier series of 24 Earthquake Tips brought out by the Council in collaboration with IIT Kanpur, the Council proposes to prepare 8 more new Tips as an extension of the original series with the original format. The topics to be covered are:

- Confined masonry
- Load path and frame system
- Soil and foundation



- Non structural elements

These Tips will be targeted at an average civil engineer engaged in design or construction and will be in a very simple and illustrative manner. These Tips will also be useful for a common man. Tips will be released to all interested journals/magazines/newspapers every two months for publication. The Tips will also be provided on the web sites of BMTPC and NICEE. The intent is to have widest possible dissemination of the Tips.

### **3 National Consultation on Disaster Resistant Construction Technologies including Retrofitting**

It is proposed to organize a National Consultation on Disaster Resistant Construction Technologies including Retrofitting in New Delhi for formulation of necessary guidelines and discuss the policy issues for safety against natural disasters.

## **ACTIVITIES IN THE NORTH EASTERN REGION**

### **1 Setting up of 2 Bamboo Mat Production Centres in Bamboo growing areas including North Eastern States**

Two Bamboo Mat Production and Training Centres are proposed to be established in Bamboo growing areas including North Eastern States. The setting up of Bamboo Mat Production and Training Centre will facilitate availability of bamboo mats for production of Bamboo Mat Board, Bamboo Mat Corrugated Roofing Sheets and other structural and non-structural applications in the house construction and provide training to local men and women in Bamboo Mat weaving operations.

### **2 Setting up of Bamboo Mother Park at one location in North Eastern Region**

The objectives of establishment of Bamboo Technology Mother Park are as under:

- To facilitate both primary and secondary processing of bamboo under one roof.
- To develop human resources in the field of processing of bamboo to add more value to products

- To standardize the process parameters for the manufacture of value added products like bamboo mat boards, curtain boards, floorings, construction and furniture lumbers, BMCS, BMBS, Bamboo panels etc.
- To facilitate transfer of technology to the entrepreneurs for making these products
- To identify the suitability of different species for production of different products.
- To document region specific applications of bamboo technologies and developing technical manuals for wider field application.
- To identify newer application of multi bamboo which will undergo gregarious flowering on a commercial basis.

The above project will be undertaken in consultation with the North Eastern Council.

## **OTHER ACTIVITIES BEING UNDERTAKEN**

### **1 Appraisal and Monitoring of Projects under JNNURM**

The Council has been designated as one of the Appraisal Agencies for appraisal of Detailed Project Reports received under BSUP and IHSDP from identified Mission Cities under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). BMTPC is also helping the Municipal Bodies and State Nodal Agencies in preparation and modifications of DPRs through various workshops, meets, etc. and has actively taken part in the capacity building programmes organized by the Ministry of Housing & Urban Poverty Alleviation for the capacity building of the municipal functionaries in preparation of DPRs for the BSUP and IHSDP projects.

The Council has also been designated as Monitoring Agency for monitoring of the projects in the States. A detailed monitoring mechanism in consultation with the Ministry of HUPA has been evolved for effective monitoring of these projects.

### **2 Operationalisation of Revised Scheme of Building Centres**

The Ministry of Housing & Urban Poverty Alleviation is proposing to launch the revised Scheme of National Network of Building Centres. Accordingly,

the Council was asked to prepare the revised scheme. BMTPC has been designated as the nodal agency for operationalisation of the scheme. The Council would be undertaking the implementation of the scheme under the guidance of the Ministry of HUPA during the year.

### **3 India - Africa Cooperation Programme in the field of Housing and Human Settlements**

The Council has prepared a project titled "India - Africa Cooperation Programme in the field of Housing and Human Settlements" and submitted to Ministry for consideration. The proposal is likely to be approved by the Govt. of India during the year. The project duration is 5 years. The Council will undertake following activities under the project:

- Establishment of Human Settlement Centres in Mozambique, Namibia, Sudan, Ghana, Morocco
- Establishment of Centres of Technology Demonstration and Diffusion in Zambia, Congo, Uganda, Sierra Leone and Senegal
- Adaptation of technologies, R&D for adaptation, testing, certification, prototype development and batch production
- Organisation of Seminars/Exhibitions across the region including public private partnership
- Construction of 20 demonstration houses, at 10 locations
- Construction of 200 houses 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
- Facilitation for technology transfer including support to the professionals, students, delegations for training.

During the year atleast one Human Settlement Centre and one Centre of Technology Demonstration and Diffusion will be established by the Council including organization of Exhibition/Seminar and/or Training Programme at one place.

**4 India - UNIDO Cooperation Programme on Low Cost Housing for Asian, African and Latin American regions**

The Council is implementing the India-UNIDO Inter-Regional Cooperation Programme to promote technology transfer and investment in the area of building materials for low cost housing based on local resources amongst the developing countries of Latin America, Africa and Asia under the framework of MoU between MoHUPA and UNIDO. During the year efforts will be intensified to undertake activities as identified by the Ministry and UNIDO.

**5 One Day Workshops on Model Building Byelaws for Safety Against Natural Hazards – sponsored by Ministry of Home Affairs**

MHA sponsored one day Technical Workshops on Model Amendments in Town and Country Planning Act, Zoning Regulation, Development & Control Regulation and Building Regulation for safety against natural hazards was organized by BMTPC in 19 States/UTs. Officials from various state Govt. departments including engineers and architects attended these workshops and State Governments are taking actions to modify their respective bye-laws on the basis of recommendations of the Expert Group set by MHA.

In continuation of the above series, the Ministry of Home Affairs has approved organization of these Technical Workshops in few more States/UTs.

1. The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's development.

2. The second part of the report deals with the economic situation of the country. It is a very interesting and informative study of the country's economic development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's economic development.

3. The third part of the report deals with the social situation of the country. It is a very interesting and informative study of the country's social development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's social development.