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निर्माण सारिका

A Newsletter of BMTPC

निर्माण सामग्री एवं प्रौद्योगिकी संवर्द्धन परिषद्
आवासन और शहरी कार्य मंत्रालय, भारत सरकार
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
Ministry of Housing & Urban Affairs, Government of India

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From the Desk of the Executive Director

In order to keep pace with the India's growing urban population which is going to touch 815 million by 2050, India has to quickly build housing & infrastructure. It cannot be done with *business-as-usual* approach being adopted into construction sector over the years. The construction fraternity has to think *out-of-box* & introduce new sets of skills & use building technologies which can bring in efficiency & speed in the construction sector. World over, prefabricated, precast & offsite construction methodology has been used successfully to address common issues of fast-growing countries such as urbanization, housing shortage, environmental issues, sustainable development, resource efficiency etc.

India is also not lagging behind & through construction of six light house projects in six cities of the country using innovative technologies, Govt. of India has proactively become torchbearer showing path to the stakeholders regarding use of next generation construction materials, processes & systems. Hon'ble Prime Minister laid the foundation stone of these six Light House Projects (LHPs) in Indore, Ranchi, Agartala, Lucknow, Rajkot and Chennai on 1 January 2021. The LHPs are promoted as *Live Laboratories* for learning, facilitating transfer of technology to the field and its adaption in Indian context for further replication. The series of dissemination activities e.g. onsite training programmes, webinars, study tours, webcasting, e-learning etc. have also been initiated to encourage large scale citizen participation, build capacities and spread technical know-how.

(Dr. Shailesh Kr. Agrawal)

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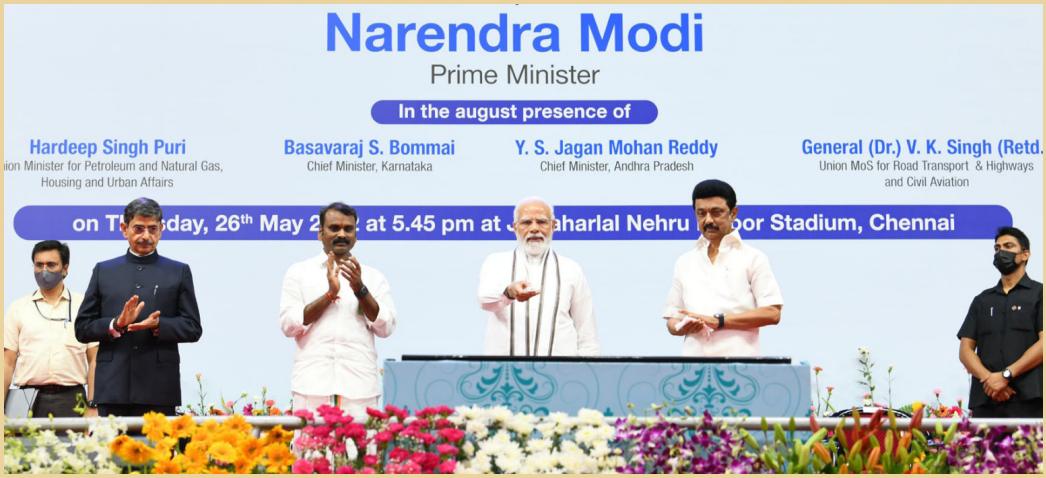
Inauguration of Light House Project at Chennai by Hon'ble Prime Minister



Hon'ble Prime Minister Shri Narendra Modi inaugurated Light House Project (LHP) in Chennai, Tamil Nadu on Thursday, the 26th May, 2022, constructed under Global Housing Technology Challenge-India (GHTC-India) of Pradhan Mantri Awas Yojana (Urban). The event was held at JLN Indoor Stadium in Chennai, wherein Hon'ble Prime Minister dedicated the LHP Chennai & handed over keys to beneficiaries along with other projects to the nation and laid the foundation stone of 11 projects worth over 31,500 Crore. Hon'ble Governor of Tamil Nadu Shri RN Ravi and Hon'ble Chief Minister of Tamil Nadu Shri MK Stalin were present on the occasion. Secretary, Ministry of Housing and Urban Affairs (MoHUA), other officials of the Ministry and BMTPC also attended the event.

While inaugurating the LHP, Hon'ble Prime Minister said, "I congratulate all those getting a house under the historic Light House Project at Chennai under the Pradhan Mantri Awas Yojana. It was a very satisfying project for us. We had started a global challenge to get the best practices involved in making homes that are affordable, durable and environmentally friendly. In record time, the first such LHP has been realised and I am glad it is in Chennai."

Emerging Technologies for Building Construction

PUF Sandwich Panel with Pre Engineered Building Structure

(Certified under BMTPC Performance Appraisal Certification Scheme (PACS), PAC No. : 1060-S/2022)

PUF Sandwich Panels with Pre Engineered Building structure is a combination of Structural Steel Framing System designed as per relevant Indian Standards, with PUF Sandwich Panels in wall and roofing system. PUF panels consist of a rigid PUF core sandwiched between color coated Galvanized Steel/Galvalume steel sheet facing on both sides, complete with joint sealants and fixing ancillaries, which is easy to install and affordable. The sandwich panel offers high thermal efficiency, comes with variety of finishes and can be installed easily & quickly for being light in weight. The Steel structural system of Pre-engineered building offers flexible design option with diverse layout possibilities/ architecture. It helps achieve very fast installation & durable structure.

Types and sizes of PUF Sandwich Panel Wall Panel

Standard size 1200 mm/customized (effective width), manufactured in thickness range from 50 mm to 150 mm as per requirement of customer, the panels have a CAM lock Jointing System.

Roof Panel

The Standard size of roof panel is 993 mm (effective width) and manufactured in thickness ranging from 30 mm to 150 mm as per requirement, the roof panels have overlap jointing system. The roofing panels have a large number of ribs, which increase the load carrying capacity of the panel and prevents deformation.

Uses of the System

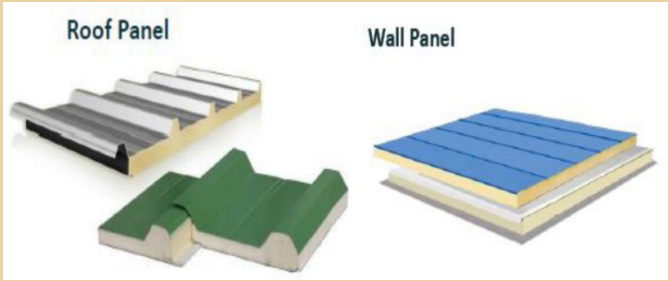
The PUF Sandwich panels can be used in construction of walls and internal partitions, as well as for roofs. The typical applications of PUF Sandwich Panel with Pre Engineered Building Structures include exterior / interior wall and roof of Industrial buildings, Commercial buildings, Row Housing, Multistory Buildings, prefab buildings, Site offices, Cold storages, Warehouses, etc.

Raw Materials

S.No.	Raw Material	Specification Conforming to
1.	Insulated PUF Panels	Iso(55%)& Polyol(45%)
2.	Colour Coated Coils	Fy245MPa,120GSM or 550MPa, AZ120
3.	HR Plates	Fy 345 MPa
4.	Cold form GP Coils	Fy 245 MPa,120 GSM or 275 GSM

Polyurethane Foam (PUF): It is a thermosetting material when it comes contact with fire, it does not drip or melt. It shall be Chlorofluorocarbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988.

Pre Painted Galvanized Iron (PPGI): The PPGI sheet shall have min. yield strength of 245 MPa conforming to IS 14246:2013 and shall have zinc coating of min. 90 Gsm as per IS 277:2018. The sheet shall have 5-7 micron epoxy primer on both sides and polyester top coat of 15-18 micron. The sheet shall also



have plastic protective guard film (Optional) of min. 25 micron to avoid scratches during transportation.

Flashing/Accessories: Made of PPGI sheet conforming to IS 14246:2013 and shall have zinc coating of min. 70 Gsm as per IS 277:2018.

PUF Sandwich Panels with Pre Engineered Building Structures/ Prefabricated Structures are made of Steel and Connecting components. However, the Agency can also provide EPS, Rockwool, Glasswool panels which are manufactured in house as per customers' requirement.

Manufacturing Process of Sandwich PUF panel

To make the panel, the 'Panel Press' equipment is used, which features a vertical hydraulic ram of the length and width of the largest panel desired to be produced. Profiling of the two faces of metallic facing is done as an 'Off line' processes and brought to and stacked on either end of the press. The base on which the bottom facing is placed is a precisely machined flat Platten equipped with a built in heating system. Sides of the mould are made of machined Aluminum extrusions (jigs), profiled to the male and female joint features. These jigs are specific to each thickness of panel being produced. Jigs also feature accurately positioned fixtures to mount "CAMLOCK" components, which get embedded in to the foam later. When the pre-profiled top and bottom facing sheets are placed in this mould with special spacers, a hollow space is created, which is ready for chemical injection.

This complete pre-assembly is moved laterally into the 'daylights' of the press by a positioning actuator. A heavy ram, which is a precision machined guided block, closes the mould tightly and holds the 'mould' firmly. The temperature controlled heated plattens keep the mould at the optimum reaction temperature. Through many nozzles provided on the sides of the 'mould', PU chemicals mix is injected to precise volume as per settings in the microprocessor controlled delivery head. The liquid mix finds its level well before the 'cream time' of the chemicals is reached. The foaming reaction starts and the foam rise gradually to fill the nooks and corners of the mould. The rising of the foam is complete well before the 'tack-free' time, when the adhesion to the sheets starts- i.e., well after the foam has filled the 'mould'. The assembly is held in position, in the preheated mould till after the 'mould release' time has elapsed. Maintenance of each of the time elements of the process is achieved using the microprocessor assisted control system.

Light House Project (LHP) at Chennai, Tamil Nadu

Project Brief	
Location of Project	Nukkampal Road, Chennai, Tamil Nadu
No. of DUs	1,152 (G + 5)
Plot area	29,222 sq.mt.
Carpet area of a DU	26.78 sq.mt.
Technology used	Precast Concrete Construction System - 3S System
Other provisions	Anganwadi, shops, milk booth, library and ration shop
Foundation	RCC isolated footing
Structural Frame	RCC precast beam/columns
Walling	AAC Blocks
Floor Slabs/Roofing	RCC partially precast slab
Door/Window Frame/ Shutters	• Pressed steel door frame with flush shutters, • PVC door frame with PVC Shutters in toilets, • uPVC window frame with glazed panel and wire mesh shutters.
Flooring	• Vitrified tile flooring in Rooms & Kitchen, • Anti-skid ceramic tiles in bath & WC, • Kota stone Flooring in Common area, • Kota stone on Staircase steps.
Wall Finishes	• Weather Proof Acrylic Emulsion paint on external walls, • Oil Bound distemper over putty on internal walls

Demonstration Housing Project (DHP) at Bhubaneshwar, Odisha

Project Brief	
Location of Project	Chandrashekharpur, Bhubaneshwar, Odisha
No. of DUs	32 (G + 3)
Built up area	11,782 sq.ft.
Carpet area of a unit	23.97 sqm.
Technology used	Reinforced Expanded Polystyrene sheet core with sprayed concrete
Foundation	RCC Strip foundation in M-25 Concrete
Structural Frame	• RCC framed structure • Expanded Polystyrene Core Panel System with Sprayed Concrete Structural Plaster for wall/slab/roof
Door/Window Frame/ Shutters	• Pressed Steel Door Frame with flush door shutter • PVC door frame & shutter in toilet • MS Section window frame with guard rail and glazed shutter
Flooring	• Ceramic tile flooring in rooms • Ceramic tile flooring in WC & Bath • Kota stone in passage
Wall Finishes	• Oil distemper on internal wall surface • Acrylic emulsion paint on external wall surface
Others	• Common area lighting with solar panels • Pathways with concrete pavers • RCC staircase with kota stone flooring

The LHPs and DHPs are being taken up across the country to showcase & spread know-how on emerging construction systems under PMAY(U).

Inauguration of Demonstration Housing Project (DHP) at Agartala, Tripura

Shri Biplab Kr. Deb, the then Hon'ble Chief Minister of Tripura inaugurated the Mahatma Gandhi Memorial Old Age Home in the august presence of Hon'ble Minister of Social Welfare and Social Education Department, Smt. Santana Chakma on April 25, 2022. The Old age home has been constructed under PMAY-U as Demonstration Housing Project (DHP) using new emerging technology "Structural Stay in Place Formwork System (Coffor)".

The DHP consists of 40 typical units (G+1) having built up area of 321.72 Sq.fts (29.90 Sq.mts.) of a room with pantry, toilet & balcony. The other provisions includs Office, Medical Room, Care Taker Room, Dining Room with Kitchen & Activity Rooms. DHP has been constructed at the land provided by Social Welfare & Social Education Department, Government of Tripura.

The Project also includes on site Infrastructure work road and pavement, boundary wall with gate, landscaped court, UG water tank, septic tank, rain water harvesting tank, external electrical work, solar street lights and provision for firefighting etc. The project is funded by Ministry of Housing & Urban Affairs (MoHUA), Government of India under Pradhan Mantri Awas Yojana - Urban (PMAY-U). The project was undertaken with the aim to popularize emerging building materials and technologies in the area as part of BMTPC's mandate to disseminate sustainable technologies.

Foundation Stone Laying of Demonstration Housing Project at Nagaland

Shri Hardeep S. Puri, Hon'ble Minister for Housing & Urban Affairs and Petroleum & Natural Gas laid the foundation stone of the Demonstration Housing Project at Dimapur, Nagaland in the august presence of Shri Tongpang Ozukum, Hon'ble Minister, Housing & Mechanical, Government of Nagaland on June 25, 2022 through Video Conferencing. The Demonstration Housing Project (DHP) will be used as Working Women Hostel and is being constructed using EPS Cement Sandwich Panels with steel structure.

The DHP consists of 40 Nos. (G+2) having built up area of 28.60 Sqmts. of a room, a pantry, toilet & balcony. The other provisions includes Office with Toilet (1 No.), Dining Hall with Kitchen (1 No.), Activity Room (1 No.), Medical Room with toilet (1 No.), Care Taker Room with toilet (1 No.), Community Centre: Single storey Multipurpose Hall with Kitchen, 2 shops & a office, 2 toilets & 1 physically handicapped toilet.

The Project also includes on site Infrastructure work such as Roads & pavements, Sewerage, External water supply, Drainage, Rain water Harvesting, External Electrification, Solar street lights, Fire-fighting works, Landscaping, etc. The project is funded by Ministry of Housing & Urban Affairs (MoHUA), Government of India under Pradhan Mantri Awas Yojana - Urban (PMAY-U).

For further details, please contact:

Executive Director
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
Ministry of Housing & Urban Affairs, Government of India
Core 5 A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi – 110003
Phone: +91-11-24636705; 24638096; Fax: +91-11-24642849
E-mail: info@bmtpc.org

@bmtpcdelhi
bmtpc.mhua
www.bmtpc.org