



# Promotion of Innovative Construction Technologies



## Top Stories

ARHC at Hosur, Tamil Nadu using Precast Construction System

LHP Lucknow using Monolithic Concrete Construction- Key handover

Sensitization Programme on New Construction Technologies

3,996 EWS houses using Innovative Technologies in GHMC, Telangana

Demonstration Housing Project at Jammu, Jammu & Kashmir

2,112 EWS houses with Monolithic Construction in Tamil Nadu

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## Affordable Rental Housing Complex at Hosur, Tamil Nadu

Hosur is an industrial city located on the bank of River Ponnaiyar in Tamil Nadu. The city is one of the major manufacturing hub of State and is home to major industries like Stellantis, Ashok Leyland, Titan, TVS Motors, Caterpillar, Ather Energy, Schaeffler, and many others. With more than 2000 companies, Hosur has a dire need of residential complexes to house the industrial workforce.

The Ministry of Housing and Urban Affairs, Government of India has been implementing Affordable Rental Housing Complexes (ARHCs), a sub-scheme of

Pradhan Mantri Awas Yojana - Urban to provide dignified living to industrial & construction workers, migrants working with market/ trade associations educational/ health institutions, hospitality sector etc. near their workplace. The Model-2 of ARHCs envisages construction, operation & maintenance of rental complexes by public/ private entities on their own available vacant land.

The ARHC Hosur, located in Krishnagiri district, is one such rental housing complex built by Tata Electronics Pvt Ltd.



exclusively for its workers. The project comprises of 10,756 dormitory beds distributed amongst 2,700 rooms. The entire complex has been built using 'Precast Concrete Construction System'. An already established technology for building construction, Precast concrete construction is a system where the individual precast components such as walls, slabs, stairs, column, beam etc, of building are manufactured in plant or casting yard in controlled conditions. The finished components are then transported to site, erected & installed. The technology provides solution for low rise to high rise buildings, especially for residential and commercial buildings.

This project has been implemented by M/s Vidiyal Residency Pvt Ltd. The Construction work was carried out in two phases in which Phase 1 comprising of 8 residential towers along with allied services such as central kitchen, medical center, commercial complex, STP, WTP, security block etc has been completed and is ready for occupancy. The Construction of phase 2 is in advanced stages of completion.

1	Total blocks	13
2	Number of floors in a typical residential tower	G+11
3	Number of rooms per floor	18
4	Number of people per room	4
5	Total Dormitory beds	10,756
6	Project Cost	₹ 580 crores
7	Area of a typical room	300 sft



## Precast Concrete Construction System

- Nearly all components of building work are manufactured in plant/casting yard & the jointing of components is done In-situ.
- The controlled factory environment brings resource optimization, improved quality, precision & finish.
- The concrete can be designed industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBFS), Micro silica etc.
- Eliminates use of plaster, helps in keeping neat & clean construction site and dust free environment.
- Optimum use of water through recycling. Use of shuttering & scaffolding materials is minimal. All weather construction & better site organization.



# Affordable Rental Housing Complexes ARHCs

## ARHC Hosur, Tamil Nadu

### Construction Process

The construction process comprises of manufacturing of precast concrete Columns, Beams and Slabs in steel moulds. The reinforcement cages are placed at the required position in the moulds. Concrete is poured and compaction of concrete is done by shutter/ needle vibrator. Casted components are then moved to stacking yard where curing is done for required time and then these components are ready for transportation and erection at site. These precast components are installed at site by crane and assembled together through in-situ jointing and/or grouting etc.





## Message from JS&MD (HFA) Shri Kuldip Narayan

Innovative construction technologies from across the globe are bringing a paradigm shift in the housing sector of the country. Such technologies surpass the conventional construction methods and play a crucial role in enhancing the efficiency & sustainability of houses. This e-Newsletter titled 'Promotion of Innovative Construction Technologies' has been tailor-made to keep readers informed about the array of alternate technologies adopted in mass housing projects under PMAY-U along with other developments in this sector.

In the Ministry, ours has been a continuous endeavour to promote Innovative Construction Technologies through various initiatives. The Light House Projects have

demonstrated the adaption of such technologies in high rise mass housing. Similarly, the Demonstration Housing Projects, showcase the use of relevant technologies in low rise and small projects. There are numerous cases under PMAY-U where beneficiaries have adopted such technologies in individual BLC houses too. Apart from these, various training programs, exhibitions etc by the Ministry contribute to awareness generation about innovative and alternate construction systems to the public at large.

I urge the readers to go through this e-Newsletter, which is a step to further understand how these technological advancements are shaping the way we build our homes, making 'housing for all' more accessible.



## Key handover in Light House Project, Lucknow

Over 30 selected families were handed over the keys to their houses at LHP Lucknow recently. The beneficiaries of the project also received a letter from Hon'ble Prime Minister congratulating them on getting a pucca house under Pradhan Mantri Awas Yojana- Urban mission.

The Light House Project at Lucknow, inaugurated by the Hon'ble Prime Minister, is an iconic manifestation of Innovative construction technology and a dignified living. The project has been built using Stay-in-Place PVC Formwork with Pre-Engineered Steel Structural System and comprises of 1,040 houses spread over 4 towers in S+13 configuration. The project has been constructed at a cost of ₹130.90 crore. LHP Lucknow has facilities of community centre and a shopping complex within the compound and all other amenities to enable families lead a secured and comfortable life.

The construction technology of LHP Lucknow is already in use in Canada & Australia. The plant manufactured rigid PVC based polymer components serve as a permanent stay-in-place finished form-work for concrete walls. This System is suitable for residential and commercial buildings of any height from low rise to high rise.



# Sensitization Programme on New Construction Technologies for Mass Housing

**B**uilding Materials & Technology Promotion Council (BMTPC) in collaboration with Indian Institute of Architects, Northern Chapter (IIANC) organised Sensitization Programme on New Construction Technologies for Mass Housing, on November 27, 2024 at New Delhi. The aim of the event was to increase awareness amongst architects, who are a major stakeholder in the construction industry, with the latest advancements in construction technologies, crucial for addressing the future of India's Urbanization demands. The event was inaugurated by Shri Srinivas Katikithala, Secretary, Ministry of Housing & Urban Affairs, Government of India. The event was attended by more than 60 architects and Government officials.





# Construction of 3,996 EWS houses using Shear Wall and Precast construction in GHMC, Telangana



<b>Name of the Project:</b>	Construction of 3,996 EWS houses at Bowrampet, Dundigal in GHMC, Telangana
<b>Project cost:</b>	₹ 345.65 Cr (Housing: ₹ 315.68 Cr. & Infra Cost: ₹ 29.97 Cr.)
<b>No. of Dwelling Units:</b>	3,996
<b>Built up area:</b>	560 Sft. (52.02 Sqm)
<b>Carpet Area:</b>	398 Sft. (36.97 Sqm)
<b>Construction Technology used:</b>	Mivan/shear wall Construction, Precast Construction apart from Conventional technology
<b>No. of Floors:</b>	C+S+9

## Construction Technologies used in project

- Mivan/Shear wall Construction using Aluminium formwork
- Precast construction using precast walls and Hollow core slab panels
- Conventional construction using regular formwork





## Mivan/Shear wall Construction

Mivan is an aluminum formwork system that revolutionized the industry. This methodology employs pre-engineered, factory-made aluminium panels to construct walls, floors, and other structural components. One of the primary differentiators between conventional and Mivan construction lies in their respective construction timelines. Mivan construction is renowned for its remarkable speed and efficiency. The utilization of pre-engineered panels enables swift assembly and dismantling, effectively reducing construction time by up to 30-40% when compared to conventional methods.

## Precast Construction

Precast construction method involves setting up of casting yard, production & stacking, transportation and erection of precast elements. Precast Construction is effective in terms of time, labours requirement, superior quality, better performance & finish, optimal material requirement, less wastage, reduced use of shuttering, desired shape, better finish etc., It is convenient to establish precast yard and to erect the precast elements at (near) site which speeds up the process & contributes towards mitigating delays in large scale construction projects. As this method requires huge initial investments, it is feasible for Large Scale Construction Projects.

## Conventional Construction method

The conventional method, also known as in situ construction, involves building structures using RCC framed structure directly at the construction site using raw materials.





## Demonstration Housing Project (DHP) at Jammu, Jammu & Kashmir

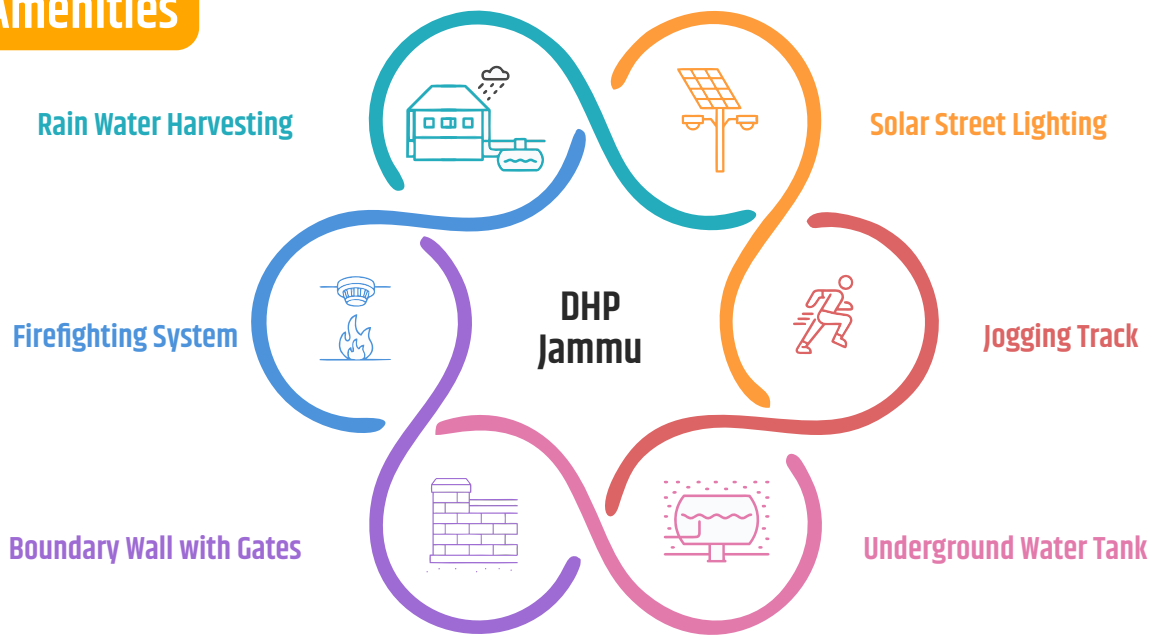
The Demonstration Housing Projects feature model houses built utilizing innovative construction technologies with around 40 houses in a single project. These projects allow industry practitioners to gain hands-on experience and insights into modern building techniques. The DHPs are a part of Technology Sub-Mission (TSM) under Pradhan Mantri Awas Yojana - Urban and are executed through BMTPC.

The DHP in Kot Bhalwal, Jammu comprises of 40 houses in G+2 configuration along with a separate dining hall and other provisions. This location is strategically positioned adjacent to proposed construction of 760 EWS houses as a part of the Affordable Housing in Partnership (AHP) component of the PMAY (Urban) Mission. The project is constructed using Prefabricated Sandwich Panel System - EPS core panel using Quikbuild Panels.

Category	Details
<b>Nodal Agency</b>	J&K Housing Board
<b>Project Location</b>	Bhalwal, Jammu
<b>Project Usage</b>	Sports Hostel
<b>Plot Area</b>	4048.00 Sq. mts
<b>Dwelling Units (G+2)</b>	40 Nos. with 2 Rooms, Kitchen, Toilet & Balcony
<b>Carpet Area of a Unit</b>	28.57 Sq. mts
<b>Built up Area of a Unit</b>	35.35 Sq. mts
<b>Total Built up Area</b>	2054.00 Sq. mts
<b>Other Provisions</b>	<ul style="list-style-type: none"> <li>• Office with Toilet</li> <li>• Dining Hall with Kitchen with store</li> <li>• Activity Room cum Gym</li> <li>• Medical Room with toilet and store</li> <li>• Care Taker Room with toilet</li> <li>• Laundry Room</li> </ul>



## Other Amenities



## EPS core panel system

EPS core panel using Quikbuild Panels as walling (Prefabricated Sandwich Panel System) and EPS roof/slab Panel with concreting - QuikBuild panel system consists of a welded wire space frame integrated with a polystyrene insulation core. The wall panel is placed in position and a wythe of concrete is applied to both sides. The wall panel receives its strength and rigidity from the diagonal cross wires welded to the welded wire fabric on each side. This combination produces a truss behavior, which provides rigidity and shear terms for a full composite behavior. Steel trusses are pierced through the polystyrene core and welded to the outer layer sheets of galvanized steel mesh to form a rigid panel. The shell of the structure is built by manually erecting the panels directly onto the slab with reinforcement rods.

Desired utilities like doors, windows and ventilators are pre-built while plumbing, electrical conduits are added onsite. The wall is then finished by plastering with cement using the traditional method or by shotcreting machine to create a monolithic structure. These panels are used in the construction of exterior and interior load bearing and non-load bearing walls and floors of buildings of all types of construction.



### Specifications

#### Foundation

Isolated RCC column footing/pile foundation with Plinth beam

#### Walls

Prefabricated Sandwich Panel of EPS with sprayed concrete

#### Roofing

EPS Sandwich Panels with screed concrete.



## 2,112 EWS houses with Monolithic RCC Concrete Construction in Kancheepuram, Tamil Nadu

Tamil Nadu Urban Habitat Development Board has constructed 2,112 EWS (G+3) storey tenements at Kilkathirpur Village in Kancheepuram district at a project cost of ₹190 Cr under Affordable Housing in Partnership (AHP) vertical of Pradhan Mantri Awas Yojana - Urban. The entire project has been constructed with Monolithic RCC Concrete Construction using Mivan Technology.



**Project name: Construction of 2,112 EWS tenements (G+3) with infrastructure at Kilkathirpur village in Kancheepuram District**

Name of the City	Kancheepuram
Name of the scheme	Kilkathirpur Scheme
No of Dwelling Units	2,112
Project Cost	₹190.08 Crore
Plinth Area	357.88 sq. ft
Carpet Area	282.24 sq. ft
No of Floors	G+3
Total no of Blocks	33
No of Tenements for one Block	64

### Infrastructure Facilities



Primary Health Centre – 1 No



Primary School – 1 No



Milk Booth – 3 Nos



Ration Shop – 3 Nos



Convenient Shop – 18 Nos

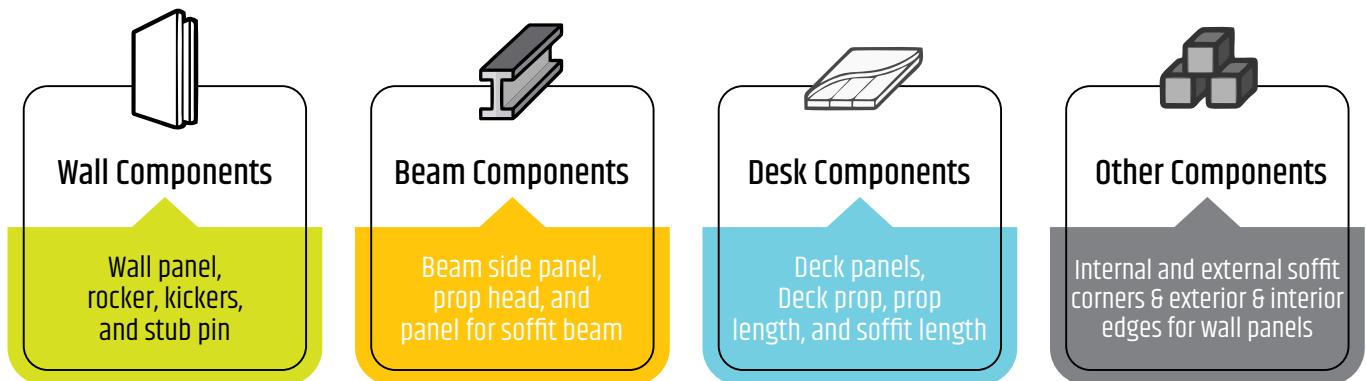


Sewage Treatment Plant - 1 No



Mivan construction is a fast paced construction technology that is built to offer strength and durability to buildings built using aluminium formwork. This technology is preferred for constructing a large number of houses in a limited period of time. This technology also makes use of room size structures to construct slabs and walls. It permits shuttering for both slabs and columns in construction. Walls of huge room size, as well as floor slabs, are done right through this kind of Mivan shuttering. They are extremely sturdy and strong forms and are constructed with the utmost accuracy plus it is easy to manage.

## Major Components of Mivan Formwork



There are three unique construction techniques used by the Mivan technology:

1. **THE SETTING OF THE ALUMINUM FORMWORK** - The aluminum formwork of the Mivan technology is set around the factory-made steel mesh, instantly built on the construction site.
2. **PLACEMENT OF ALUMINIUM FORMWORK** - In addition to the wall strengthening steel, room-sized walls, and structured floor slabs, these aluminum metal slabs are also easy to handle, made accurately. To combine these structures, the pin and spearhead system is used which can be destroyed once the structure is ready.
3. **POURING OF CONCRETE** - Once the forms are shaped, high quality concrete is poured into the structure which is removed later to help make a structure backed by strengthening steel.

