

NEW INNOVATIVE CONSTRUCTION TECHNOLOGIES IN AFFORDABLE HOUSING



WHEN MODULES MAKE A HOME

The entire building, made of individual modules, is pre-cast based on the specifications and dimensions given. The structure is built fast and lasts long too. By Nandhini Sundar

Walk through any construction site and the scene that greets you is the presence of hordes of labourers working with construction materials. Many a time shacks prevail on the borders of the site, housing the labour. Dust and accompanying chaos is an integral part of this scene.

What if all this can be changed, the construction site left clean sans the mess, with only engineers and machinery present, the building coming up at a pace hitherto unimagined. Sounds like a fairy tale? Perhaps not. Not if the 3D monolithic modular technology that is fast gaining popularity is opted for.

A technology widely in use in countries like Singapore and Australia, it is now being tested in India, the Tata Housing Boisar project having already adopted it, the multi-level housing complex completed within 33 days. The technology, with its range of possibilities, offers the prospect of bringing in a paradigm shift in the construction techniques hitherto adopted in the country.

Under this technique, the structure is not based on beams and columns with accompanying hollow block walls. Neither does it involve the use of concrete slabs with their multiple joints, which is currently quite popular. Instead, the entire volume of the space is pre-cast based on the specifications and dimensions given and fitted in as individual modules.

These 3D components in the form of modules are stacked together, eventually forming the entire multi-

storeyed building. Since columns and beams do not prevail in this technology, the entire volumetric modular system serves as the load bearing structure for the building.

Explaining the technique of the modules, S.J. Vijay, Director, hoM Mission India, says, "There is a casting yard at the site where the modules are done based on the given specifications. The manufacturing here is standardised, with the reinforcement connecting the entire module. This means that every square foot of the structure of the building is reinforced, interconnecting the entire building, ensuring it does not collapse easily even in the case of natural disasters."

MONOLITHIC PIECE

He further adds, "Unlike in the case of concrete pre-cast slabs that require multiple joints, here each module is fitted perfectly into a 30mm drop, with no multiple joints. The entire module is cast as one monolithic piece. The plumbing and electrical conduits are all planned and fused into the module before the casting. The quality as well as the finish is also retained as the casting requires the use of M40 grade concrete as against the conventional M25 grade or less. This, together with the reinforcement, makes the structure strong enough to last a century."

It is natural to assume technology comes only at a price. Vijay allays such fears, pointing that the cost per square foot is the same as conventional construction.

"The advantage is the speed of construction as well as the assured quality. Operating with unskilled labour not only raises quality issues but also comes with problem of labour shortage as well as delays which the construction



CHOOSE FROM A CATALOGUE



YOUR HOME MANUFACTURED OFFSITE



YOUR HOME TRANSPORTED TO YOUR SITE



YOUR HOUSE INSTALLED ON YOUR SITE



YOUR HOME FINISHED

WEEK 0

WEEK 1

WEEK 2

WEEK 2

WEEK 3-8

industry is currently battling with. This technique is driven totally by engineers and machines.”

Commenting on the technique, Architect Shyamala Prabhu, Chairperson, IIA Bengaluru Chapter, says, “This technology would be suitable for affordable housing units where standardisation is the norm. In high-end developments, customisation is the key and in many cases a strong leaning to bring in traditional materials and designs is prevalent where this would not be relevant. Even where customisation is possible, the cost may not match the conventional approach.”

Vijay, however, refutes this contention, pointing that while the structural element is prevalent in every centimetre of the module, “The strength lies in the corners, just as in the column and beam grid. If spaces need to be opened up, the walls can be removed after leaving 30cm on either side.” As for bringing in differential designs that are not confined to a box form, he avers, “The moulds can be cast based on these differential specifications.”

Says architect Leena Kumar, Chairperson IIA Karnataka Chapter, “In a country which is abounding with unskilled labour, requiring to be employed, the construction industry serves as a vital source for employment. Replacing labour with machines may not be the option at this point of time. Besides, labour comes with its own individual unique skill sets which are effectively employed. Using this technique for individual units where design and customisation serve as the key, many a time linking to traditional modes and materials, currently may not serve to be a suitable option.”

Vijay, not surprisingly differs. “We will soon have villas done in a month, the structure complete in a week. And if the affordable housing target set for 2022 is to be met, the 3D monolithic modular technology is the answer.”

If the current interest evinced in the technology is to go by, Vijay may prove to be right.



SHIPPING CONTAINERS INTO HOMES

"We are in the process of converting shipping containers into homes," was the straight-faced response from Hemant Attray, who along with his BITS-Pilani batchmate Rajesh Kotta, started Square Plums last year.

When ready, these are loaded onto trucks and eventually installed on a site that is pre-owned by a property dealer.



AFFORDABLE HOUSING

Attray's product offers a unique solution to the supply problem around affordable housing in India. Sourcing new as well as recycled containers from ports across India, it will be fabricated, welded and designed by the startup in several factories in and around Bangalore.

With each unit sized at 200 sq ft, this is designed to mimic a small studio room meant for one individual.



The concept has been successfully demonstrated in places like Dubai, Hong Kong and some pockets of Europe for hostels, shopping malls, hotels and even hospitals," says Attray.

But, is the idea of being boxed up in a large steel container in a summer-strong country like India really the best solution to soaring real estate prices?

These homes come with zero brokerage and no hefty deposits, and are available on rent for as low Rs 6,500 a month.



Located in prime locations and strapped with top-end amenities, these are curated and designed specifically for singles and working professionals who otherwise have to settle for run-down PGs or dilapidated one-bedroom flats in questionable localities.

What is more, it assures landlords nearly 50% higher rentals even as tenants enjoy cheap yet quality stay.





A typical 3-bedroom apartment in Bangalore goes for close to Rs 30,000 (depending on the location), and the market price for many homes listed with us also come up to the same amount. Instead of selling the whole apartment as one unit, we fractionalize it and sell it either as six beds or three rooms. Now, six people will bring in about Rs 9,000 (a bed) on an average, bringing the total payment a month to Rs 54,000. Profits thereafter is shared between Square Plums and the landlords.

(Source: Anu Thomas, ET Online)

Though India's first container home was built in Bengaluru five years back, container homes are still a new concept. While mobile offices, mobile medical services and mobile classrooms are becoming popular, container homes have yet to become a part of the Indian housing story. Not that things are not changing already. According to a report by The Times of India, interior designer Neeraj Khandelwal is designing container homes for high-net-worth individuals in South Delhi and Gurgaon. According to him, people are making an addition in their farmhouses in areas such as Chhatarpur.

Another example is a studio apartment in Pune created by Dhara Kabaria, an interior designer. She had purchased a container from the Bombay Port Trust for the purpose. The complete process took eight weeks and cost a total of Rs 15 lakh.

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