

## TO STUDY THE TYPES OF MODERN METHOD OF CONSTRUCTION IN INDIA

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### ABSTRACT

In India, the Census Commission describes a major city as having a population of over four million. Kolkata, Chennai, Hyderabad, Delhi, Mumbai, Bangalore, Ahmedabad, Pune, Surat and Nashik are Indian cities with a population of over four million. The fast-growing city is facing a housing crisis as there is a lack of affordable housing in the city to make it easier for new families to buy a home, for essential social workers to pay for housing, for low-income people to have a home. Therefore, the government in this particular region relies on today's Modern Method of Construction that can help the middle class and the poor to adopt affordable housing. This inexpensive house includes the simplification of building structures to make major goals and the operation of machinery for the construction work.

**Keywords:** Census, Commission, Affordable, Modern Method of Construction.

### I. INTRODUCTION

The term modern construction methods (MMC) accepts many methods that involve off-site manufacturing or assembly. The definitions of MMC vary from previous years but for the purposes of this study which type of MMC can be used. Traditional construction often refers to methods and techniques used for centuries to build houses and other structures. Construction occurs mainly or entirely on site, and involves a series of processes in which one phase of work needs to be completed before the next start. It is considered a very 'handshake' process. In contrast, modern construction methods (MMCs) are a process in which individual components are made separately - either in industry or, if they are on site, away from the actual development building; materials are transported to the site in a complete manner and consolidated locally with a small amount of effort. The main reason for considering the use of MMC is to implement a rapid construction program. Reasons to consider MMC include improving the quality of construction, affordable housing, use of space, saving time, addressing skills shortages, and improving health and safety. Obtaining a dense climate envelope, reducing costs and improving operational environments are also mentioned. Housing organizations are encouraged by the need to deliver housing faster, and it is more expensive and the results suggest that they believe the MMC will help them achieve this goal. There is an undeniable need for more new homes and the housing industry is slowly increasing its production. Modern Building Methods are about better products and processes. They aim to improve business efficiency, quality, customer satisfaction, environmental performance, sustainability and predicting service delivery times. Modern Building Methods, therefore, are based on much broader than a specific focus on the product. They engage people in their quest for improvement, through better processes, delivery and construction work.

### II. LITERATURE REVIEW

**(Modern Methods of Constructions and Their Components Lenka Kyjaková 1, Tomáš Mandičák 2 & Peter Mesároš 3 2014)** In this paper Literature states the Increase in the construction industry may appears concept of modern methods of construction in the delivering of faster and more efficient construction. One of these methods & system is volumetric structural systems. Common ground benefits of modular construction philosophy begin to break the unprofessional especially from the public as it is going to provide affordable housing with low space utilization and cost saving. The article mentions the modern methods of constructions, with points to one of their components & specifically to modular constructions.

**Modular building (Cal Harvey 2016)** In this paper Literature states the case of Modular building holds the promise of overcoming the challenges facing by Canada's construction industry. Construction companies are slow to embrace the benefits. The studies addressing the engineering challenges in this innovative building

system, the Canadian modular industry is behind the developed world. Seven potential non-engineering barriers to modular construction is identified in the literature reviewed.

**Modular buildings in modern construction. Procedia engineering, 153, 167-172. (Generalova, E. M., Generalov, V. P., & Kuznetsova, A. A. (2016).** In this paper Literature states Modern modular systems are based on using not only large elements such as block rooms with various small 3D building elements mention. The analysis result of Russian developments the construction of modular buildings also proves that Russia has great exp in the building 3D reinforced concrete modules. The results of the article show promise for developing the modern modular construction systems in order for the population with affordable, comfortable and eco-friendly housing.

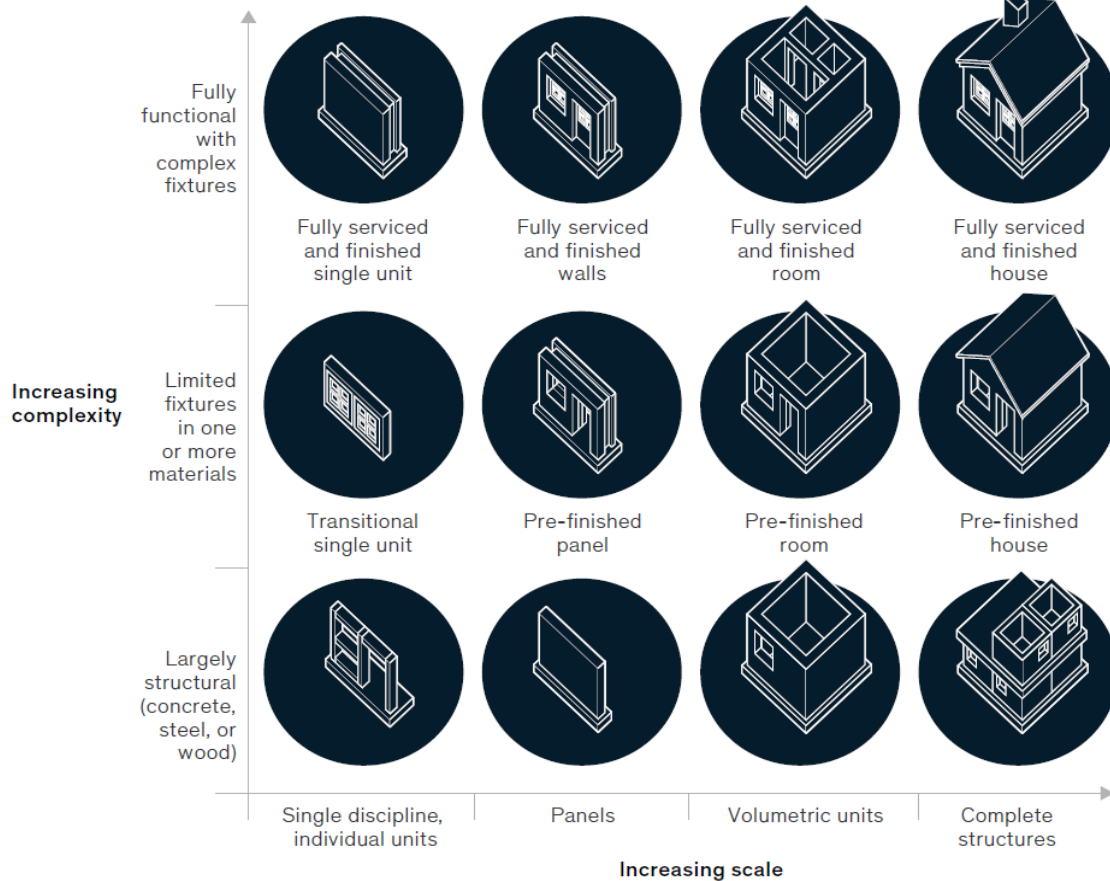
### III. METHODOLOGY

Methods of Modern Method of Construction and Their Analysis: -

#### 1. THREE-DIMENSIONAL (3D) VOLUMETRIC DESIGN ANALYSIS: -

A Three-dimensional volumetric construction is a modern form of construction in which large, standard modules are made in a factory room, and then delivered to the site and assembled locally. Modules can also be installed before accessing the site. This approach is suitable for high-density buildings such as houses, hotels, schools and prisons. In its purest form, the volumetric modules come together like a jigsaw and do not require additional structure or additional facades. But the industry has yet to fully embrace the model, and projects often take a hybrid approach that combines offsite and traditional approaches. For example, panels can be attached to a metal frame, wood or concrete, or a “skin” of bricks to give the impression that the structure is constructed. Hybrid construction is popular with contractors, but it fails to get the full volumetric gain. This is because it still requires large groups of commercial people on site, as well as complex work sequences. Volumetric, in contrast, has the potential to deliver significant victories over time, reduce waste and control quality. Modular construction can accelerate construction by up to 50%. In the right environment and commercially, it can reduce costs by 20%.

Complexity and scale of modular construction—comparison of approaches



Seven factors determine the attractiveness of a market for modular.



**2. PRECAST CONCRETE FOUNDATION ANALYSIS: -**

Cast-in-place slab floor system systems are highly flexible as they give the designer freedom from architectural designs. These systems include: one-way slab and beam, ribbed slab, flat slab, flat slab with drop panel, two-way slab and beam, waffle slab, and waffle slab with drops, flat slab with column capitals, slab with slab band. The average length to up to 45 depths with two library systems for a cast-in-place concrete slab can be a shallow floor system when using post-tension as it allows, resulting in an 8 "slab thick for a typical bay of 30 ft x 30 ft when compared to a 12 "thick slab for the same port where no post tension was used. Major constraints on installation, in general, cost and time required for striking, construction, pouring, and stripping operations. In addition, post-conflict activities increase construction costs, duration and complexity as it requires the involvement of special contractors.

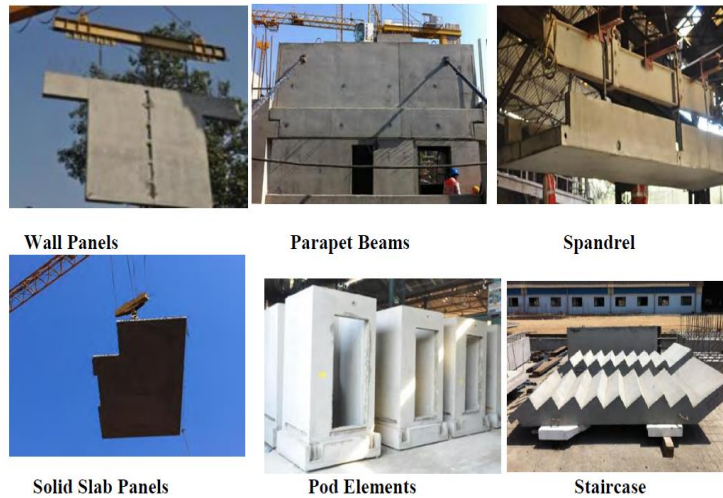
**3. PRECAST CONCRETE PANEL SYSTEM ANALYSIS: -**

The Precast building system is usually a large panel, modular or a combination of both. The Precast Large Construction Panel (PLCP) system contains a variety of precast materials such as walls, beams, slabs, columns, stairs, slopes and other custom-designed materials designed for stability, durability and integrity of the structure. The construction of a Precast residential building includes the construction, planning of courtyards, lifting, managing and moving precast materials. This technology is suitable for the construction of high-rise buildings that withstand the rear wind loads and gravity forces. The structure of the structure is designed in such a way that a high number of molds are obtained. These items are placed in a controlled factory condition. The factory is located on or near the site which provides a cost-effective solution in terms of storage and mobility.

Typical size of precast elements is given in Table 1\*

**Table 1**

Sr. No	Precast Components	Typical Sizes
1	Wall Panels	5m X 2.85 m
2	Slabs	3m X 5m
3	PODS	1.52mX1.36mX2.83
4	Beam	0.20 X 0.40 X L
5	Staircase	-
6	Columns	0.90m X 0.35m X2.85m



### Precast Installation

Prior to the actual installation of the precast concrete elements, it is necessary to carry out proper planning and the preparation of the work, in order to ensure the high quality of the installation. The following items need to be pre-planned:

1. **The method & Sequence of the Installation and Assembly:** Ready-to-assemble elements must be identified on the basis of their number, location, and tagged.
2. **Temporary Support method:** The Element must be supported with temporary until they are stabilized. As a general rule, a structural element with an adjustable end be used for the mounting of the panels.
3. **Installation tolerances:** Tolerances should be based on the combination of the position of the design considerations and should be clearly stated.
4. **Material handling and Rigging requirements:** Highlight the parts need to be checked for the overload of stress, and the taps must be of sufficient capacity to handle the pre-fabricated panels. In the calculation of the load capacity, it is necessary to take into account the effects of not less than 10%. At the place of installation, the panels must be first unloaded and stacked, or directly lifted with a crane. The cranes will be released on the next liftin only as a temporary support to be installed. The shims should be used to carefully adjust the elements are prior to the grouting of the joints. The panels need to be grouted after the final adjustment made.

Precast elements Production has to been done in casting yard. Moulds of adequate stiffness have been used and installed as per issued drawings. The no of activities involved for the production of elements of precast is as follows:

- Mould cleaning and preparation
- Shuttering / Assembling the mould components
- Fixing of rebars / cast-in-fittings
- Pre-concrete check
- Concreting
- Curing
- Demoulding
- Final inspection
- Stacking

#### 4. STRUCTURAL CONCRETE WALLS

System for the construction of concrete walls present a method, which is based on the concepts of large-scale production, increasing labor productivity. This method structure's and the acoustic-thermal's system is the combined in one. The walls made are of concrete & complementary systems, as hydraulics and electrical, are combined together before dumping concrete. The main factor of the system is to replace of the traditional

masonry system with structural concrete pillars and beams for single wall filled with reinforced structural concrete.

#### IV. RESULTS AND DISCUSSION

##### A. FACTOR CONSIDER FOR SELECTION OF MMC METHOD

Studies have attempted to develop a link for measuring affordable housing satisfaction. Following areas are denoted according to research areas are Space Utilization, Cost Effective Construction ,Time Saving Construction, Factors Affecting for Surrounding, Flexible enough for modifications, Directions for improvement ,.Repair and Maintenance ,Observations of quality measurements, Variety of other components that can be used as replacement parts, Suggests suitable measures for improvements of service quality, Identifies futures needs etc.

##### B. METHOD SELECTED FOR RESEARCH ASSESSMENT: -

Considering the above research assessment factors, the Modern Method of Construction selected for cost comparison for affordable housing is **PRECAST CONCRETE PANEL SYSTEM**

##### C. DESIGN CONCEPT FOR PRECAST SYSTEM:

###### STRUCTURAL CONCEPT:

The overall behaviour of a precast structure is dependent on the behaviour of the connections which must provide: Resistance to all design forces, Ductility in case of excessive deformation, Resistance to volume changes and related forces, Adequate durability, Required fire resistance, Feasible production considerations, Feasible construction considerations

#### V. CONCLUSION

- All studies Concluded that the Precast Concrete Panel System based on factor as Modern Method of Construction in India.
- But, still, there are a number of conditions that we need to take good care when you are using a Precast Concrete Panel Systems, which are of the quantity, the design, the distance of the place, and the units of production.
- It's Definitely, a more effective way to build. The end-user which won the effectiveness of the house. Don't have to spend time on the construction site, and so that the nearby surrounding environment will not be affected.
- The MMC's contribution is that it can be even faster, providing a limited range of similar homes.

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