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As a professional COA registered Architect, She have had the opportunity of gaining experience on design and management of wide range of Architectural projects that includes individual residences, bungalows, Apartment projects, Media Studios, Commercial buildings & Office spaces.

Over the past few years she had the opportunity to render her services as a teaching professional in an Architectural Design school. Currently, she is rendering her services as a freelance Architect, Interior Designer and Project Manager. Areas of interest involve, Construction Management and Building services,

## PREFAB CONSTRUCTION SYSTEM & ITS AID IN PANDEMIC FIGHT

### *Abstract*

The intent in this journal is aimed at studying standard prefabricated and modular design and also try to go beyond the research that typically centers around what prefab is and its general applications; this research additionally targets considering the effects, positive or negative, that pre-assembled/prefabricated structure has on structures in urban regions, and its development techniques and property market and how prefab aids during pandemics and facilitate in the country's GDP growth.

Prefabricated construction is being utilized generally by several nations around the globe, which is one of the most practical and quality pragmatic framework. Because of the protective condition, the quality and productivity can be checked and wellbeing can be guaranteed. The study intends at finding out and understanding as to why the prefabricated system has taken such a long time to break into the Indian construction and development markets; and will prefabricated systems have an impact on the Architecture, Design and how it affects on the buildings aesthetically in comparison to conventional buildings in mid & large scale segments. This also studies the impacts of prefabricated structures on a structure's uniqueness and sustainability.

Furthermore, the purpose is in like manner to examine development delays because of which tasks experience time deferrals and cost overrun and how prefabricated structures can aid to solve this to a large extent. Construction delay is an incessant issue in the development business and it adversely affects activities' achievement in terms of time, cost and quality. The variables like time and cost are examined in conventional and in prefabricated construction. The purpose of this research iis assessing distinctive prefabrication advancements and systems in developing nations. Prefabrication in development has the ability to have any sort of impact inside various nations' construction industry in money related, social and ecological terms.

The study and research also intends to find what the future holds on prefabrication in Bengaluru's mid & high rise segments. The issue focused here is interpreted through surveys and interviews, and dependent on contextual analysis



Architectural & Interior Design, Sustainable Architecture, Energy Efficient Buildings and alternative building technology.

from comparable procedures of prefabrication frameworks been brought into different nations.

Also, the study intends to find advantages of introducing the prefab construction system and technologies in the Architectural curriculum as a course material, as we can foresee this technology as the future of construction industry.

**Keywords :**

*Prefabricated & Modular Construction; Pandemic, time delays and cost overrun; Property Markets*

### 1. Precast and Prefabrication

In the world of construction, there are numerous methodologies used during the creation of buildings, structural foundations, and modules. Two important processes that are regularly used during construction projects are Precast and Prefabrication.

These two processes have a similar concept but offer two different solutions for construction business.

**Purpose :**

As per a survey, Prefab Construction have many potential advantages over site-built projects for the following reasons :

- The site waste /Construction waste is reduced.
- Construction in a controlled environment ensures better quality standards & insulation
- Accurate measurements and connections.
- Reduce the overall energy consumption .

The demands on infrastructure in India are huge. Given the country's decentralization and its building trades' reliance on manual labor, this level of modular building

integration has been a far-off dream across all sectors.

As far as affordable housing sector is concerned, prefab construction offers itself to be of higher quality and more durability than the public sector can supply. Aim is to study and understand the prefab building technologies and all practical aspects of transport and installation of the prefab units and how this advanced construction system and technology could be introduced in the architectural curriculum as a course material.

**Need :**

Looking ahead to building trends in post-pandemic world !

Post Pandemic 2020 ; world is changing, changes that disrupt previous relationships and naturally change the future of the city, architecture and construction .

From accelerating existing trends to inspiring technological advances, the Covid-19 pandemic is poised to have a lasting impact on the way future buildings are designed, built and used.

Engineering, construction, and building materials have a vital role to play in a post-pandemic recovery of our communities and economies.



Post-pandemic construction should be driven by ***Collaboration, Innovation and Sustainability***.

Prefabricated Modular Buildings are ideal for providing workforce housing accommodation, real estate offices, banks, classrooms, medical centers, recreation centers and others.

### **1.1 Prefabrication in India:**

Prefabricated Construction in India began with Hindustan Housing Factory production.

The organization was founded by India's first Prime Minister, Pandit Jawaharlal Nehru, as a response to the emergency accommodation that existed during the 1950's due to the refugee deluge. Construction in India will continue to grow as demand for fast, affordable accommodation increases.

Nevertheless, the innovation revolution of the prefabrication process, including materials and digital devices, may have an opposite effect on the embracing nation's climate, economy and culture. There are risks associated with moving to creativity in prefabrication design. Delays and cost overruns reduce the efficiency of the available economic resources, limit the potential for growth and reduce the economic competitiveness.

### **1.2 Prefabrication Construction Market in Bengaluru, India**

In Bengaluru real estate developers have shifted their focus from traditional brick and mortar construction techniques to contemporary prefabricated technology. The prefabricated construction not only ensures optimal use of steel and concrete, but also reduces up to 15 per cent of the average construction cost.

Prefabricated technology has emerged today as a solution to stringent deadlines for construction and to maintaining consistent project quality. Increased precision, timely completion and faster project delivery have made it a popular choice among metro-specific real estate developers, especially Bengaluru.

Many developers who trade in the affordable housing sector or have recently forayed into the market are embracing prefabrication technology as it complies with building quality requirements, decreases waste and accelerates project growth without raising construction fees. As a popular builder has said, prefabrication technology not only overcomes the need for skilled labour, but also eliminates lags in time. Some of the city's prefabricated projects lie along the Ring Roads, Balagere Road and Kanakpura Road. In addition, many builders still use prefab technology in leisure ventures, such as farmhouses and holiday cottages.

### **1.3 Comparison of Prefabrication to Conventional In-Situ Building**

All the below mentioned points of interest in comparison to conventional in-situ building erection technique can be summed up in the accompanying table 1.

### **2. Literature Reviews**

Few of the literature studies concluded that prefabricated structures can be used as an alternative to the ordinary masonry or normal structural construction method that consumes far less materials, complete in less time with higher quality standards and are more resistant to the loads.



Factor	Prefabrication	On-Site
Quality	In a controlled condition utilizing proficient technology and by trained personnel.	Uncertain climate can bring about not exactly anticipated development quality.
Speed	Speedy process (up to 70% less)	The procedure can be deferred by climate or scheduling clashes.
Cost	Better control in manufacturing resulting in lesser chances of cost overruns.	Uncontrollable factors, for example, climate, work issues and scheduling can increase the cost.
Flexibility	Less	More
Site space	Panels arrive on a level bed trailer and are set up with adequate lifting plants.	Bigger space is required. Moreover scaffolding is often necessary.
Site Wastages	Less waste at site.	A large quantity of waste is produced and removed from the site, adding to costs.

**Table 1:** Comparison of prefabricated structures with on-site building erection process

Source- Author

## 2. Literature Reviews

Few of the literature studies concluded that prefabricated structures can be used as an alternative to the ordinary masonry or normal structural construction method that consumes far less materials, complete in less time with higher quality standards and are more resistant to the loads.

It is anticipated that the utilization of prefabrication and pre-assembly has almost expanded over the most recent 15 years, ascending by 86%. The utilization of precast solid development will significantly decrease the measure of building waste created on building sites. Diminish harmful effects on the air & soil. Increase quality control of the concreting activities. Reduce the sum of labor on site. Increase protection for the staff. Other advantages of using Prefabricated structures

in these papers are prefabricated structures which increase the possibility of conversion, disassembly and movement to another site, possibility of erection in areas where a traditional construction practice is not possible or difficult, low labor intensity This can also reduce material wastage, as well as simpler building site management. Great overall construction efficiency.

Over and above, prefabricated construction depends heavily on the efficient transport of prefabricated parts and this has a direct influence on many ways on the overall building cycle, such as cost savings, time savings and spaces.

Other benefits of prefabrication over traditional construction, including decreased time and cost in construction and assembly of parts on a site, as well as less waste since



factory production is more efficient. Microorganisms are easier to eliminate in an interior build environment that makes greater use of machinery and reduces human touch and interaction. Now, many prefab and modular companies are considering how they can best get ahead of the curve before the next wave of Covid-19 or another crisis emerges in the future.

### 3. Key Benefits:

- **Cost-Effectiveness** - Pre-fabrication makes efficient use of steel and concrete that helps reduce waste and provides end consumers with sustainable solutions, lowering the overall cost of construction by up to 15 percent. The method avoids the spending on practices such as plastering.

The increase in a property's expense is often directly related to the raw material costs. Any increase in raw materials costs reflects on the overall construction costs. Efficient use of materials in prefabricated manufacturing, however, means less expense compared to conventional methods of construction; making it a cost-effective production tool for developers.

- **Time Efficiency** - Time-efficiency is one of the mainly important Unique Selling Proposition (USP) of prefab technology. Here, the units are assembled in the factory and transported within a short span of time to the site where they are mounted, resulting in faster project growth. Overall it is possible to save 40 per cent -50 % of the time of the project.
- **Minimum Waste** – Prefab Structures are built in factories using cutting-edge technology, using stricter standards and specific conditions. The precision helps to minimize waste and use the available resources in a sensible way. This also solves

environmental concerns by reducing the carbon footprint, as units are being produced under regulated conditions in the factory. Fifty per cent less waste is generated overall.

**Environmental performance:** Prefabricated Construction will reduce the amount of building waste produced, increase the rate of material recycling and encourage sustainable development during all life cycle phases.

**Economic performance:** Prefabricated building is capable of reducing costs over the life cycle, raising the profits of construction firms and enhancing supply chain management.

**Social performance:** Prefabricated construction will boost industrial production, create new jobs, encourage the growth of industry and improve public quality of life.

When the prefabricated building is built to some degree, economies of scale impact and cost savings may occur. Today, realistically selecting a prefabricated part is a novel mode to be economical.

For the "social atmosphere and public opinion" element, the characteristic of prefabricated buildings, such as energy conservation, environmental protection, and excellent efficiency, should be given more publicity. At the national level, the government will make acceptable policies, rules, and guidelines to shape the frame. The undertakings should pay more attention to improving standards of enterprise. With government incentives and the development of policies, prefabricated construction will become more popular.

To the safety of prefabricated construction, designers should choose the appropriate assembly speed according to the level of the technique. The design stage should be given



more attention to needed problems occurring in the prefabrication and assembly process. Factory prefabrication should be encouraged to improve component manufacture.

#### 4. Conclusion

Pre-fabricated Construction in Bengaluru is still in its initial stage, but it will undoubtedly be the direction of future industrialization of buildings. This research has limitations. Note that few factors were selected to demonstrate the state of Pre-fabricated assembly.

- The expense of receiving prefabricated innovation is 15-30 percent higher than the expense of customary/traditional innovation for the examination ventures.
- The key considerations to be deal with in Prefab construction planning are transport restrictions, legislation and special traffic control within the construction area.
- An absence of perceptiveness of the effectiveness, advantages of the prefabricated frameworks is a first test for the promoting of prefabricated structures.
- Reception by the Public: Public acceptances as an outside environment play a very significant part in the promotion of Prefabricated Construction. A pessimistic view and lack of Prefabricated Constructions' awareness hinder consumer demand.
- Promotion of prefabricated construction requires cooperation of all interested parties. The concerns need to be tackled before steps to encourage prefabricated construction can be taken. The growth of the Prefabricated Construction Industry will begin with paying attention to policy and regulatory formulation.

- The utilization of prefab can assist with accomplishing results for the general public's prompt needs on the grounds that the quick evolving condition, business, financial aspects, industrialization, private needs, settlements and numerous different variables of transportation like extensions, towers, railroads calls for quick settlement and prerequisite for structures, workplaces and ventures, consequently construction is the answer for quick and efficient development.

- The utilization of precast concrete will extraordinarily diminish the measure of building waste delivered on building destinations. Diminish destructive effects on the air on grounds. Increment quality control of the cementing exercises. Diminish the aggregate of work nearby. Improve work environment wellbeing and safety.

- The fundamental advantage of prefabrication is that construction time is minimal, waste diminished and the quality extended.

- The Prefab construction system is recommended to be to introduced in the Architectural curriculum as a course material, as we can foresee this technology as the future of construction industry consodering all the above advantages.

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