Prefab -Engineered Buildings (PEBs)

A new approach in construction Sector

by

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Merits :

- **Prefabricated components speed up construction time, resulting in lower labour costs**
- **Prefabrication allows for year-round construction; work is not affected by weather delays (related to excessive cold, heat, rain, snow, etc.)**
- **Mechanization used in prefabricated construction ensures precise conformity to building code standards and greater quality assurance;**
- **Less wasted materials than in site-built construction**
- **Less theft of material/equipment**
- **Worker safety and comfort level are higher than in site-built construction**

- **Computerization of the production process permits a high degree of customization at an affordable cost**

- **Quality control and factory sealing and design can ensure high energy efficiency**

- **Cost savings through prefabrication can reduce the income required to qualify for a high ratio mortgage by up to one third compared to a conventionally built home of the same size**

Issues

- **Cost still take precedence over speed to construction**

- **Heavy transportation costs and risk of damage while in transit.**

- **Careful handling of components and limitation to the size of modules**
- **Skilled labor required for assembly**
- **As most construction work requires modifications to be done on site, prefabrication limits the option of alterations in the design scope of the building**
- **Handful companies offering complete building solutions (apart from industrial and warehousing units)**

Reasons to use steel in residential construction

A. Strength, beauty, design freedom

- Steel offers architects more design freedom in colour, texture and shape

- Its combination of strength, durability, beauty, precision and malleability gives architects broader parameters to explore ideas and
- develop fresh solutions

- Steel's long spanning ability gives rise to large open spaces, free of intermediate columns or load bearing walls

- Its capacity to bend to a certain radius, creating segmented curves or free- form combinations for facades, arches or domes sets it apart

- Factory-finished to the most exacting specifications under highly controlled conditions, steel's final outcome is more predictable and repeatable, eliminating the risk of on-site variability.

B. Fast, Efficient, Resourceful

- **Steel can be assembled quickly and efficiently in all seasons**
- **Components are pre-manufactured off site with minimal on-site labour.**
- **A whole frame can be erected in a matter of days rather than weeks, with a corresponding 20% to 40% reduction in construction time relative to on-site construction,**
- **Steel often allows less points of contact with the earth, reducing the amount of excavation required.**
- **Structural steel's lighter weight relative to other framing materials such as concrete enables a smaller, simpler foundation**
- **These efficiencies translate to considerable resource efficiencies and economic benefits, including accelerated project schedules, reduced site management costs and an earlier return on investment.**

C. Adaptable and accessible

- **A building's function can change dramatically and rapidly**

- **Walls may need to be repositioned to create new interior layouts based on different needs and space usage**

- **Non-composite steel beams can be made composite with the existing floor slab, cover plates added to the beams for increased strength, beams and girders easily reinforced and supplemented with additional framing or even relocated to support changed loads**

- **Steel framing and floor systems also allow easy access and alterations to existing electrical wiring, computer networking cables and communication systems.**

D. Less columns, more open space

- Steel sections provide an elegant, cost-effective method of spanning long distances

- Extended steel spans can create large, open plan, column free internal spaces

- In single storey buildings, rolled beams provide clear spans of over 50 metres. Minimising the number of columns makes it easier to sub divide and customize spaces.

E. Endlessly recyclable

- Demolished steel-framed building components can be reused or circulated into the steel industry's closed-loop recycling system for melt down and reuse

- Steel can be recycled endlessly without loss of properties.

F. Fire resistance

- **Advanced design and analysis techniques allow precise specification of fire protection requirements of steel-framed buildings resulting in significant reductions in the amount of fire protection requirement.**

G. Earthquake resistance

- **Earthquakes are unpredictable in terms of magnitude, frequency, duration and location**

- **Steel is the material of choice for design because it is inherently ductile and flexible**

- **It flexes under extreme loads rather than crushing or crumbling.**

- **Many of the beam-to-column connections in a steel building are designed principally to support gravity loads.**

- **Steel also have a considerable capacity to resist lateral loads caused by wind and earthquakes.**

H. Aesthetics, meet function

- **Flexibility and malleability inspire architects to achieve their aims in terms of exploring distinctive shapes and textures.**

- **Its acoustic noise dampening abilities, endless recyclability and the speed and precision in which it is manufactured and assembled onsite with minimal on-site labour.**

I. More usable space, less material

- **Steel's ability to maximise space and internal width with the thinnest shell possible means thinner, smaller structural elements**

- **Steel beam depths are around half of timber beams, offering greater usable space, less materials and lower costs with other materials**

- **Wall thicknesses can be thinner because steel's strength and excellent spanning capacity means there's no need to build solid, space-consuming brick walls.**

J. Lighter / less impacting on the environment

- **Steel structures can be significantly lighter than concrete equivalents and require less extensive foundations, reducing the environmental impact of the build.**

- **Less and lighter materials means they are easier to move around, reducing transportation and fuel use**

- **Steel pile foundations, if required, can be extracted and recycled or reused at the end of a building's life, leaving no waste material on site.**

- **Steel is also energy efficient, as heat radiates quickly from steel roofing, creating a cooler home environment in hot climate areas**

- **In cold climates, double steel panel walls can be well insulated to better contain the heat.**

Indian Scenario:

- Prefabricated Engineered building (PEB) in India are slowly getting
- a move on with many builders and construction companies now
- adopting the technology.

- Currently, pre-engineered steel buildings (PEB) comprise of merely 1% of India's $100 billion real estate market.

- PEBs market in India will witness staggering growth and will post an impressive CAGR of more than 30-35 % during the next 5 years.

- Given the extended slump in the residential real estate, with inventories at all-time high, developers believe that its popularity will rise in coming years

- The reason behind this is the faster completion of projects due to prefabrication which further lowers overall costs

- **According to industry experts, if it takes two years to complete a housing project using conventional methods, it takes 12 to 14 months using precast construction, with the scale being the same**

- **Construction industry following the slump is greatly leveraged, with mounting debts and restricted cash flows, completing projects early saves interest cost and is of vital importance.**

- **Lot of effort and money have been invested on a prefabrication facility**

- **Presently have a production capacity of 1.5 crore sq.ft of building material annually with which they can construct an 18 floor tower in less than 10 months, which typically takes around two years.**

- **This technology can be used for all types of construction, i.e. low rises, high rises, mass townships, villas, etc.**

- **Very useful for mass housing as it lessens both time as well as dependence on labour**

Growth drivers for PEB

i) Government aims to provide housing for all by 2022, which requires constructing 30 million low cost houses along with building 98 smart cities

ii) Government's decision in late 2014 to relax previous conditions relating to 100% FDI in real estate has enabled quicker adoption of modern prefab technologies.

iii) With a rise in the number of e-retailers, the demand for warehouses is also increasing.

iv) Indian online market is expected to reach US $ 64 billion by 2021 growing at a CAGR of 30% during the past 5 years

- **To meet the supply demand, these e-retailers are constructing warehouses to enhance their distribution**

- **As PEBs offer the fastest method to build warehouses compared to conventional methods, its demand for a broad range of construction activities will increase over the next four years**

All the above factors expected to provide a boost to PEB in coming years

THANK YOU