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"Comparative Study on Precast construction Conventional Construction"

Dr. Vidyarani Kshirsagar[1], Pratik Anilkumar Savant[2]
[1]*Professor, Sveri's college of Engineering, Pandharpur, India.*
[2]*Student, Sveri's College of Engineering, Pandharpur, India.*

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ABSTRACT :
The Indian construction system is going to become a modernized, cost efficient and achieving advance technique. The paper based on cost comparison of precast concrete vs. cast-in-place (i.e., traditional) concrete. How total cost of construction by precast concrete system is less than the cost by use of cast-in-place concrete. Cost of any construction is directly varied with time of construction. As we know the Precast is manufactured in factory (i.e., in controlled environment) with required quality, can easily mix, cure with good quantity. Precast concrete is manufactured in factory and transport to site. The strength of precast concrete is achieved in greater extent by using high technology, controlled system. For precast construction less manpower is required, labors are required only to joint precast members. That means indirectly saving cost on labors. In precast concrete construction wastage of materials is negligible as compared with cast-in-place concrete. There is no need of curing on site after erection of members because members are cured in factory for desired days.There for the time (in days) is saving in construction which will reduces the cost of construction. Precast construction increases the quality of work, save time, reduced the cost of construction required for maintenance of work. The cost on shuttering and deshuttering is eliminated by using precast will result into saving total cost of construction. The cost of rework due to improper work, faulty construction method, unskilled labor, material quality, onsite environmental problem can be eliminated by using precast members.
KEYWORDS : Precast concrete, waterproofing Admixture, Cost efficiency.

I. INTRODUCTION :

The construction boom in India is developing at a fast rate of growth. It provides wide opportunity in India for a new entrant in precast sector. At present precast concrete buildings are the advanced construction techniques available over worldwide. Being its wide applicability, the total precast concrete buildings systems are becoming a popular choice for many construction. Precast concrete available in many shape, sizes, including structural elements and unreinforced pieces. The precast industry is the backbone for the development of new ideas in construction business of any country; Factory buildings, residential buildings and the industrial township are needed practically by all the sectors, either to support the manufacturing or services of any industry.

II. OBJECTIVES :

- ✓ To study the Conventional &prefabricated building construction.
- ✓ To Analyze the time and cost required for various building components.
- ✓ To compare the conventional and precast building construction with respect to time and cost.
- ✓ To determine the type of construction that would reduce the construction cost.
- ✓ To determine the method of construction that would help to finish the construction
- ✓ project in shorter duration.

III. MATERIALS :

3.1) Different materials used for Precast Concrete Buildings :

Precast elements could be made of reinforced or prestressed concrete. The behavior of these two under service loads is dependent on the properties of the material composition as well as the manufacturing process. It is important to understand the nature of the materials used in the precast concrete buildings.

Given below is an overview of different materials used in precast concrete buildings.

3.2) Cement for Precast Concrete Buildings :

• Cement should comply with the requirements of IS 456;2000, for gaining satisfactory performance

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in a structure. The standard classifies cement under two divisions

• General-purpose- Ordinary Portland Cements [OPC] 43 grade [IS:8112] and 53 [IS:12269] are normally used in precast concrete construction.

• Special purpose-These cements are specified for elements in aggressive environments, eg. tidal and splash zones, in sulfate bearing soils and in chemically polluted environments. Portland Pozzolana Cement [IS 1481] and Portland Slag Cement [IS 455] are preferred.

3.3) Aggregates for Precast Concrete Buildings :

Aggregates for precast concrete should be durable. They should not deteriorate or disintegrate under the action of the weather. Items for consideration under weathering action are freezing, thawing, variations in moisture content, and temperature changes. General aggregates [coarse and fine aggregates including manufactured sands] should comply with requirements of IS:383. Methods of the test of aggregates are covered by IS; 2386. Special Aggregates may be required to give desired features such as color and texture for exposed aggregates surfaces. Where special aggregates are used it is better to stockpile them at the beginning of a project for avoiding variations in supply. Gap- graded aggregates will give the most uniform exposed aggregate surface.

3.4) Water for Precast Concrete Buildings :

Water should be free from matter which will reduce the strength and durability of the concrete. The use of recycled water may lead to a rise in the proportion of soluble salts and alkalis in the concrete. Testing should be carried out to ensure the limits are not exceeded and where potentially alkali-segregates are being used. Mixing water/curing water shall conform to the requirements as per IS 456-2000.

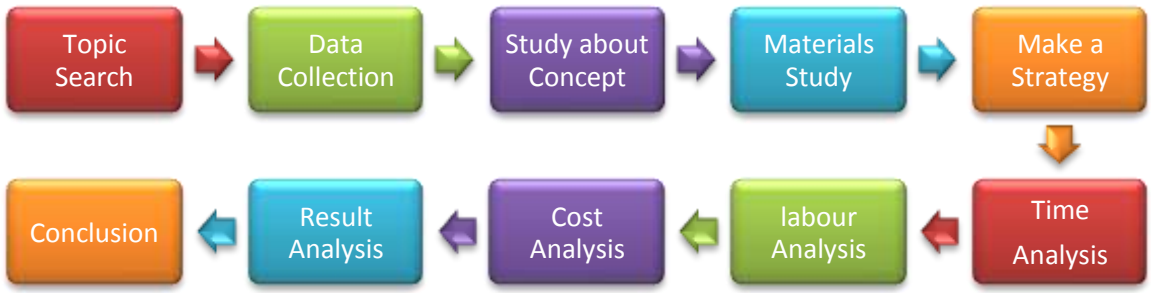
3.5) Waterproofing admixture for Precast Concrete Buildings :

Waterproofing admixture for precast construction should comply with the requirements of IS; 9103-1999, when compared with the manufacturers' declared values. Where two or more admixtures are to be used in combination they should be checked for compatibility with the cement. It is also desirable to conduct trials with admixtures using the specific materials to be used in the project to ascertain the dodge for the desired performance.

3.6) Reinforcement bars for Precast Concrete Buildings :

Reinforcement bars should comply with IS; 1786-2008 for high strength deformed bars for concrete reinforcement, IS; 432 for mild steel and medium tensile bars. Bars are classified by shape, ductility, class, strength grade and size.

IV. METHODOLOGY :



V. RESULT :

Time Analysis for one Storey Building

Sr. No.	Description	Conventional Method (days)	Precast Method (Days)	Difference (Days)
1	Sub Structure- (Site Cleaning , Earthwork, Soil filling)	15	15	0

2	Foundation	21	8	13
3	Super Structure – (column, Lintels, Beams & Roof slab)	50	30	20
4	Finishing Work (electrical, Plumbing, tiling & windows)	46	35	11
5	**Total**	**132**	**88**	**44**

Cost Analysis for G +15 storied Building,

Sr. No.	**Description**	**Conventional Method (Rs.)**	**Precast Method (Rs.)**	**Difference (Rs)**
1	Sub structrure	22,72,512	22,72,512	0
2	Foundation	1,03,35,925	1,03,35,925	0
3	Super Structure	23,74,62,936	21,93,53,531	1,81,09,405
4	Finishing work	1,25,03,568	1,25,98,098	9,05,470
5	**Total**	**26,25,74,941**	**24,35,60,066**	**1,90,14,875**

VI. CONCLUSION :

- ✓ Precast concrete system is economical than conventional cast in place method but still there are some conditions which we have to take care of while using precast, those are quantity of construction, Distance of site from manufacturing unit. Type of building etc.
- ✓ We have identified that for standard & Repetitive work precast is the best option to choose.
- ✓ In observation the most important thing is to be observed project is in precast construction technique is the time effective it requires less time to construct.
- ✓ It requires skilled worker and qualified contractor, Lower initial cost especially for large project.
- ✓ We can achieve better concrete quality control and lighter concrete unites.
- ✓ The main limitation of precast is transportation from place of manufacturing to place of site where it is to be fixed.

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