

Survey of Precast Concrete Method and Cast-in-Situ Concrete Method

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Abstract— The conventional method of concreting i.e. cast-in-situ or cast-in-place is mostly used for various types of constructions. There are many drawbacks of this method like less quality, lesser speed of construction, high labour requirement etc. These drawbacks ultimately affect health of structure. To overcome these drawbacks a new method of concreting can be adopted called as precast concrete method. Precast concrete method is accepted world wide for its advantages over conventional concrete method.

Index Terms—Cast-in-situ concrete, precast concrete

I. INTRODUCTION

Concrete is the most essential part of the modern structure. Concrete provides compressive strength to the structure which helps structure to withstand compressive forces. There are different methods of concreting one of which is conventional method of concreting called as cast-in-situ which is generally used for construction. This is the oldest method of concreting and being used for many years in construction industry. Even if this method is an oldest method, its drawbacks cannot be ignored as quality of structure is dependent on quality of concreting. The most important drawback of cast-in-situ method is quality of concrete cannot be assured and more time required for construction. In the modern era where quality is more important within minimum time using cast-in-situ method is less advantageous. To overcome the drawbacks of cast-in-situ method of concreting and to follow terms of modern era a new method of concreting called as precast concrete can be adopted. In precast concrete method quality of concrete can be assured as concrete is prepared in controlled environment. Speed of construction is really fast as compared to cast-in-situ construction. Precast concrete method is used all over the world and in all types of construction as well. Both the methods of concreting are explained below.

II. CAST-IN-SITU CONCRETE

Cast-in-situ is the conventional method of concreting. In this Method concrete is prepared on the site and poured in formwork and then cured. It often requires more labours and even takes longer time.



Fig 1: Cast-in-situ concreting method [5]

III. PRECAST COCNRETE

Precast concrete is the new method concreting used all over the world extensively. It is also used in India as well but not very often. In this method concrete is prepared, poured in formwork and cured in controlled environment. In this method quality of concrete can be assured because concrete is prepared and cured in controlled environment.



Fig 2: Precast Concrete Factory [8]

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Fig 3: Precast Concrete Wall [12]



Fig 5: Lifting of precast members [9]

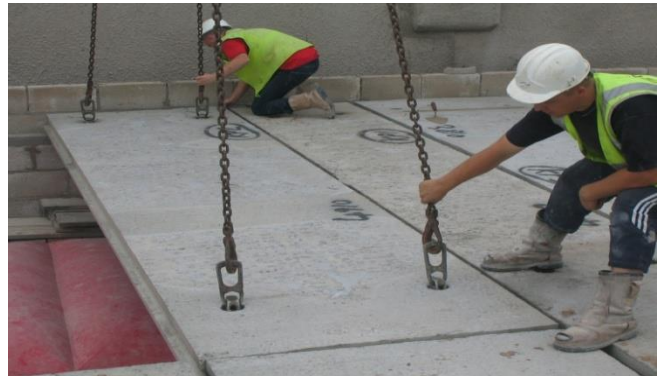


Fig 6: Easy placing and working platform of precast member [11]

IV. COMPARISON BETWEEN PRECAST AND CAST-IN-SITU CONCRETING METHOD

1. Time saving- Precast concrete method requires less time for onsite construction as compared to Cast-in-situ concrete method, because as prepared materials are transported to site and can be directly lifted and placed on the desired position. Precast elements can be delivered just in time for fast erection, reducing unnecessary handling and equipment use. With minimal propping and bracing, and with precast flooring providing an immediate working platform, precast concrete allows other trades to begin work more quickly, speeding the construction time and saving costs. Fast construction on site also means fewer disturbances for surrounding properties. Cast-in-situ method of concreting requires lots of time because concrete requires minimum 28 days to achieve 99% strength of its total strength. Thus after creating one element, only after 7 days a new element can be created which is dependent on previous one because concrete achieves 65% strength of its total strength in 7 days.

2. Quality control and finishing- The main benefit of using precast concrete over cast-in-situ concrete is proper quality which obtained when concrete produced in controlled factory environment. Water cement ratio can be properly adopted in precast concrete than in cast-in-situ concrete which can lead to better quality control. In cast-in-situ method concrete is prepared on the site which can be affected by weather. Better finished concrete surface can be obtained in precast concrete method because inside surface of moulds are kept good in condition. There is no grout loss from badly fitted formwork which can lead poor quality in concrete. Plaster requirement is also very less in precast concrete as product have way better finish than cast-in-situ concrete method.



Fig 4: Easy Transportation of Precast members [10]



Fig 7: Precast concrete finished surface [2]

- Material Requirement-Precast concrete method requires less material quantity i.e.it requires less concrete cement and steel as it is factory made advanced mix designs and better vibrations are used. Less quantity of concrete is used in hollow core slabs. No formwork is required on site for precast concrete method. As no need for storage of materials and formwork, precast concrete method is very useful in small sized construction site with less storage space. Number of labours is less in precast concrete method as compared to cast-in-situ method because there is no actual work on site in precast concrete as compared to cast-in-situ concrete method. As quantity of materials is less, wastage is also less in precast concrete method. It is about 50% less than in cast-in-situ method.



Fig 9: Hollow core slab [8]



Fig 10: Fewer props required for precast concrete [3]



Fig 11: Shuttering and formwork in cast –in-situ [4]

V. SUMMARY

No.	BENEFITS	PRECAST	CAST-IN-SITU
1	Time saving	Yes	No
2	Quality control	Yes	No
3	Weather affect	No	Yes
4	Long Spans	Yes	No
5	Formwork	No	Yes
6	Design Flexibility	Yes	No
7	Finishing	Yes	No
8	Cost efficient	Yes	No
9	Reusable	Yes	No
10	Easy installation	Yes	No
11	Dismantling	Yes	No
12	Storage on site	No	Yes
13	Material Requirement	Less	More
14	Wastage	Less	Yes
15	Labours on site	Less	More
16	Plaster requirement	Less	More
17	Dimensional accuracy	More	Less

VI. SOME PRECAST STRUCTURES IN INDAI

- Santushti Home at Bhiwandi, Maharashtra.
250 affordable home
G+3 storied 3 Blocks
Load Bearing Precast walls
Precast solid slabs(room size)
- SRA Scheme at Bhoiwada, Mumbai, Maharashtra.
2500 apartment scheme
Slum Rehab Project
G+23 storied 7 Blocks
Load Bearing precast walls
Precast Solid Slabs(Room size)
Precast WC and Bath pods
- CIDCO affordable housing scheme, Maharashtra.
Total 54 Blocks
G+14 storied 32 Blocks
G+7 storied 22 Blocks
Precast Column
Precast Beams
Precast Hollow Core slabs
- Lakeside at Chennai
300 apartment scheme
Stilt+4 storied 6 Blocks
Load Bearing Precast walls
Precast hollow core slabs
- Commune-1 at Bangalore
Basement+G+13 Load Bearing

Precast walls

Precast Concrete Slabs

- 6) Hostel Building at Trichi
 - 210 Hostel Rooms
 - Dining Hall at Ground Floor
 - G+10 Storied 2 Blocks
 - Load Bearing Precast walls
 - Precast hollow core slabs
 - Precast Portal Frames at Ground Floor
- 7) Marvel Sangria at Pune, Maharashtra
 - Commercial Building of 250,000 sq.ft
 - Shops at Ground and Mezzanine Floor
 - Basement+G+3 storied 3blocks
 - Load Bearing Precast walls
 - Precast hollow core slabs
 - Precast retaining walls at basement

of the work or suggest applications and extensions.

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VII. CONCLUSION

SOME BENIFITS OF PRECAST

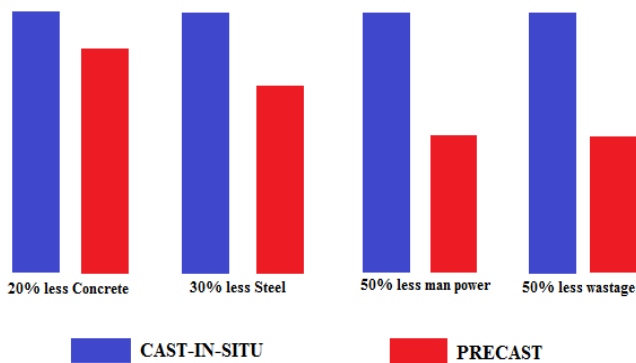


Fig 13: Some Benefits of Precast



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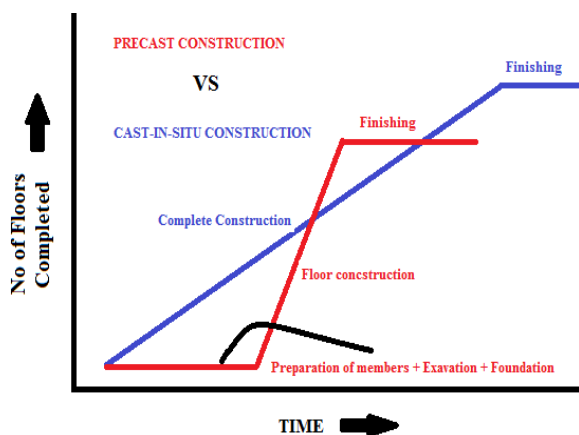


Fig 13: Precast Construction VS cast-in-situ Construction

If precast concrete method is used over cast-in-situ method in India it can be very useful and advantageous to solve housing problem. Maximum number of homes with greater quality with in minimum time can be provided by using precast concrete method than using cast-in-situ method of concreting. A conclusion might elaborate on the importance