Comparative Study of Conventional (Cast-In Situ) & Pre-Cast Method for Residential Project

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Abstract – ***Based on recent scenario, India has begun towards industrialization in all features of development. Construction industry in now days became a Fast, Developed, Modernized, Time Effective, Cost Efficient and Adopting Advance Construction Techniques. The Objective of study is to find the Present situation of the Pre-cast Construction Technique in India, Finding the Feasibility Study of Conventional (Cast In-situ) Vs. Pre-Cast Construction Method. This study focuses on different concepts of Pre-cast Construction Technique. A literature survey done highlights the facts associated with it. This study compares the parameters or area of effectiveness of both the Conventional and Pre-cast Technique.***

Keywords: - Cost, Time, Quality, Productivity, Wastage.

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1. INTRODUCTION

As Union Budget 2017-2018 decided the much required "Infrastructure" status for Affordable housing; with the govt. agenda of **'Housing for All by 2022'**.

To encourage India's Rural Housing, INR 230 billion are allocated under the **"Gramin Pradhan Mantri Awas Yojana"** with aim to endorse affordable housing in city and rural areas; India's government planning for the completion of 10 million homes till 2019. The scheme provides housing for poor people and it encourages the residential area in rural sector.

India is turned the sixth largest industrialised country in world thus holding its bright spot in world financial background. India became a second fastest growing economy (Source- *India Budget 2017: On the growth path February 2017 PwC*)

2. OBJECTIVES

1) To study the different stages and processes involved in Conventional (cast in- situ) and Pre-cast technique in Construction of Residential Project considering problems in implementation.

2) To compare Conventional & Pre-cast Method and check their feasibility in residential projects.

3. SCOPE OF PROJECT

Present study deals with Conventional (Cast In-situ) & Pre-cast Construction Techniques. The purpose of this study is to find the Feasible Areas of Conventional (Cast In-situ) and Pre-cast Construction Technique. Overall the study will become very useful for the on-going and upcoming future construction projects.

4. LITERATURE REVIEW

4.1 Awareness of the Industrialized Building System (IBS) Implementation in Northern Malaysia - A Case Study in Perlis [Umar Kassima 2012] Author Concludes that, Pre-cast Construction Technique is extremely adequate to be implement in Perlis state. Also highlights that Technique requires skilled work force, actual study states that in Perlis state Factories are far away from site/city so, components feeding gets in less numbers. In Pre-cast Technique the Factory/Casting Yard should be near to the Site Location/at less Distance.

4.2 Issues in Managing Construction Phase of IBS Projects [Izatul laili Jabar, 2013] Author Discussed some generic issues phased during Pre-cast construction Projects those are as follows – 1) Enormous Capital Cost 2)Insufficient Knowledge 3) Component Standardization 4) Integration 5) Co-ordination 6) On site construction Process 7) Planning and Implementation. Author overviews on

construction phases those are Pre-construction phase, Construction Phase and Post Construction Phase.

4.3 Public Participation: Enhancing public perception towards IBS implementation [Izatul laili Jabara, 2014] Author identifies the negative Perception of Contractor, Buyer, and Client & Designer. Pre-cast Adaptation is not successfully achieved as the people mind-set is such to not accept the technique due to unaware of the technology.

4.4 The Potential Application of IBS Modular System in the Construction of Housing Scheme in Malaysia [Mohammad Fadhil Mohammad 2015] Author completed a questionnaire survey of Pre-cast manufacturers and Conventional Contractors Results in Issues and Benefits of both the techniques. Those are

Issues while executing Conventional Technique are-

1. Cost overrun
2. Delays due to conventional procurement approach
3. Quality issue
4. Jointing issue
5. Labourers are not fully skilled in IBS system
6. Delays due to improper planning
7. Machinery redundancy

Benefits after implementing the Pre-Cast Technique are-

1. Reduced the overall costs
2. Reduced the overall construction time
3. Reduced the construction waste
4. Produce high quality and durable product
5. Reduce and limit construction noise
6. Weather proof construction – not depending on climate conditions
7. Reduced unnecessary plant and machineries cost

4.5 Cost Effectiveness of using Low Cost Housing Technologies in Construction [Vivian W. Y. Tam 2011]

This Paper Examines the Cost Effectiveness using low cost housing labour Cost, can be saved by adapting low cost housing technology comparing with conventional technique. Case study completed shows that about 26.11% and 22.68% of the Construction Cost, Including Material And Labour cost can be saved by implementing/Replacing Conventional Technique with Low cost Construction Technique.

5. PROBLEM STATEMENT

India faces a large housing creation backlog and sorrow with the housing products delivered till date. The low-cost housing development sector requires urgent attention and further research for refining Existing conditions of individual communities and the broader Indian population. The present research addresses the shortage in housing supply for low income households in India and the challenges faced by both existing and potential developers. The current study also focuses on the factor affecting low-income group housing supply, the motivating factor for existing developers in investing, housing models they have to adopt in their projects.

CASE STUDY

For this study I visited the following sites to understand the processes involved, material required, Time and Cost required for the project.

Site-I*:* - Executing **Conventional Construction Technique.**

AVAANTI- Residences Hirabaug Chowk, Tilak Road, Pune.

Site-II: – Executing **Pre-cast Construction Technique.**

'MHADA PROJECT' Pimpri- Waghere, Pimpri

Site-III: – **Casting Yard** B G SHIRKE Construction Tech. PVT LTD, Kivale, Dehu road.

6. DATA COLLECTION

Site-I: - Conventional Construction Technique.

Processes Involved = Survey - Starter R/f - Starter Shuttering – Starter Concrete – Column R/f – Column Shuttering – Column Concrete – Beam Bottom Shuttering – Beam Side Shuttering – Slab Shuttering - Beam R/f – Slab R/f – Outer Beam Side Shuttering – Concrete.

Column Starter Shuttering / Reinforcement

Column Starter Concrete

Column Shuttering

Column Concrete

Beam Bottom Shuttering

Beam Side Shuttering

Slab Shuttering / Reinforcement

Slab Concrete

Site-II: - Pre-cast Construction Technique.

Processes Involved = Column Erection – Beam Erection – Half Grouting – Slab Erection – R/f Work - Full Grouting.

Column Beam Erection

Half Grouting

Slab Erection

Reinforcement Work

Full Grouting

Site-III: - Casting Yard

Processes Involved = Column / Beam / Slab = (Mould + R/f + Concrete)

PRE-CAST BEAM:-

Beam Mould with Reinforcement

Pre-Cast Beam

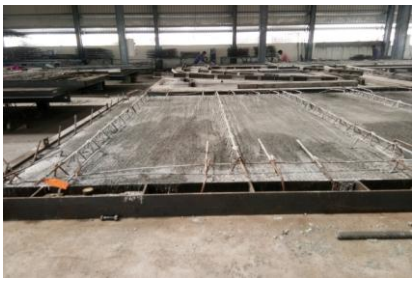
PRE-CAST COLUMN:-

Column Mould with Reinforcement

Pre-cast Column Concrete

PRE-CAST SLAB:-

Slab Pallet with Reinforcement



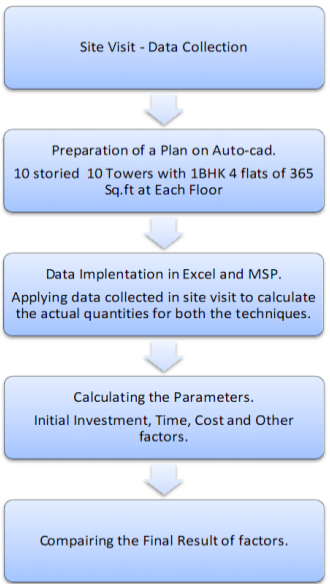
Pre-cast Slab Concrete

COMPARISON

Conventional Construction and Pre-Cast Construction is as Follow:-

Parameter	Conventional Construction	Pre-Cast Construction
Initial Investment	Less	High
Slab Cycle	20 Days	7 Days
Quality	Negligence can affect the quality.	Good
Effective area	Unique Structures	Mass Housing/ Typical Structures
Advantages during quoting Tender.	Negotiation can be done while tendering	-

7. METHODOLOGY



FLOW CHART – METHODOLOGY

8. CONCLUSION

From Case study results it concludes that, there is huge difference between Pre-cast and Conventional Construction Projects when considered with parameters such as Cost, Time, Material, Quality and Initial Investment.

Case study results in conclusion that effectiveness of the Conventional & Pre-cast Techniques changes with parameters such as Type of Structure and Client Requirements.

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