

COMPARATIVE OF PREFABRICATION AND TRADITIONAL CONSTRUCTION IN CONCERN WITH TIME AND COST

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ABSTRACT

One of India's most significant sectors is the construction sector. The majority of building projects are known to be completed using conventional techniques, although prefabrication is a new technology for the industry. The project aims at the comparative study of precast construction vs traditional construction for reducing cost and time. In Traditional construction the duration of a project and the material consumption rate increase as compared to prefab construction. Traditional construction delays in the planned work. It puts economic burden on company and affects the company image. If construction time increases construction cost also increases. It is required for effective management and planning. In order to compare prefabricated construction buildings with conventional buildings, a literature survey was conducted. Residential buildings are taken into account in order to study the costs and duration of precast construction and in-situ construction.

KEYWORDS Prefabrication Construction, Conventional Construction, Duration, Cost.

I. INTRODUCTION

Precast, commonly referred to as prefabricated construction, describes buildings whose principal structural components are produced and standardised at factories located far from the building site before being transported there and put together. These parts are made with industrial methods focused on mass production, allowing for the speedy and affordable construction of numerous buildings. Because there are so many different technologies available on a global market for achieving this, prefabrication allows designers to quickly assemble their structures. Almost all of these technologies aim to save expenses and wait times. Although designers are able to use a range of materials, they typically choose lightweight ones. Steel and wood are the materials that are most suitable for prefabricated building. In many developed countries, prefabricated construction techniques are used.

II. DATA COLLECTION

The information obtained from the survey is laid out in this section. To obtain information for precast and conventional construction, questionnaire survey should be done in a variety of businesses. We are able to learn about the building work's methods and problems during the obtaining data. The cost of the project for both constructions can be determined with the help of this collection. With these inquiries, we may also determine how long the construction process will take.

Questionnaires survey

Survey questionnaires are produced by a few companies. We studied about the benefits and drawbacks of conventional and prefabricated construction through this. Also, from this we learned about the precast techniques' actual status and scope.

III. METHODOLOGY OF THE STUDY

General

The study's methodology for compare prefabrication with traditional building is presented in this chapter. A residential building is used as a comparison, and it involves the creation of a plan, data gathering from the precast industry, quantity estimation, and project time determination.

Plan preparation

To determine the amounts of conventional and precast constructions, plans are prepared for residential construction. The plan of the building is shown in fig 3.1

Estimation

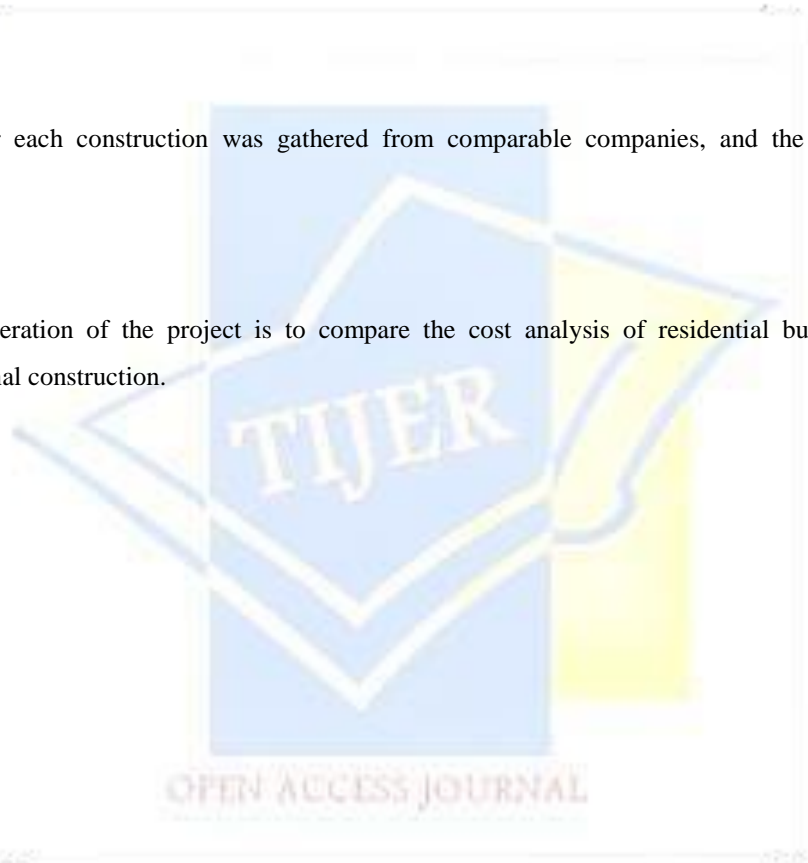
To determine the amount of materials needed for both structures, estimation is employed. The particulars of the Companies provided the necessary building supplies, which were gathered. We can estimate the amount of the materials by gathering these information.

Duration

Project duration for each construction was gathered from comparable companies, and the time to completion was evaluated.

Comparing cost

The primary consideration of the project is to compare the cost analysis of residential buildings constructed using prefabrication and conventional construction.



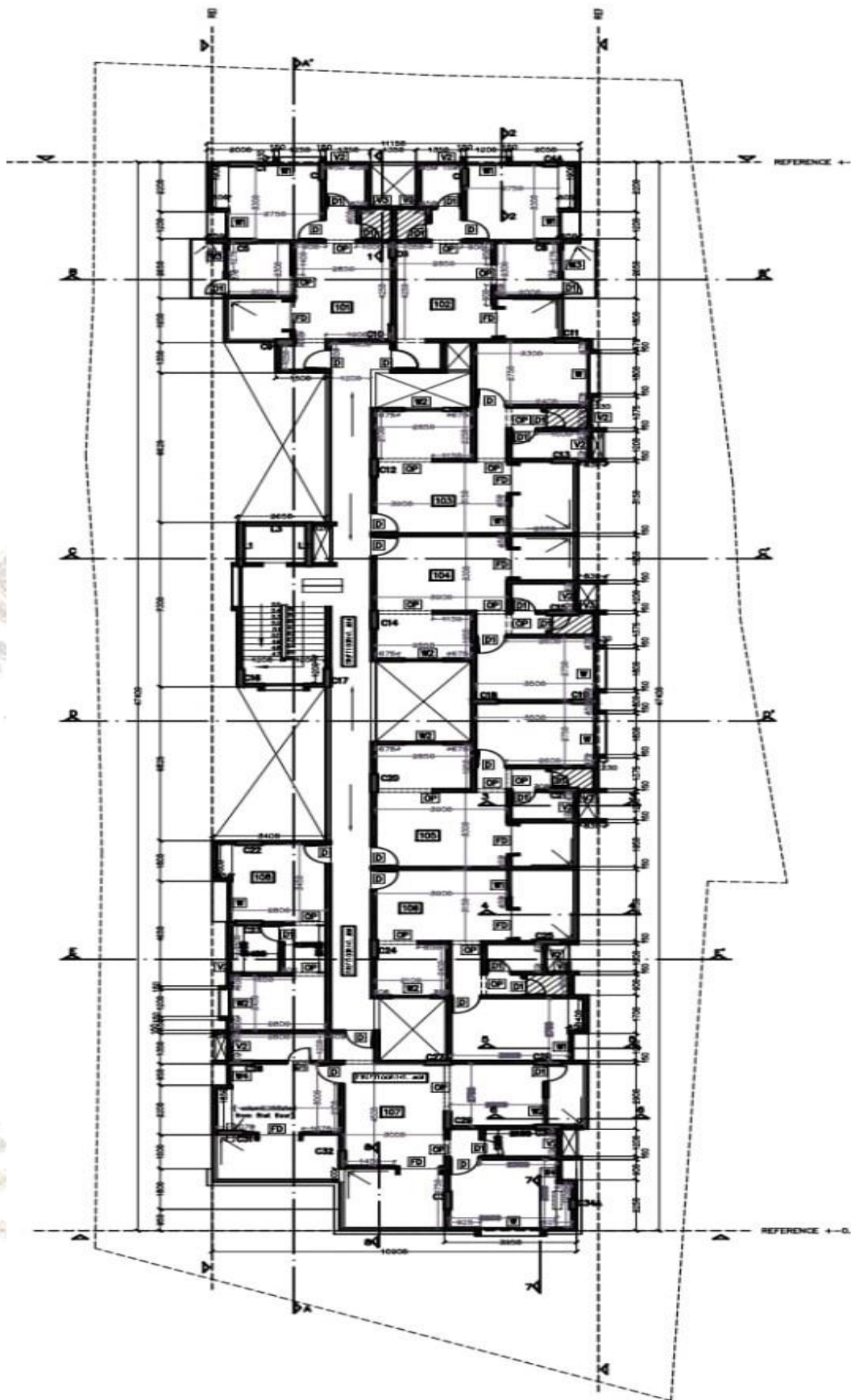


Figure. 1 Plan of residential building

IV. RESULT AND DISCUSSION

- Project duration

Conventional duration

Table 1 Total duration for conventional construction

Sr.No	Description	For one floor days are required	Total days required
1	Excavation	30	30
2	P.C.C	11	11
3	R.C.C work	35	35
4	Column	21	126
5	Beam	21	126
6	Slab	21	126
7	Staircase	15	90
8	Masonry wall	30	180
9	Plastering	20	120
10	D/W	18	108
11	Tiling /Flooring	20	120
12	Plumbing/ Electrification	30	180
13	Painting	10	60
14	Water proofing	10	60
TOTAL		1372 days	

Prefabrication duration

Table 2 Total duration for prefabrication construction

Sr.No	Description	For one floor days are required	Total days required
1	Excavation	30	30
2	P.C.C	11	11
3	R.C.C work	35	35
4	Column	15	105
5	Beam	15	120
6	Slab	15	120
7	Staircase	5	35
8	Masonry wall	15	105
9	Plastering	20	140
10	D/W	15	105
11	Tiling /Flooring	20	140
12	Plumbing/ Electrification	20	120
13	Painting	5	35
14	Water proofing	10	70
TOTAL		1171 days	

Data gathered from conventional companies was used to calculate the duration of the conventional buildings in order to assist with estimating its duration. It many stages of the project's duration are shown. Both constructions used the same approach to build them, hence the sub-structure duration was the same for

both. And still, compared to prefab building, conventional superstructures take a long time to finish. In conventional construction, the super-structure project duration varies significantly and is a major cause of project delays. Futhermore, finishing work in conventional building takes much longer than finishing work in prefab construction since electrical and plastering work is only done on-site. According to table 1, the residential building will take 1372 days to complete under conventional construction.

Data gathered from a precast firm was used to calculate the period of the prefab construction, which assist in determining how long it will take to assemble the superstructure using prefabrication construction. The project's duration is displayed in different stages. Due to the fact that the prefab was built using the same manner as conventional building, the substructure took the same amount of time to complete. All the same, compared to conventional building, the superstructures of the prefab were finished quicker. Prefab construction gives the benefit of having a wide range in project duration for superstructures. The walls and slabs are made in a factory and placed on site, which shortens the time the superstructure is in place. According to table 2, it will take 1171days to complete the residential building when it is constructed using prefabrication.

We were aware of the overall project duration for both traditional and prefabricated buildings when conducting our research. the evaluation of project duration for both traditional and prefabricated construction at various stages. Due to the sub-structure being constructed using the conventional approach, as shown in the figure, the sub-structure took the same amount of time to finish the project for both residential buildings.

Because the superstructure for the prefab was made in a factory and put on site, which reduces the working time, the prefabrication construction is finished earlier than the conventional building. Because compared to conventional construction, finishing tasks for prefab buildings also require less time.

Building and overall project durations were calculated and displayed in Figure (2). The graph shows that prefabrication takes less time than traditional building to complete. Prefabrication and conventional building differ in terms of project duration by 201 days. In comparison to the standard approach for the individual residential building, this takes a very short time to complete.

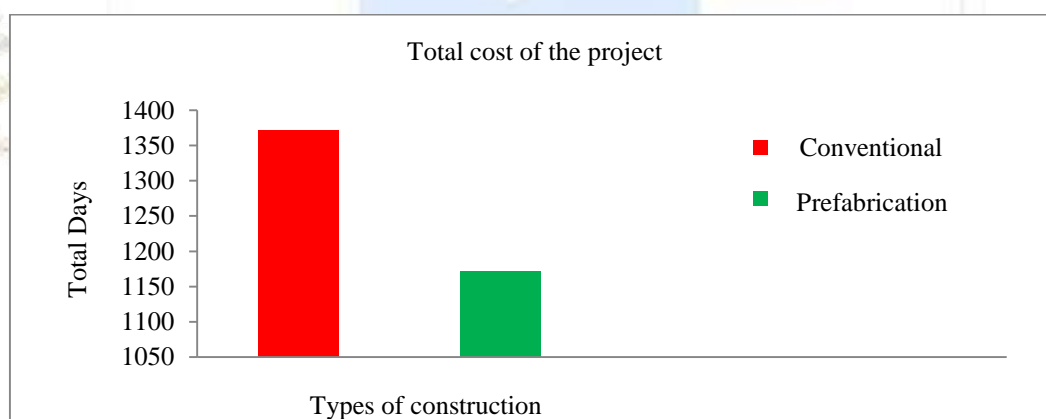


Figure. 2 Shows the overall project duration for residential buildings constructed using prefabrication and conventional methods.

• Project Cost

Table 3 Total estimation for conventional construction

Sr.No	Description	Cost in Rupees
1	Sub Structure	15,744,161.13
2	Super Structure	18,569,923.9
3	Finishing Work	22,665,442.97
	Total Cost	56,607,341.19

Data collected from conventional construction companies helped determine the cost of the entire project and was used to assess the cost of conventional building. Costs associated with the substructure and finishing work were transferred from traditional to prefabricated construction. Data collected from traditional construction companies helped determine the cost of the entire project and was used to assess the cost of conventional building. Expenses involved with the substructure and finishing work were transferred from traditional to prefabricated construction. Hence, there are no cost differences between the two constructions at these stages. All the same, the superstructure cost variation was small compared to prefab construction for residential buildings. The residential structure will cost 60,472,063.86 to complete in total building.

Sr.No	Description	Cost in Rupees
1	Sub structure	16,065,938.72
2	Super structure	21,428,378.23
3	Finishing work	22,977,747.77
	Total cost	60,472,063.86

Table 4 Total estimation for prefabrication construction

The cost of the prefab construction was determined using information collected from a precast factory, which helped to determine the cost of the prefab superstructure. Because the prefab is built using the same method as conventional building, the cost of the substructure and finishing work was the same. Several steps are used to display the project's cost. The residential building's overall construction cost for prefabrication is 56,607,341.19.

We had included the cost of both conventional and prefabricated structures in this analysis. Also, the cost comparison for sub-structure, super-structure, and finishing work for different floors. Compares the costs of traditional and prefabricated building at different phases. Due to the sub-structure and finishing works being completed using the traditional method, the costs for both residential building construction are comparable. However, there are more differences within the super-structure category, and prefabrication construction is much more expensive than traditional building since superstructures were built using prefab and conventional methods, respectively. Both construction costs and the overall project cost were calculated.

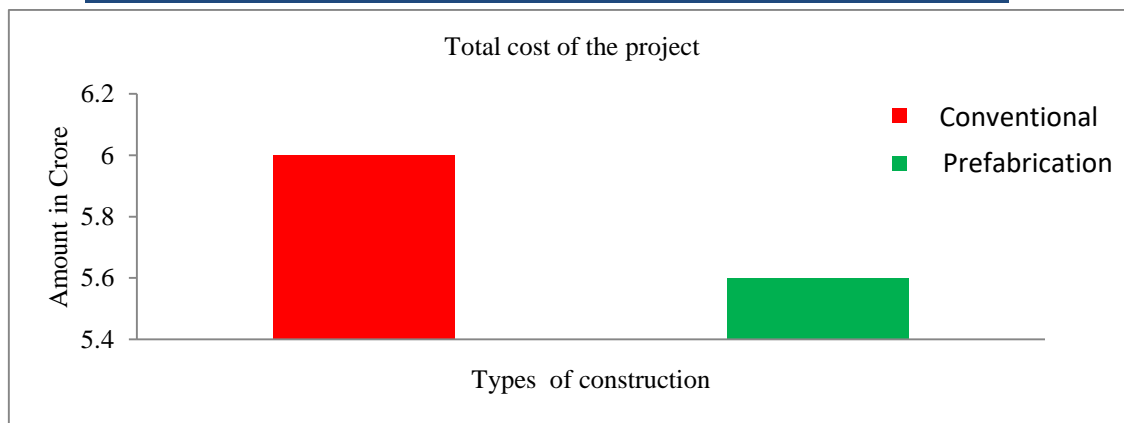


Figure. 3 Comparison the total project costs for residential building built using prefabrication and conventional methods.

The figure shows difference demonstrates that prefabrication building is more expensive than traditional construction. The cost difference between prefabrication and traditional building is 634,082.39 rupees.

V. CONCLUSION

The work's main goals have been fulfilled. Both conventional and prefab construction have total costs and completion times for the residential building. Also, a survey carried out in related companies had informed us of the benefits and drawbacks of prefabrication and conventional building. The study revealed a significant cost differential between the two, with prefab having a far higher cost than conventional on this type of individual home.

The result shows the prefabrication construction cost for residential building is less than conventional construction. This is the greatest advantage of prefabrication building, which in this situation makes it cost-effective to build. Prefab building is very simple to use and speeds up projects by 371 days when compared to conventional construction. It's one of the primary benefits of prefabrication, and it also helps when there is a worker shortage. We found from the survey that prefab construction has greater advantages and is more commonly accessible in modern, large infrastructures.

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