Time and Cost Analysis of Prefabricated and Conventional Building

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Abstract— Based on the previous study, prefabricated building usage in the construction sector are differ or varies over time and also it vary from country to country. The main objective of prefabrication construction adopted is to the study the prefabricated construction and analysis the factors time and cost for the prefabricated building. Prefabricated construction is economical and time saving for the mass scale construction. In the mass housing we can conserve the environment also like carbon is to be reduced and reduced the material cost of construction if the construction is on mass scale. By using various material like rammed earth, hollow clay blocks, soil cement blocks etc are to be used to reduced the cost of construction. The cost of construction become reduces again with the help of AAC block instead of bricks and by using precast RCC elements and ferrocement precast elements with chicken wire mesh are used to construct the building. With the help of this material the cost getting reduces and time for the construction of building is also become reduced. The main aim of the study is to compare the time and cost require for the construction of precast building and prefabricated building. The time and cost are compared at various stages of construction for prefabricated and conventional construction. The result of the study shows that the prefabricated construction save the overall time and cost of the construction.

Key words: Prefabrication, Conventional, Time, Cost

I. Introduction

Today the construction industry needs fast track construction which save time and cost and complete the project on time without any failure. The conventional construction methods require more time in overall construction in curing process of concrete, framework construction etc. In prefabricated the overall time is saved because the components of building are made in factory it transported to site and erected. Again labour required for the construction is less and wastage on the site is minimum. Therefore by using prefabricated construction the time as well as cost is saved. The construction of building complete on time without any failure. This construction process is very helpful in mass housing construction and todays fast track construction industry. From the internet source and previous literature study we can also use alternate building material to save the cost in construction like rammed earth, precast elements, ferrocement, AAC block.

II. Advantages of Prefabrication

1) In prefabricated construction, as the components are ready made, self-supporting, shuttering and scaffolding is eliminated. In conventional methods, scaffolding is required.
2) In prefabricated housing system, time is saved by the use of precast elements which are casted off-site.
3) In precast construction, similar types of components are produced repeatedly, resulting in increased productivity and economy in cost too.
4) Precast are factory made products and reduction of construction waste, Shorter construction time less than half of conventional cast in site construction.
5) Cost effective solutions as well as safety in construction and Increase in the quality of construction, Economical in big project with repetition in work execution.
6) Production of precast units in large series makes it practicable to use machines whereby the required amount of manual labour is substantially reduced.
7) Better quality of the products is obtained as a result of manufacture under factory conditions with constant Quality control, the use of machines, and the better Working environment provided by the factory.

III. Limitations of Prefabrication

1) Careful handling of prefabricated components such as concrete panels or steel and glass panels is required.
2) Attention has to be paid to the strength and corrosion-resistance of the joining of prefabricated sections to avoid failure of the joint
3) Leaks can form at joints in prefabricated components.
4) Transportation costs may be higher for voluminous prefabricated sections than for the materials of which they are made
5) Large prefabricated structures require heavy-duty cranes & precision measurement and handling to place in position.
6) Local Jobs are lost.

IV. Methodology of Study

1) DATA COLLECTION: The primary data collected from internet resources, previous literature study etc from that study it understand that what is the prefabricated construction technology and how it works. Then we take 30 sq m plan and prepare estimate for that plan by both prefabricated and conventional method.
2) PLAN PREPARATION: The plan preparation is done for the plot which is single storey and it contains living room, kitchen and bathroom and it is done for the estimating the quantities of conventional as well as prefabricated construction.
3) ESTIMATION OF QUANTITIES: Estimating column, beam, lintel, slab by using collected data. From the data require Steel, concrete quantity can be calculated and estimation of prefabricated as well as conventional building is obtained and we can compare the cost for prefabricated and conventional building.
4) PROJECT DURATION: Duration of the prefabricated and conventional building construction will be collected from site. And then we can compare the time require to

complete the prefabricated and conventional building construction.

5) COST ANALYSIS: From calculation of estimation of quantities we can calculate the cost of the particular activity. From the cost of activities the total cost of Project can be determine and then we can compare the cost taken by prefabricated construction and conventional construction.

From the above methodology the construction of building is done by conventional and prefabricated construction methodology.

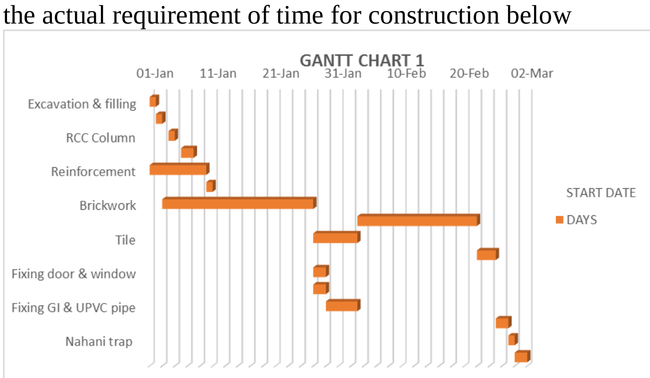
V. RESULT AND DISCUSSION

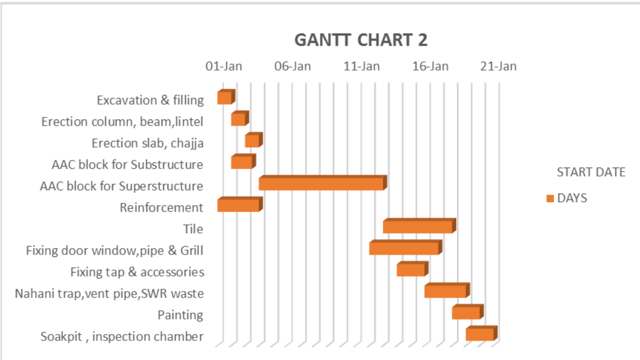
The total cost, labour cost, material cost, duration of prefabricated construction and conventional construction are to be compared for building is shown in table below

Sr. No	Construction	Total cost	Labour cost	Material cost	Duration
1	Conventional	386443 rs	96167.25 rs	290275.75 rs	85 days
2	prefabricated	322384 rs	61264.25 rs	261120.24 rs	42 days

From the calculation the cost of conventional and prefabricated building can be obtained. The total cost of convention building construction is 386443 Rs. And the total cost of prefabricated construction is 322384 Rs. From the result we find that time and cost require for the prefabricated construction is less than conventional construction. The time require for the conventional construction is 85 days and the time required for the prefabricated construction is 42 days.

Following Gantt chart is shown the time require for the construction after overlapping of activities and some work carries with simultaneously. The gantt chart are shows the actual requirement of time for construction below



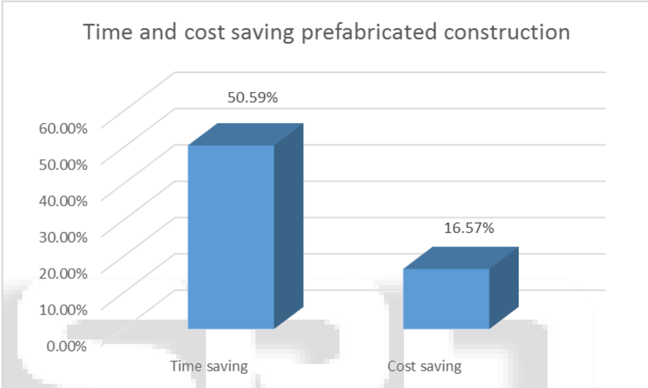


The gantt chart are shows the actual requirement of time for construction. The time require for the prefabricated construction is less than conventional construction. Therefore we obtained result in which shown that time and cost is reduced in prefabricated construction.

VI. TIME AND COST SAVING IN PREFABRICATED CONSTRUCTION

Sr.no	Construction method	Total cost saving	Time saving
1	Prefabricated construction	16.57%	50.59%

In the building, cost saving in prefabricated construction is 16.57% than conventional, time saving in prefabricated construction is 50.59% than in conventional construction. And the other cost like labour cost and material cost is also reduced in prefabricated construction than in conventional construction method.



VII. CONCLUSIONS

From the above study and based on the previous literature study the conclusions are as follows

1) By implementation of prefabricated construction method, we reduced the cost of construction upto 16.57%.
2) By implementation of prefabricated construction method, we reduced the time of construction upto 50.59%.
3) Implementation of prefabricated construction methodology helps to achieve economy and fast track construction which is need of construction industry.
4) Quality obtained in prefabricated construction is better than conventional because elements are made in proper standards.
5) Labour requirement is less than conventional. Wastage on site is minimize, therefore material cost is also save

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