EFFICIENT COST MANAGEMENT OF MATERIALS IN CONVENTIONAL AND PRECAST CONSTRUCTION

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ABSTRACT

Objective: To find out cost variations of materials used for the conventional building and precast building, wastage percentage in construction of a commercial building using conventional and precast technology. And to find out the time and cost variations in construction of commercial building using conventional and precast technology.

Methods/Analysis: Outwardly the technique of using precast members in construction has played one of the key roles in the industry. This technique has been measured and speckled in terms of cost inference. A Model was carried out on a Residential building project and the data was collected for study and concluded that the use of precast members is a better tradable factor to that of conventional system.

Findings: Precast construction saves time and cost when compared to conventional type of construction.

Novelty/Improvement: The transformation and revolution in the technology was grown out of the demand of the clients/customers of both residential and commercial purposes. Outwardly the technique of using precast members in construction has played one of the key roles in the industry.

Key words: Construction Cost Comparison, Conventional Type, Precast Construction.

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1. INTRODUCTION

Material management is the system of planning and controlling all the resources to ensure quality of project. In a project materials can contribute 50 to 60% of total cost\(^1\). When materials are not managed properly the problems like shortages, surpluses and cost overflow exists\(^2\). The material management system helps to provide the benefits in terms of labour productivity, reduced bulk materials surplus, reduced materials management manpower, and cash flow savings\(^3\). Construction site was portioned into 3 zones such as semi-permanent (exterior) storage, staging areas, and workforce (interior) storage. Each has its own function related to site management of materials\(^3\). Contrary conditions which were caused by the lack of an effective material management were identified, and the days on which the conditions occurred are noted. For these identified days, the actual daily productivity is compared with the expected productivity to regulate the number of work-hours lost\(^5\). The application of an inclusive materials management system contributes to predictable project outcomes, cost reduction, improved productivity and quality\(^6\). With the initiation of the new government, India is being developed in terms of all the aspects of development and industrialization to achieve remarkable hikes in the industry sector, of which construction industry is the first one to focus. The industry seemingly showed its raise from 19s and now as a mark of use of new technology. The new government of India is greatly involved in emphasizing the necessity of industrialization in India for a rapid economic growth. The inspiring demands by the government to gain their financial resources through the sector pointedly guaranteed and raised the demand of the construction workers. The use of precast members has been implied to have numerous compensations over the conventional methods. A few patterns of such kind could be reduction in resource deployment, material wastage, less volume of materials to be used, which intern creates the environmental and site cleanliness over the safety, time of completion of the project, which are the core management observations. All these factors discussed indicate and denote that the use of precast is much more economical, safe compared to that of conventional system; nevertheless the construction cost involves all the costs right from its construction, maintenance and its life. And the effort of this study is to throw light and focus on the comparison of construction cost in using conventional methods to that of precast techniques. And further to provide information as a parameter for the construction cost comparison for both systems and there will be a chance for the future generations to use the materials which we have conserved by reduction of wastage of materials in conventional building.

2. GENERAL ANALYSIS

2.1. Data Collection

The data required was estimated on the commercial buildings that are constructed using conventional and precast techniques. Comparison of a building constructed using two techniques gives the variations in usage of materials and cost variations due to material consumption. Comparison of the process in two methods gives the statistical data which can be useful to find out the cost of whole structure for both techniques. The estimated statistical data will also provide the variations in time and amount of wastage in construction using above techniques. This chapter gives the special importance to the methods of research on comparison of precast construction and conventional method. A multi-storied building is compared for comparing the preparation of plan, statistics framing from precast industry, project duration and cost.

2.2. Plan Preparation

A plan of structure G+5, Commercial building is prepared to study the estimation of quantities of the materials used for both conventional and precast members. It is shown in Figure 1.
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Figure 1 Floor Plan of G+5 building

Window (W) = 2*1.2
Column (CL) = 0.6*0.6
Long Beam (B) = 0.23*0.45
Short beam (B1) = 0.23*0.45
Height of the floor = 4

All dimensions are in meters

2.3. Estimation of Quantities
Estimation of quantities is done for estimating the requirement of materials for both conventional and precast types of construction for a particular structure considered. The detailed estimation is as given in the Annexure.

2.4. Project Duration
A time line is set to predict the time required for the project by using simple techniques. The variations are shown in Table 1 and Fig 2.

Table 1 Variations in Total Duration of the Project

<table>
<thead>
<tr>
<th>S.No</th>
<th>Type of construction</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conventional construction</td>
<td>548 days</td>
</tr>
<tr>
<td>2</td>
<td>Pre cast construction</td>
<td>105 days</td>
</tr>
</tbody>
</table>
3. COST ANALYSIS

Cost analysis is one the important factor for comparing both the techniques. For better understanding labor, materials and missionary are considered for the study. The cost variations are shown in Table 2 and Fig 3.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type of construction</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conventional construction</td>
<td>2.12 crore</td>
</tr>
<tr>
<td>2</td>
<td>Pre cast construction</td>
<td>1.40 crore</td>
</tr>
</tbody>
</table>

Figure 2 Variations in Total Duration of the Project

Figure 3 Cost comparison between pre cast and conventional type of constructions

4. CONCLUSION

The main objective of the study is to elevate the recent advancements and developments in both technology and usage of prefabrication in construction of commercial building of large plinth areas and spans. Understanding the study and various pros and cons of prefabrication in construction industry, it is clear that all the factors are dependently relative to each other. If the technology is to be used, there will be large amount of money spent on the installment and materials. If the conventional type of construction is used, it leads to large amount of time. So, the two main constraints of the project is time and cost, which is the main management constraints for any project. Depending on the requirements like size, type of the structure the type of construction is to be decided. Prefabrication type of construction incurs more costs for installation, and it opts for large span structures and multiple stories, which is economical and standardized for that type. Where in conventional type is suitable only for simple and individual structures.
REFERENCES


