

## Analysis of Pre-Engineered building and Conventional building using Primavera software

Stania I Patra<sup>1</sup>, Melitia D'Mello<sup>2</sup>

\*(Department of Civil Engineering, Shree Devi college of Engineering & Technology, VTU, Mangaluru, India)

\*\* (Asst. Professor, Department of Civil Engineering, Shree Devi college of Engineering & Technology, VTU, Mangaluru, India)

**Abstract:** This thesis is based on analysis of pre-engineered building and conventional building taking case study as a three storey apartment (G+3) which is located at Hubli, Karnataka. In this thesis an effort is made to analyze the pre-engineered building and compare it with conventional structure for cost and other criteria. In super structures columns, beams, walls, flooring, slab, lintel, chajja are analyzed as pre-cast members. The planning is done as per requirements and the various activities involved in the construction of these members are considered. The study is carried out using Primavera P6 software which is a project management program

### I. INTRODUCTION

The existence of pre-cast concrete industry are numerous, successfully executed construction project, its uses not disputed and it's the proof that the manufacturing and production technology is practical and cost-effective. The growing requirements of architectural design at building construction raise progress of stable and constant development of the industries as this is a new technology.

Primavera program an article is planned to approve managing projects at greater extent at once. This accepted tool is used to approve the needs of project teams working at unusual locations and at different stages of the company. The basic abstract idea of project management is to plan, observe and control projects.

### II. OBJECTIVES

- To study various aspects related to planning, scheduling, project monitoring, analysis of cost and time management
- Structuring the project
- Implementing the schedule
- Updating and managing the schedule
- To find out the over allocated resource for all activities
- To find out the efficiency of the project as per the planned schedule and levelling
- To know, the efficiency of the project by the application of techniques adapted and quality aspect.

### III. METHODOLOGY

- Layout: A Gantt chart is represented at top and activity table at bottom of the layout. Here the description of work can be modified and saved. The layout consists of: Activity table, Gantt chart, Activity spreadsheet, Activity usage spreadsheet, Activity network, Activity details, Resource usage spreadsheet, Activity usage profile, Resource usage profile, Trace logic.
- Enterprise project structure (EPS) is tool to assemble and observe work accessed in an organization.
- Organizational breakdown structure: The plans and specifications of construction are converted into physical structure and facilities. They involve organization and co-ordination of all the resources required for project.
- Calendar: calendar is regarded separately to assets and work. There are three types: Global, Project and Resource calendar
- Work breakdown structure: The process of breaking the project into easily identifiable major systems, their subsystems and discrete activities is called the Work breakdown structure.

- Activities: The principle elements of a project work is called as activities. These have lowest position in work breakdown structure and are the lowest divisions of a project that is considered from an example.
- Resources: Resources include the people employed in organization and machinery that perform task on activities across projects
- Roles: Roles are project personnel job titles or skills.
- Budget: Budget consist determined attempt of the total estimate and the cash flow needed, to complete a project.

This includes:

- Establishing budgets
- Establishing a monthly spending plan
- Tracking Budgets:

Proposed budget = Original budget + Approved budget changes + Ending budget changes

Current budget = Original budget + Approved budget changes

- Earned value management: Earned value is a technique for measuring project performance according the project costs and the schedule. It is calculated by;

Earned value = Budget at completion (BAC) \* Performance % Complete

#### IV. RESULTS

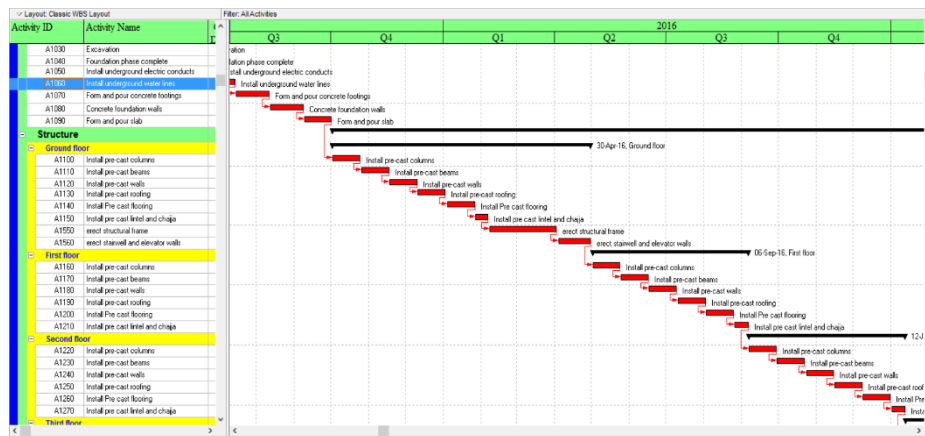


Fig 1: Layout, to left represents the activity table, and to the right activity network

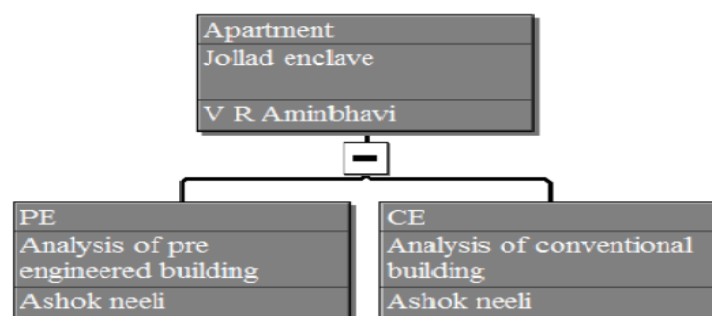


Fig 2: Flow chart for enterprise project structure

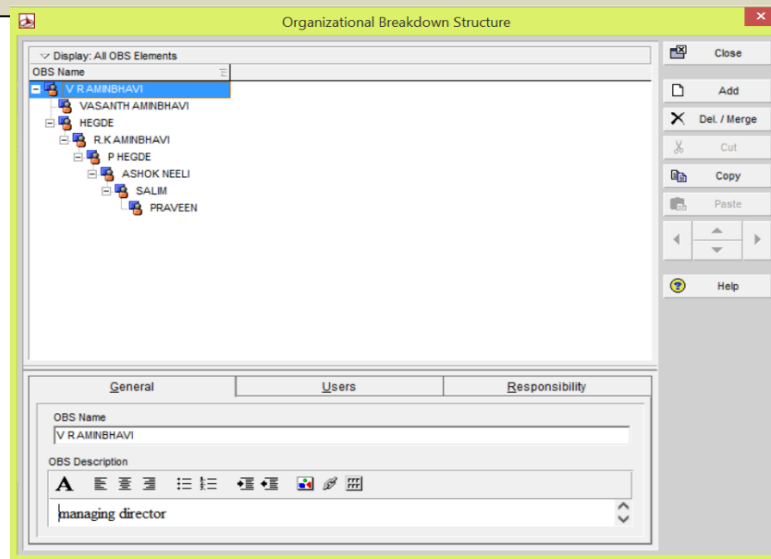


Fig 3: Organizational breakdown structure

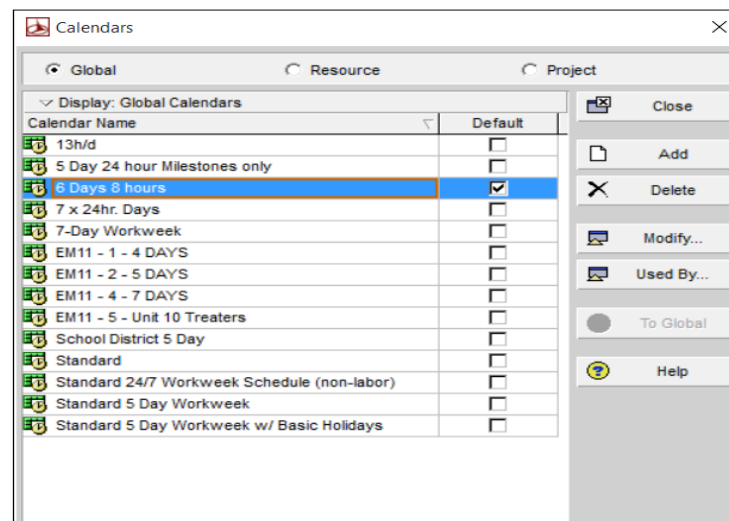


Fig 4: Calendar

Table 1: Budget log for pre-engineered and conventional building

<b>Original budget</b>	₹ 50,000,000 (Pre-engineered)	₹ 50,000,000 ( Conventional building)
<b>Current budget</b>	₹ 60,000,000	₹ 60,000,000
<b>Proposed budget</b>	₹ 60,000,000	₹ 60,000,000

Table 2: Budget summary for pre-engineered and conventional building

	Pre-engineered building	Conventional building
<b>Budget</b>	□ 60,000,000	□ 60,000,000
<b>Variance</b>	□ 10,000,002	□ 10,669,700
<b>Spending plan</b>	□ 50,000,000	□ 49,330,300
<b>Benefit plan</b>	□ 28,455,567	□ 669,696

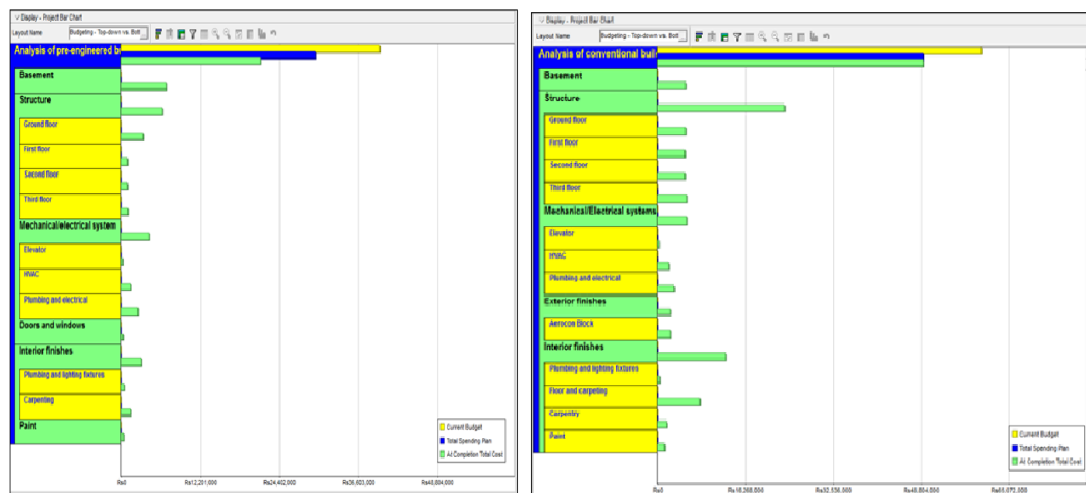


Fig 5: Tracking of pre-engineered and conventional building

Table 3: Estimate to complete for pre-engineered and conventional building

<b>Project budget (BAC)</b>	□ 21,544,432	□ 49,330,300
<b>Planned budget</b>	□ 50,000,000	□ 50,000,000
<b>Earned value</b>	□ 5,361,108	□ 24,665,150
<b>Cost performance index(CPI)=EV/PV</b>	0.10	0.49
<b>PF=1/CPI</b>	10	2.04
<b>Estimate to complete(ETC)=PF*(BAC-EV)</b>	□ 1.61 crores (pre-engineered building)	□ 5.03 crores (conventional building)

## V. CONCLUSION

The main aim of the study is to interpret the detail examination of the elements of pre-engineered building and conventional building. The study concluded as follows:

- Pre-engineered building proves to be most efficient than conventional building in aspects of monitoring, minimal number of resource, time managing and cost.
- Pre-engineered building is easy to construct as some of the methods implemented in conventional buildings are eliminated.
- Pre-engineered building saves time as advance techniques are used, whereas in conventional buildings detailing work is must.
- The requirements of resources in case of pre-engineered building are less than conventional buildings.
- The overall cost of pre-engineered building is low compared with conventional buildings.
- Earned value of pre-engineered building is less than conventional buildings.
- The project duration of pre-engineered building takes considerably less time than conventional buildings as only installing of pre-fabricated elements are done as they are factory produced.
- Pre-engineered building requires minimum labor units than conventional buildings.
- The resources cost is minimum for pre-engineered building than conventional buildings.
- Dismantling of structure is easy in case of pre-engineering building, whereas in conventional building the structure need to be demolished.
- Quality control in pre-engineering building, the elements are inspected and then installed, in conventional building most of the cases thumb rules are followed.
- Pre cast technology is a newer technology and achievable in Indian conditions.
- The comparison of pre-engineered building and conventional building proved that pre-engineered buildings have various advantages than the conventional buildings.

## REFERENCES

- [1] Prof Dr S Seetharaman, "Construction engineering and management", Published by "Umesh publications", 2005.
- [2] Primavera, "EduCADD Training material", published by "EduCADD learning solutions Pvt.ltd", 2005.
- [3] Andrew Fernans Tom, Sachin Paul, "Project monitoring and control using Primavera", "Journal of innovativeResearch in science, engineering and technology", Volume 2, Issue 3, PP.762-771, 2013.
- [4] Kim S Elliot, "Pre-cast concrete structures", published by "Butterworth Heinemann, an imprint of Elsevier science", 225 wildwood Avenue Woburn, Ma 018101-2041, 2013.
- [5] Milind Bhojkar, Milind Darade, "Comparison of pre-engineering building and steel building with cost and time effectiveness". "International journal innovative science, engineering and technology", Volume 1, Issue10, PP.487-490, 2014.
- [6] Pradeep V, Papa Rao G, "Comparative study of pre-engineered and conventional industrial building", "International journal of engineering trends and technology", Volume 9, Number 1, PP.1-6, 2014.
- [7] Sagar wankhande, Prof Dr. P S Pajgade, "Review paper on comparison of conventional steel building andpre-engineering building", " International journal of research in advent technology", Volume 2, Number 5,PP.271-276,2014.
- [8] Abhyuday Titikish, Abhinav Dewangan, Ankur Khandewal, "Comparative study of conventional steel building and pre-engineering to be used as an industrial shed", "International journal of engineering and applications", Volume 5, Issue 2(Part-2),PP.25-28, 2015.
- [9] N.Dineshkumar, P.Kathirvel, "Comparative study on pre-fabrication construction with cast in situ construction of residential buildings", "International journal innovative science, engineering and technology", Volume 2, Issue 4, PP.527-532, 2015.
- [10] Akash lanke, Dr. D. Venkasteswarlu, "Design, cost and time analysis of pre-cast and RCC building, "international research journal of engineering and technology", volume 3. Issue 6, PP.343-350, 2016.