

Analysis of Residential Building by Monitoring, Resource Allocation and Cost Optimization Using Construction Management Tool

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Abstract: This research focuses on the construction project management of a residential development including amenities like landscaping, clubhouse, recreational area and commercial, this involves directing and organizing each part of the project life cycle, from ideation to completion. Project management is the coordinating effort to fulfill the goals of the project, an art of balancing project objectives against the constraints of time, budget, and quality. Achieving that balance requires skill, experience, and techniques. This project report focuses on the planning and scheduling of residential apartment buildings in Oracle Primavera construction management tool. Project monitoring, resource allocation and cost optimization of study area is done using Oracle Primavera P6.

Keywords: Primavera, Planning, Scheduling, Construction project management, Gantt chart, CPM (Critical path method), Monitoring, Resource levelling.

1. Introduction

The construction industry is an integral component of a nation's infrastructure and industrial growth. Proper skillful management is essential for a project to be completed within time, estimated budget and with allocated resources. Project monitoring acts like a warning mechanism. Various project management software is available today viz. Primavera, Microsoft project management, Autodesk construction cloud, Smart sheet.

Oracle Primavera P6 is a project, program and portfolio management tool that is used for planning, managing and executing project work. Oracle Primavera P6 is designed to handle large and small projects in several diverse industries, such as construction, manufacturing, energy, and IT. Primavera P6 is a database system that codes and records the logic networks on complex scopes of work. It records the agreed project contracts dates. The combination of powerful critical path analysis and customizable coding structure makes Primavera P6 the most common engineering and construction planning and execution tool. The result is that Primavera P6 is the preferred project management software used by many companies worldwide to manage projects, programs, and portfolios. P6 allows the project budget to be integrated into the execution strategy and managed as the work progresses. It acts

as the connection between the project's financing strategy and the project's execution strategy.

2. Methodology

The methodology in this in this report serves as a guide in achieving the objectives of the study and discusses in detail the procedures, from how the data is collected till how it is processed and analyzed to achieve the objectives and scopes of the study. It involves the identification and further understanding of the project management, which consists of use of project management software like Primavera P6. Literature review has been done on several references, either from electronic journals, books, magazines, articles and so on to further enhance the understanding on the topic. The high-rise residential building with amenities has been scheduled using Primavera software and analyzed for project management. More emphasize is on how the scheduling on time is carried out efficiently at a site using software components for the completed high rise residential building. Finally, a detailed schedule will be prepared based on activities using primavera, which will be further used for monitoring and tracking of project. Resource allocation and cost optimization will be done using Primavera P6 software for better project management.

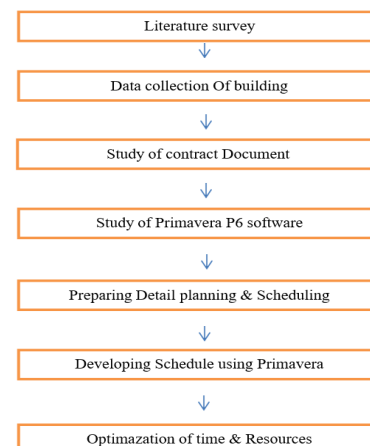


Fig. 1. Methodology flow

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1) *Creating EPS*

To create a schedule for project, first step is to collect data available from the project reports. Create the complete structure of the construction entity with its branches, which is executing the project using primavera P6. This is known as Enterprise project structure (EPS).

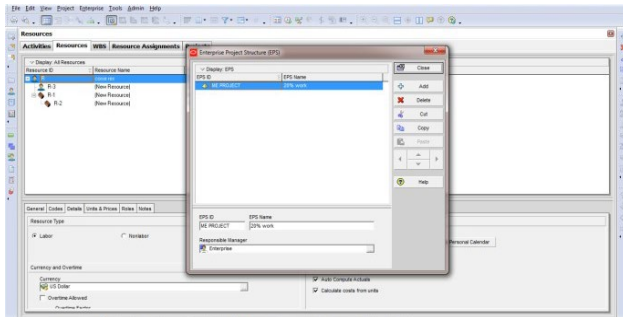


Fig. 2. EPS

2) *Creating new project*

The project is created under the chosen EPS scheme. Further its broken down into major project milestones, elements etc. The project is governed under respective divisions in EPS. That can be given planned start and finish dates. Global, resource or project calendar is assigned by the project.

3) *Work breakdown structure*

WBS elements is defined as the hierarchical arrangements of all the activities involved in the construction project. It helps to clearly identify the deliverables, report and summarize project schedule and estimated cost data at different levels of detail. Each project has its own project WBS hierarchy structure with top level WBS element being equal to that of each EPS node of the project. Each WBS element contains more detailed in WBS levels, activities, or both resources constraints.

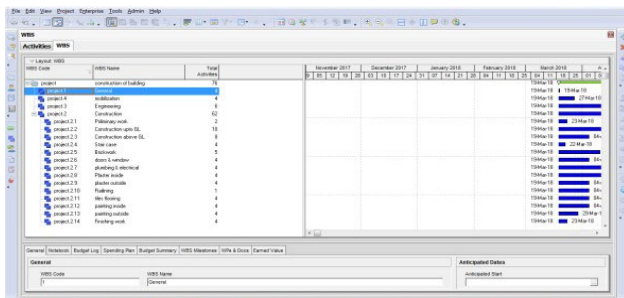


Fig. 3. WBS

4) *Defining activity*

The smallest subdivision of a project activities are the fundamental and key work elements of a project and form the top to lowest level of a WBS. The characteristics Activity like ID, activity name, start and finish dates, activity calendar, activity codes, activity type, constraints, expenses, predecessor and successor relationships, resources, roles etc.

5) *Relationship between activity*

By assigning succeeding, preceding activities with significant relationship to the overall project activities, form a network, scheduling the activities should be connected to each other.

- Finish to start (FS) relationship
- Start to start (SS) relationship
- Finish to finish (FF) relationship
- Start to finish (SF) relationship

6) *Creating a calendar*

The calendar can create and assign it to each activity. These calendars define the available work hours in each calendar days. Also specify national holidays, organizations, and project-specific work/non a workdays and resource vocation days.

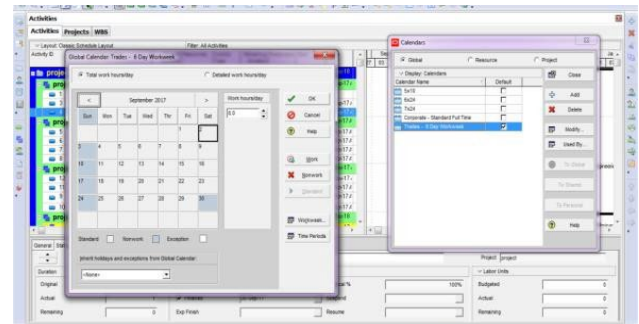


Fig. 4. Calendar

7) *Activity duration*

When planning the work, the project duration is entered in the original duration field. The actual duration can only be entered for the project activities, which are completed.

8) *Activity dates*

The following types of project activity dates available in the primavera; actual start, planned start, actual finish, planned finish.

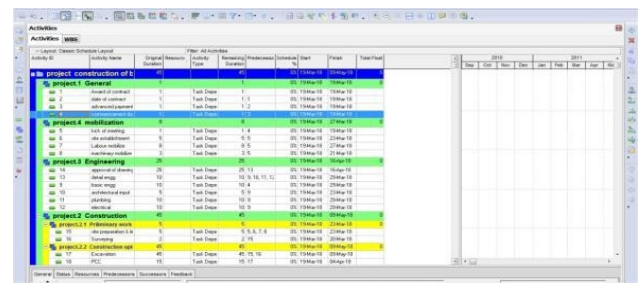


Fig. 5. Activity dates

9) *Creating baseline*

A complete copy of the original schedule is a simple baseline plan which provides a target against which a project's performance is tracked. Choose project. Maintain baseline. Then add and save a copy of current project as a new baseline B1. Then choose project baseline as B1 and assign primary baseline as B1. Daily updates to be made. Firstly, start date and end date Choose the activity to be updated. Then in the activity details window, select status tab. Then tick mark started if the activity has been started and select the date. Tick mark finished if the activity has been finished and select the finish date.

10) *Tracking of project*

Project tracking is an important tool for understanding the delay in the project. Teaching can help to reduce the delay and effectively manage the cost. Primavera tool is highly effective in tracking the project, critical activities can be managed easily

using tracking tool in Primavera. Actual Duration and baseline duration of project can be tracked closely to understand the deviation and manage to overcome the deviation and bring project on track.

3. Results and Conclusion

Emphasizing the importance of planning, monitoring, and controlling in the progress and on-time completion of a construction project, as well as the necessity and efficacy of project management software like Primavera P6, was the goal of this study. By reviewing the research and monitoring and control methodology, this goal was accomplished. The study served as a reference for comprehending the development of building work and identifying the unique issues that cropped up during the procedure. The findings of this study highlight the shortcomings of the current project management framework for managing projects. Finally, a new project management strategy

that is effective and affordable is developed.

- Obtained detail Project Activities.
- Monitored and tracked projects based on baseline time.
- Reduced risk of schedule overruns and cost over runs.

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