Planning and Scheduling of High Rise Building Using Primavera

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ABSTRACT

Planning and scheduling is important role in construction projects because of the increasing complexities in construction field. Construction Planning is the necessary warning to Scheduling and determining general sequence, defining labor tasks, construction methods and assigning responsibilities and cost overruns. Inappropriate planning can lead to major delays in the project work. For the planning and scheduling huge amount of paperwork is needed, this makes very difficult to handle large construction project through management. These problems can be solved using a project management software which helps to give a planned approach to planning. The benefits of effective planning, scheduling and control of construction projects are: reduced construction time, reduced cost overruns and the minimization of disputes. These benefits accrue to the contractors, owners, suppliers and workers in the form of improvements in productivity, quality and resource utilization. It helps to avoid the construction interruption, keep the continuity of crew work, and avoid the delay of construction and cost overruns.

Keywords: Planning, Scheduling, Project Management.

I. INTRODUCTION

Though technology is developing rapidly and vast day by day, the basic and fundamental needs which are required by human have not changed. In the today's world scenario, the construction industry has a great demand as the construction industry has become a fundamental part of a country's framework and mechanical growth and development. As the tall building, multi-dwelling are rising throughout the world day by day with the advance construction technology and computer skilled knowledge such as applying various software, but still fail in efficient and effective project management. The project management is an art and mission of preparing, organizing and directing human effort to control the forces and use the materials of nature for the requirement of human growth. Planning is what to do, how to do, where to do, the approximate resource required and number of days to complete particular task in construction project. This project ensures a study on a G+7 residential building, where analysis has been done using primavera software p6. An efficient and effective planning and scheduling using primavera software helps to effective control and monitor the progress of work by surveying and reconstructing under a few changes so that the work runs hand in hand with the estimated time and budget. The necessity of planning is to allow predicting the activities and resources that are critical for in time completion of the project. The main intension of planning is to ensure all activities and

resource are managed and the project is delivered both "on time" and "within budget".

Scheduling is the process of determining the sequential order of the planned activities, assigning realistic durations to each activity and determining the start and finish dates of each activity. The project schedule provides a graphical representation of predicted task, milestone, dependencies, resources requirement, task duration and deadlines.

Study object-

To prepare the planning and scheduling of a High Rise buildings and schedule the list of the planned activities using primavera software.

II. PLANNING AND SCHEDILING OF HIGH RISE BUILDING

Construction Planning -

Construction planning is a fundamental and challenging activity in project management and execution of construction projects. It includes the selection of construction techniques, the definition of work task, the estimation of required durations and resources of individual task, and identify the interdependency between different work tasks.

Construction Scheduling-

Scheduling is the process of determining the sequential order of the planned activities, assigning durations to each activity and determining the start and finish dates of each activity. The project schedule provides a graphical representation of predicted task, milestone, dependencies, resources requirement, task duration and deadlines. The project schedule should be detailed to show each WBS to be performed, the name of the person responsible to completing the task, the start and end date of each task, and the expected duration of the task.

Managing a Project-

The process of guiding a project from start to finish is the responsibility of a project manager. A good project manager wears many hats, acting at various times as a motivator, communicator, coordinator, and advisor. Project manager ensuring that project organization is carrying out its responsibilities for the best possible outcome. To be an effective project manager also requires consistency when update a projects.

Time and Cost Control -

Time control aims at to complete the project with contract duration. Time control hinges on time performances and the sequences of execution of activities. The basis of measuring activity time progress is the project master schedule of work. Time control monitoring starts with measuring of time status of completed in-progress and nonstarter balance activities. It uses time plan updating techniques to depict progress pictorially. Project cost control aims at controlling changes to the project budgeted cost in contract document. It provides management with cost and time related information for making decision with a view to complete the project with specified on time, quality and within budgeted cost. This information is extracted from performance data and other sources, is used to minimize waste, update current cost budget estimates forecast cost trends and make decision about the future. Close and periodical monitoring has to be done on the 'Assigned time' versus 'Achieved time' of various activities which would have an effect on the overall period or total project time.

III. TOOLS OF PRIMAVERA

EPS-

The EPS is a hierarchy used to organize projects, and to associate Organizational level security with that project structure.

While creating the enterprises project structure, must identify an OBS element, or person responsible for each node and project within EPS.
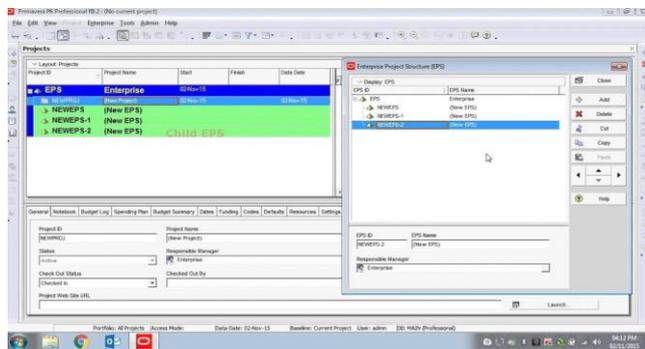


Figure 1. EPS diagram

Calendars-

Calendars are an important part of project schedules used. The calendar will demonstrate all working and non-working days for the project, including suspensions, holidays, in Oracle's Primavera P6 Enterprise Management Portfolio (P6). In P6, calendars can be assigned globally to the project, (Global Calendar) as well as to each individual activity (Project Calendar). Project calendars are assigned to individual activities in the project.
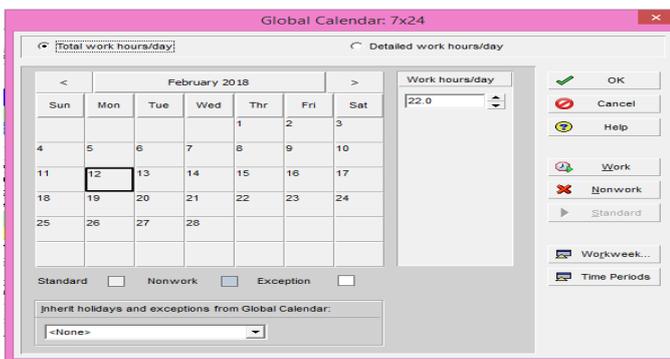
Figure 2. Calendar

WBS-

The work breakdown structure (WBS) is a hierarchical system that represents the construction project in increasing levels of detail to define, organize and display the project work in measurable and manageable components.
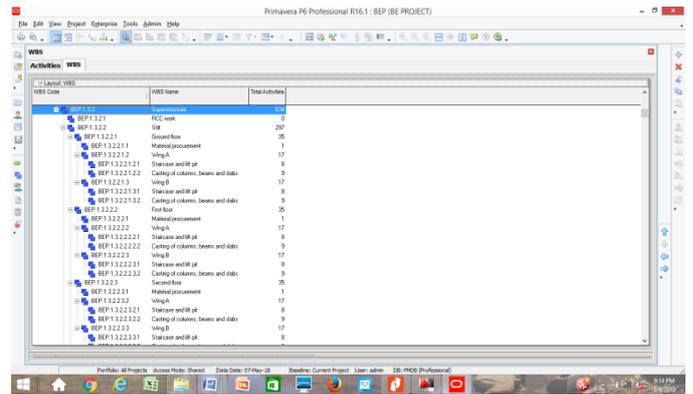
Figure 3. WBS

Relationship Types -

Finish-to-start (FS), Start-to-start (SS), Finish-to-finish (FF) and Start-to-finish (SF).By changing the relationship types between activities; project completion can be gained or lost.

Finish-to-Start (FS)

A relationship between activities in which the start of a successor activity depends on the finish of its predecessor activity.

Start-to-Start (SS)

A relationship between activities in which the start of a successor activity depends on the start of its predecessor.

Finish-to-Finish (FF):

A relationship between activities in which the finish of a successor activity depends on the finish of its predecessor.

Start-to-Finish (SF):

A relationship between activities in which a successor activity cannot complete until its predecessor starts.

Lags (or Leads):

An offset or delay from an activity to its successor. A Lag can be positive or negative.

Degree:

A positive or negative increment of the unit of time used in the schedule (also known as Lag). The

simplest of these relationships, is one in which one activity must be completed before the next one can begin. This is known as a Finish-to-Start (FS) relationship.

IV. METHODOLOGY

The scope of work was divided into the following steps:

A. Collection of data and Specifications of activities.
B. Study area characteristics.
C. Identifying the Constraints
D. Preparing Plan and Schedule for the Project in Primavera
E. Schedule of the project with Gantt chart
F. Budgeting and allocation of resources for every activity of the project

Collection of data and Specification of activities-
The data which is required for the plan of the project was collected from various sites. The total numbers of activities that are required for the schedule are listed out. Specifications required for each item or activity is collected from site to prepare plan and schedule.

Study area characteristics-
A residential building plan has taken for planning and scheduling for the project. The project of this residential building is at initial phase. Planning and Scheduling of residential building will be beneficial to the developer of this project. The construction is for a residential purpose having G+7 and the carpet area of the construction is 910 sq.m. The number of flats on each floor is sixteen with typical floor plan for each floor except for ground floor. Ground floor includes parking and general shops.
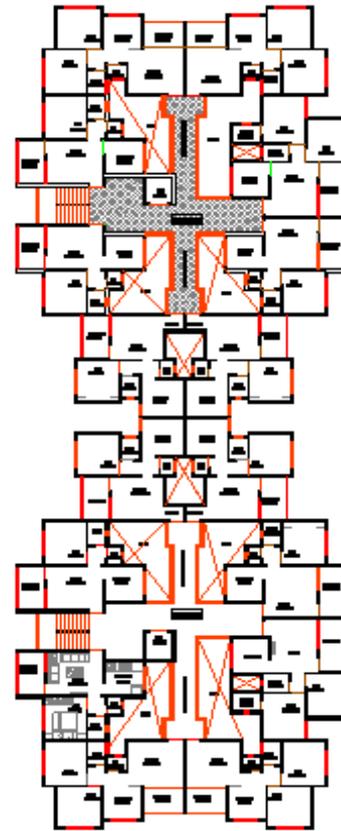

Figure 4. Typical Floor Plan

Identifying the Constraints-
The project will start in the month of May -2018.This actual construction of the residential building will take a long duration of two year for the completion of the project. The long duration of a single project will lead to a considerable increase in the cost of the project. Therefore reducing the project completion time is necessary for completing the project within the budgeted cost and budgeted time. This on time project completion and on budget completion of project is the two factors which state the project is a successfully completed. Reason for taking a long duration of this project is identified by means of the primavera schedule reports.

Preparing Plan and Schedule for the Project in Primavera-
Actual schedule preparation process starts with the collection of data like project start date, activities involved in the construction of a G+7 residential building with activities sequences, duration taken for each and every activities, resources needed for each

and every activities and its amount, cost spent for each and every activities. The collected data are entered in the software and the relations between the activities are given as per its sequence of activities collected. Project calendars are assigned to individual activities in the project. The process is started for planning and scheduling in primavera for this project.

Schedule of project with Gantt chart-

Schedule for project is prepared by creating the EPS (Enterprise Project Structure), Calendar with a time period of 8 working hours per day excluding Sunday's, WBS (Work Breakdown Structure) and adding the total number of 710 activities that are required for the project with their original duration. Successors and predecessor are assigned for all the activities by the use of Gantt chart. Interdependencies of various activities for simultaneous independent work are assigned.

Figure 5. Scheduling by Gantt chart

Budgeting and allocation of resources for every activity of the project-

Budget is prepared for each and every activity by allocating the resources to the activities. Budgeted project labour, Non labour, Expense, Material and total cost of all the activities are calculated.

EXPECTED OUTCOMES

A. Reduces risk of schedule overruns and cost over runs.

B. Optimizes management of all resource and reduces risk.

C. Optimized Resources.

D. Enhanced Visibility.

E. Forecasting of Project Activities.

V. CONCLUSION

Primavera software serves as an effective tool for generating Gantt chart for schedule of residential building (G+7) construction. Effectively link all the activities involved in the construction of the project. Primavera gives the total duration required for the construction of the different phases involved. It determines the Critical Path of the schedule of the project. It determines the total float generated due to interdependency of activities. It keeps a track of the scheduled and the on-site construction. The use of project management software in a proper way reduces the cost and time of construction. Use of software gives a proper scheduled path which helps in setting a track for all the activities, to check if there is deviation from planned cost and schedule. It can investigate the defects in the planning, scheduling procedure of the client organization.

VI. REFERENCES

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