

# International Journal of Innovative Research in Science, Engineering and Technology

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## Management of Multi Construction Projects using Primavera

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**ABSTRACT:** In today's world construction field had been improved drastically. Success of the construction is because of the effective management which has effective time, cost and scope. Managing two or more projects at a single moment may leads to take more time, distraction and confusion which also has more planning, scheduling, monitoring and controlling. In the construction projects the activities took place is repetitive to every project but the resources of the project changes from project to project. The management software helps to planning and controlling the work that takes place. Primavera helps to schedule a project without errors and to execute and control by tracking the project during execution. This paper was about the planning and scheduling of two apartment buildings in the software of primavera.

**KEYWORDS :** Primavera, Planning, Scheduling, Construction, multiproject.

### I. INTRODUCTION

Many organizations achieve their goals by completing projects that contribute to their objectives. Projects have a finite length, involve a number of activities and people, and achieve deadlines and fixed budgets. Successful project management has several characteristics. To understand the value of project management, it is necessary to know the fundamental of the project, the core characteristics of the project management processes; how success is evaluated, the roles, responsibilities and activities of a project manager and the expertise required and the context in which projects are performed. Primavera is the project management software which helps to organize the above responsibilities in a best manner without any mistakes.

Managing two construction buildings same time is difficult but with the help of Primavera one can manage many projects without any confusion in the project. In this study management of the two apartment building takes place with the help of management software Primavera which has planning, scheduling, resource and cost estimation. The aim of planning is to optimize timing, eliminate or reduce uncertainty, improve efficiency of the operation, obtain a better understand of the objectives, optimize resources, for monitoring and controlling work, provide early warning of problems and take correct measures to control the problem.

### II. LITERATURE SURVEY

**Andrew Fernans Toms Sachin Paul (2013)** was done the Project in monitor and control of a building using the software of primavera. This study has the project monitoring process of "Standard Design Factory", a four storied factory building and the duration to complete was 21 months. But during the execution period it took extra 2.6 months to complete the project. The objective of this study was to bring the awareness of the management software among contractors in India.

**Mohd Khalil Bin Abdul Kadir (2006)** was done the case study of a building construction planning and scheduling using primavera software. This study reviewed on the concept of sequence of work for building construction project, scheduling technique used in the primavera project planner and the development of construction planning and scheduling on building construction of science faculty International Islamic University Malaysia (IIUM). From the study is found that the sequence of work for building construction project can be divided in to four main categories

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which is substructure work, superstructure work, architectural work and mechanical and electrical work. The study also found that the precedence diagramming method (PDM) is a scheduling technique used in the primavera project planner and the total duration for the IIUM project after developed using the primavera project planner is 695 days.

**T.Subramani et al., (2014)** had been done a planning and scheduling of a high rise building. It compares the scheduling of conventional building and IBS building. They conducted 10 scenarios for better result. From the results they say that IBS building is best compare to the conventional because it saves time of 42%.

**Sushant Pradhan et al., (2016)** done the project of planning, scheduling and resource optimization of multiple projects. They used the management software of primavera. This study of would like to serve as a reference while managing such kind of multiple projects. There are three sites considered and the work had been done simultaneously. The challenges in managing multiple projects are project duration, interdependency of resources, scheduling of activities and project cost overrun. The resource optimization they used was man, material, money and machines. They tried to optimize resource to a level up to which the company can execute the activities without much hindrance. They used project management software of primavera. The cost of individual work break down can be known along with the duration. Thus decisions could be made wisely for proper management. For finishing works there was always more amount of additional labor needed, thus scheduling properly gives us an option to maintain proper procurement of resources. In multiple projects resource leveling was very important to maintain proper resource distribution. For multiple projects under a single company such analysis should be done to check out for over allocation. Scheduling simultaneous projects was also an important criterion for managing multiple projects. The similar types of activities should not coincide and must be avoided. If unavoidable then proper solutions should be provided to avoid delay.

## III. METHODOLOGY AND DISCUSSION

The projects of this study has following steps in the management software of primavera.

- a. Creation of Project: The title and the details of the project has been created in Enterprise Project Structure (EPS) page of the software.
- b. Calendar Creation : The calendar had been created for both the projects in Global Calendar. The Calendar has working and non- working days and the time periods per day for the project.
- c. Work Breakdown Structure : WBS had been created in the WBS Page. Every task in a project has an identification that reflects its location in the project's hierarchy. WBS is a hierarchical structure that is used to organize the tasks for reporting schedule and tracking costs.
- d. Define Activities : The activities had been created in the activity page. Activities are fundamental for project.
- e. Applying Durations : The durations had been applied for the activities after the activities had been defined to know the total duration of the project.
- f. Sequence of Activities : The relationship had been applied to the activities. Relationship lines had been viewed in Gantt Chart.
- g. Finding the Critical Path : The critical path had been determined from the Gantt Chart. The critical path had been known after the schedule had been developed.
- h. Creation of Resources : The resource has been created in the resource page. A resource can be defined as an entity that is assigned to an activity and is required to accomplish the task.
- i. Assigning the Resources : In the activity page select the activity click the resource in the title bar select the assign resource in the corner of the page and assign the resource. Give the budgeted units per day or budgeted units for the activity. Resource has been assigned for all the activities.
- j. Analyzing the Resources : Analyze the resource for an activity whether it is over allocated or under allocated by viewing it in the analyze icon.
- k. Leveling the Resources : Level the resources individually for activities by changing the maximum unit per time in the resource page.

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- l. Develop the Schedule : After leveling the resources once again schedule the activities in the activity page and view it in the Gantt chart for the critical path and check the relationship assigned for each activities is correctly scheduled.
- m. Creating Baselines : Create a project baseline for activities and view it in the Gantt chart. The baseline had been created to know the deviation of the project from the original schedule during execution.
- n. Report Preparation : The report had been prepared for the project.

## IV. PROCESS OF MULTI CONSTRUCTION PROJECTS

The processing of planning and scheduling of the two construction projects had been given below:

### APARTMENT BUILDING PROJECT 1:

The apartment building has G+2 building. The start date of the project had been March 1<sup>st</sup> 2017 and the end date had been 5<sup>th</sup> Dec 2019. It has 161 activities and 4 major deliverables and 6 sub major deliverables and 24 minor deliverables.

WBS			
Activities WBS Projects			
Layout: WBS			
WBS Code	WBS Name	Total Activities	
101-6	apartment building	161	
101-6.1	INITIATION OF PROJECT	4	
101-6.4	INITIATION OF CONSTRUCTION PROJECT	7	
101-6.2	SUB STRUCTURE	17	
101-6.2.1	FOUNDATION	8	
101-6.2.4	PLINTH BEAM	9	
101-6.3	SUPER STRUCTURE	133	
101-6.3.1	GROUND FLOOR	56	
101-6.3.1.1	COLUMN	7	
101-6.3.1.2	FLOOR LEVEL	4	
101-6.3.1.3	SUMP	14	
101-6.3.1.4	STAIR CASE	6	
101-6.3.1.5	BEAM & SLAB	8	
101-6.3.1.6	SEWAGE TANK	14	
101-6.3.1.8	PLASTERING	3	
101-6.3.5	FIRST FLOOR	29	
101-6.3.5.1	COLUMN	7	
101-6.3.5.3	STAIR CASE	6	
101-6.3.5.2	BEAM & ROOF WORK	8	
101-6.3.5.5	BRICK WORK	3	
101-6.3.5.4	PLASTERING	5	
101-6.3.2	SECOND FLOOR	29	
101-6.3.2.1	COLUMN	7	
101-6.3.2.3	STAIR CASE	6	
101-6.3.2.2	BEAM & ROOF WORK	8	
101-6.3.2.5	BRICK WORK	3	
101-6.3.2.4	PLASTERING	5	
101-6.3.4	FINISHING	19	

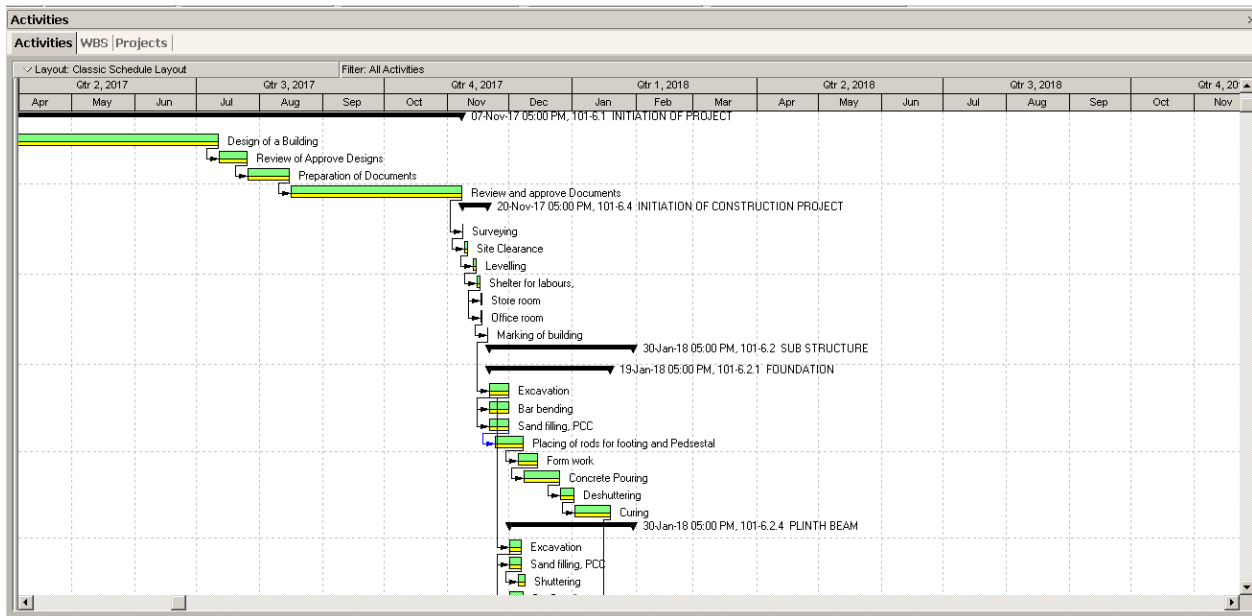
Fig.1 WBS Creation of Apartment building 1

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**Fig.2 Gantt Chart of Apartment Building 1**

Primavera P6 Professional R8.2 : 101-6 (apartment building)

File Edit View Project Enterprise Tools Help

Resources

Projects Activities Resource Assignments WBS Resources

Display: Current Project's Resources

Resource ID	Max Units/Time	Resource Name	Resource Type	Unit of Measure	Primary Role	Default Units / Time
1	14d/d	Mason	Labor			1d/d
6.5	1d/d	Electrician 1	Labor			1d/d
R-97	500kg/d	20mm	Material	kilogram		7kg/d
2	2d/d	Male Helper	Labor			1d/d
3	0d/d	Female Helper	Labor			1d/d
4	3d/d	Carpenter	Labor			1d/d
5	0d/d	Plumber	Labor			1d/d
6	6d/d	Painter	Labor			1d/d
7	0d/d	Electrician	Labor			1d/d
8	2d/d	Tile Worker	Labor			1d/d
R-14	20/d	ELECTRICAL POINT	Material			7/d
9	0ct/d	C	Material	cubic feet		1ct/d
10	326ct/d	FA	Material	cubic feet		1ct/d
11	383ct/d	CA	Material	cubic feet		1ct/d
12	219ct/d	W	Material	cubic feet		1ct/d
13	6900ea/d	B	Material	Each		1ea/d
14	200/d	SCAFFOLDING	Material			1/d
15	67/d	SHEET	Material			1/d
17	5L/d	PAINT	Material	Litres		1L/d
18	78/d	WHITE CEMENT	Material	Bag		1B/d

General Codes Details Units & Prices Roles Notes Progress Reporter

**Fig.3 Resources for the Apartment Building**

## APARTMENT BUILDING PROJECT 2:

The apartment building has G+3 building. The start date of the project had been 5<sup>th</sup> June 2017 and the end date had been 7<sup>th</sup> July 2020. It has 188 activities and 4 major deliverables and 7 sub major deliverables and 29 minor deliverables.

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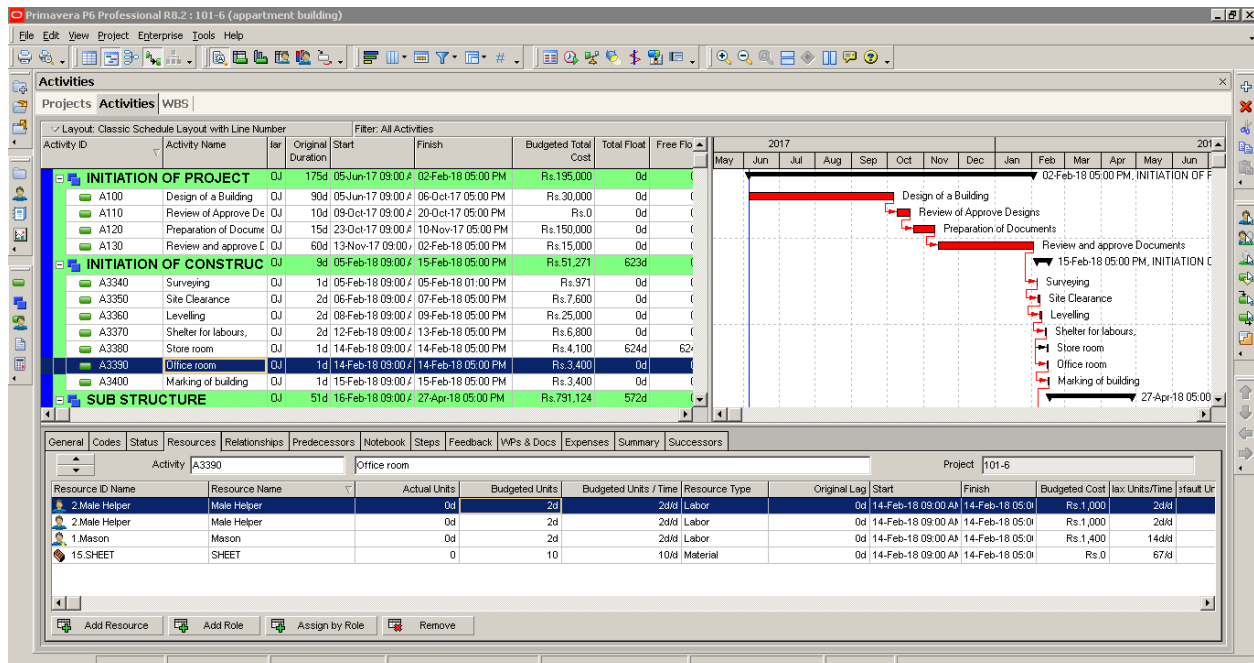


Fig.4 Activities with Gantt Chart and Resource assigned of Apartment Building 2

## V. CONCLUSION

This study had given the brief explanation of management of multi project using Primavera. The planning and scheduling of the two apartment building had been explained. The apartment building 1 has been completed in 717 days which also include the preparation of documents which has 175 days and the budgeted cost was Rs.8072725.81. the apartment building 2 has been completed in 27 months and Rs.12594975. Critical Path had been determined and schedule had been developed. The report had been prepared.

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