A Comparative Study of Scheduling of a G+2 Building Using Microsoft Project and Primavera P6

Atul Yadav[1] and Rishabh Mahure[2]

[1]*Student, Dept. of Civil Engg. Noida International University, Gr. Noida, UP*
[2]*Assistant Professor, Dept. of Civil Engg., Noida International University, Gr. Noida, UP*
E-mail: [1]atulyadav.july@gmail.com, [2]rishabh.mahure@niu.edu.in

Abstract—*The main prospect of this study is to develop an planning approach in order to optimize the construction planning and scheduling using software to complete a construction project. The main objective of this study is to carry out scheduling using software's (Microsoft Project and Primavera p6) and analyze the existing methods to identify the sequence and time (duration. Start time, finish time) of the construction project. Analyze and identify the dependencies of the tasks to track the project and update it on regular basis and to analyze the delays in the project. Suggesting the suitable and necessary methods and techniques for developing new alternative methods.*

Keywords: *Planning, Scheduling, Tracking, Updating and planning software.*

1. INTRODUCTION

Due to the development in the construction industry it requires lots of paper work for maintain the schedule, budget and resource. By the introduction of computer software technology in construction industry changes the way of working. The planning and scheduling is the fundamental and the basic requirement for understanding the construction project and to determine the satisfactory use of time, cost and quality. Proper and advance planning provide the alternative direction and technique completing the construction project successfully.

1.1 Planning

Planning is the primary activity in the management of the construction project. There are various aspects of planning which includes: - Collection of data from previous records, analysis of implemented activities and choosing the alternative to perform the activities.

1.2 Schedule

Scheduling is the critical task as it helps in deciding the time frame in which the tasks can be completed. Construction schedule can be defined as the timing of the assigned task in the project including the duration, sequence, priority and dependency. Scheduling involves: - Assignment of task, assignment of sequence of tasks assignment of task duration, start time and finish time, assignment of resources, assignment and identification of dependencies.

2. LITERATURE REVIEW

The project planning and scheduling plays an important role in the process of project and focuses on the project time and cost as targets. Delivering project on time and within budget is very essential for the project. Many different tools and techniques have been developed for the enhancement and support better the project scheduling, and these tools are widely used by the planner and the management of the origination.

Gantt chart: It is a type of bar chart that is used to show detailed project schedule along with progress graphically. Modernbar chart also shows the list of activities, relationship between the activities, status of the project and the work breakdown structure.

2.1 Critical Path Method:

In 1950, Critical Path Method (CPM) was developed by Kelly and Walker to assist in building and maintain of chemical plants. The Critical Path Method (CPM) is a mathematically based algorithm for scheduling the activities of the project. The essential techniques for using CPM include the following:

- List of Activities required with duration and relationships between activities.

- Logical end points such as milestones, start finish time or deliverables items.

CPM is also defined as the longest path of planned activities to the end of the project. The earliest and the latest time that activity can start and finish without making the delays or making project longer. Overall we can say that Critical Path Method is the effective and powerful method for assessing:

- Activities which are to be carried out and priority of the activities can be easily set.

- CPM is useful where parallel activities can be carried out.

- The shortest time in which activities can be carried out.

- Sequencing the activities, scheduling within WBS, and the timing involve with the activities of the construction project.

3. METHODOLOGY

3.1 Methodology used for this study is designed in four stages:

Stage 1: Pre-Data Collection: This stage includes collection of data from sites, previous schedules, collecting information on various constraint, collecting the information on problems that might occur in the construction projects. The data can be collected by meetings and by the senior engineers of the construction company.

Stage 2: Analysis-Implementation-Analysis: When the data is collected analyze and sort out the necessary data based on requirement of the project. Sortthe data according to the priority of the activity or on the priority basis.

Stage 3: Progress Data Collection: Collect the data from the site on regular basis compare it from the schedule which is prepared in advance in order to track the schedule and update it on regular basis. The data collection can be done through:

- Daily Progress Report.

- Labor work out:

- Tasks with their time (start and finish time, duration).

Stage 4: Post Data Collection: The data collected wils
Tools and technique
The software used in this research are Microsoft Project 2016 and Primavera P6 Professional 17. There are certain tools which are provided in these software that are used to schedule the project and make different reports as per need. The functioning of both the software is explained below: -

1.2 Microsoft Project 2016

Microsoft Project is the project management software used to manage the project and it is sold by Microsoft. This application offers to create schedule, critical network, Gantt chart, manage resources track the project.

1.2.1 Steps involve in creating the schedule on Microsoft Project:

Step 1: Setting up the Calendar
Setting up calendar is the primary task before starting the process of scheduling it includes:
Define working hours along with working and non-working days
- Define Project Start Date and holidays.
- Define Calendar Shift i.e. 24 hours, night shift, standard (default).

Step 2: Enter Activities name with WBS (Work Breakdown Structure)
Enter the activities along with WBS in the task name field. WBS can be created as:

Select the activities Click on indent task in task ribbon the selected activities comes under a specific WBS.

Step 3: Assign Duration
After Creating WBS and Activities next task is to provide the duration of the activities. It is required to collect information on each activity duration before assigning the duration. Wrong assignment of duration will affect the overall time of the project completion and resources cannot be allocate easily.

Step 4: Assign Relationship along with Type of Relation, Constraints, Lag and Lead
After assigning duration to the activities define the relationship between the activities. Relationship defines the Start date and Finish date. The relationship between activities will be of four type these are as follows: -

- **Start to Start:**it is a logical relationship in which successor activity cannot start until the predecessor activity has started.

- **Start to Finish:**It is a logical relationship in which a successor activity cannot finish until a predecessor activity has started.

- **Finish to Finish:**It is a logical relationship in which a successor activity cannot finish until a predecessor activity has finished.

- **Finish to Start:**It is a logical relationship in which a successor activity cannot start until a predecessor activity has started.

Lag: To add lag time, assign a positive number; lag time create a delay between two activities.

Lead: To add lead time, assign a negative number; Lead time is an overlap between two tasks that share a dependency.

3.3 Primavera P6 Professional 17
Primavera is thesoftware of oracle and is used for planning, managing and executing the project and portfolios. Many of the organization depends on primavera p6 for several reason such as:

- Plan, schedule and manage the project.

- Enhanced workflow and Track the progress.

Creating OBS
OBS is maintain the data of responsible managers for the project in the company. There is only one OBS of the entire organization.

To create OBS-click Enterprise > OBS.

On OBS page click add

Creating EPS

It represents the breakdown of the project in a company. It maintains the enterprise project at various level within the company. Maintain the phase of the project and the grouping that meet the needs of organization.

To create EPS-click Enterprise > EPS.

On EPS page click add

Creating Calendar

Calendar plays an important role in maintain the accuracy of the scheduling. Calendar contains various features such as working days, non-working days, working hours, non-working hours, list of holidays. We can create three type of calendar these are: - Global Calendar, Project-Specific Calendar, Resource-Specific Calendar

Create Resource Sheet with unit and cost

We can create resource sheet in hierarchy under three options that are: - People, Material and Equipment.

We can also provide unit and the cost to the resource based on the requirementeither it may fixed unit rate or the unit rate per hours or per day.

Create WBS

WBS contains the group of activities of the project along with the duration and start and finish time of the particular group of activities. WBS is useful because it divides the project activities into small groups so that scheduling, data handling become easier.

Create Activities and assign Duration with relationship and other details

Assign activities, activity id date and duration and other details.

2. Implementation (result and reports)

The work which is executed using Microsoft Project &and Primavera p6 result is as follows:-

- Duration and relationships of activity is same in both the software.
- Start and finish time is same.
- Earlier start and Latest start time is same.
- Earlier Finish and Latest Finish time is same.
- The data generated from both software is same.
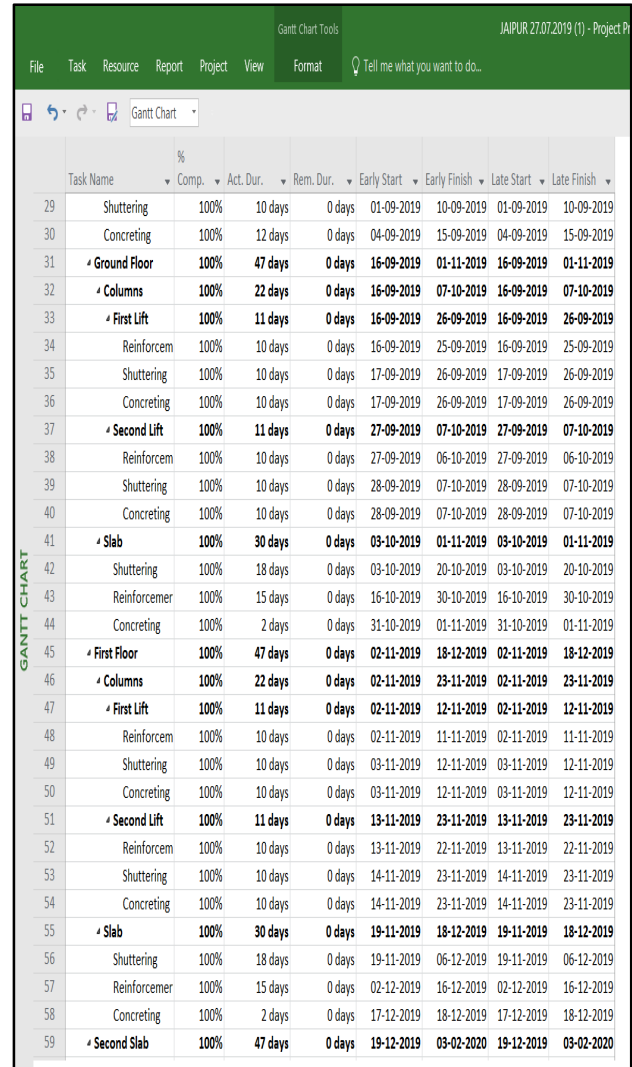
Figure 1: Tracking and schedule using Microsoft project 2016
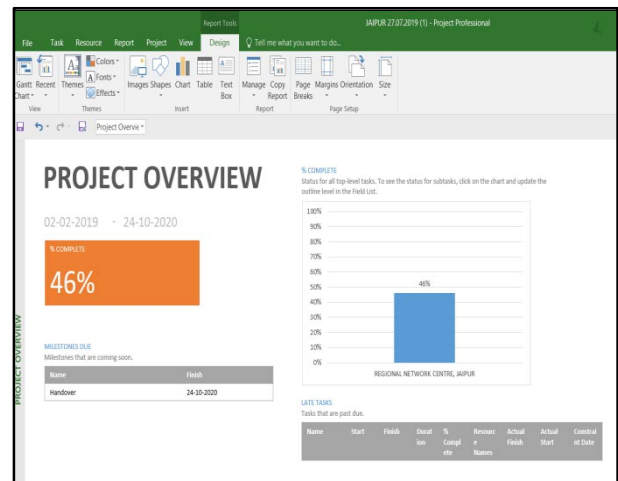
Figure 2: Project Overview report using Microsoft project 2016
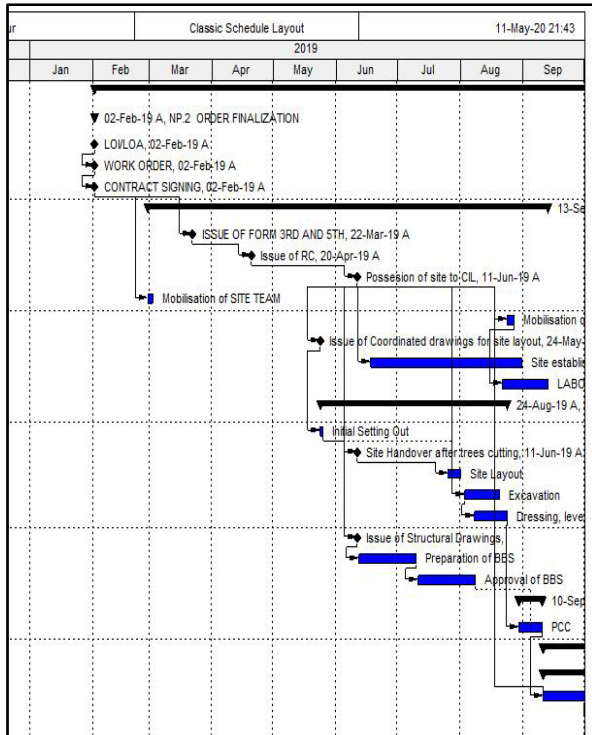
Figure 3: Sample Gantt chart generated using Primavera P6 Professional 17.

Figure4: Sample scheduling of a G+2 building in Primavera P6.

4. CONCLUSIONS

Software serves as the effective tools for creating Charts and other detailed reports for the schedule.Both the software have different way of working style as the Primavera P6 provide more systematic way of working and have more features than Microsoft Project.As all the input parameters are same so the result obtained from both the software are same.

5. ACKNOWLEDGEMENTS

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