# PLANNING, SCHEDULING AND TRACKING OF A RESIDENTIAL BUNGALOW USING MICROSOFT PROJECT 2013

## Padma Athani[1], Sachin Kulkarni[2]

[1]M.Tech. Scholar, Department of Civil Engineering, Jain College of Engineering, Belagavi, Karnataka, India
[2] Asst. Professor, Department of Civil Engineering, Jain College of Engineering, Belagavi, Karnataka, India

---------------------------------------------------------------------***---------------------------------------------------------------------

**Abstract -** *In Project Management, proper arrangement and setting the progress is the essential element. Planning is an initial step for each and every work in management field. Planning serves as the base for executing, monitoring and controlling and closing of the project. When maximum time is spent on planning, it will fundamentally minimize the time spent on execution. Planning ensures a head of time-when to do, what to do and how to do. It gives an idea of where we are and where we need to be. It is a bridge between the present and future course of action. Most of the project suffers time and cost overruns due to improper planning, scheduling, and execution works which results in several issues may be a delay in providing facilities, development, reduction quality of construction and making the project more costly.  It helps in avoiding instabilities, confusion, delay of work, unexpected risk, wastages etc.*

*This study deals with planning, scheduling and tracking of a Residential Bungalow (G+2) at sahyadri nagar, Belagavi where construction is in progress. This observation also considers a comparison between the baseline duration and cost to the actual duration and cost of the project using project management software tool Microsoft Project 2013.*

**Key Words: Project Management, Construction Planning, Microsoft Project (MSP), Work breakdown structure, Critical Path**.

## 1. INTRODUCTION

Construction plays a main role in economic growth through the multiple effects on the other sectors of the economy but, due to the silent nature of construction business, knowledge gained planning, scheduling and tracking of the construction project is rarely disseminated. The conventional task administration system can't meet the requests of the present ventures, as a huge measure of data and information on an undertaking are continually evolving. Undertaking directors from development industry express that their 70-80% time is spent on correspondence and 70% of project documentation is paper-based. The principle goal of the investigation is to evaluate, plan, calendar and track a private task with the assistance of Microsoft Project 2013 programming, consider the outcomes. It is conceivable to advance the technique appropriate for the chose private task

in the organization and applying their undertaking making arrangements for comparable project in future.

## 1.1  Project Management

The way toward overseeing and bringing human and material asset into a proficient method for working for the duration of the life of an undertaking by utilizing current administration advances to accomplish foreordained targets, cost, extension, time and quality and individual fulfillment is satisfied with project administration. The objectives are settled up in the undertaking project management, which is to be satisfied by executing a genuine arrangement of activities subjected to asset requirements.

## 1.2 Planning, Scheduling and Tracking

Construction planning is challenging and fundamental task in execution and management of construction work. It incorporates the determination of resources, the meaning of the work action, the estimation of required resources and span of an individual movement, and distinguish the connection between various work exercises.

Scheduling is determining the timing of task in the project that gives which and when the task will be performed. Defining it in other words it is a reflection of a plan. Scheduling can be also defined as a project with detail work task with time.

Project performance values that is task and actual duration of work is done by tracking the project in terms of collecting, entering and analyzing. Second important phase is tracking in project management. At start of actual work, main thing to highlight in project planning is communicating and developing the details of project plan. When actual work has been started, the next phase of project management is tracking progress.

## 1.3 Work Breakdown Structure

Simple in understanding and quickly perfect of a project can be done by work breakdown structures. Hierarchical decomposition of goal objectives, activities sub-activities and work package is done by WBS which involves managing the project.

---

### 1.3 About Microsoft Project 2013

A project manager develops a plan, assign the resources to tasks, keeping track on progress, manage the budget, and analyze the workloads with the help of Microsoft project 2013, a project management software brought up by Microsoft. Assigning work and resource cost is based on the project organize budgets. Every resources are given to the activities and the software calculates the cost to the work time rate, which manages the task level, summaries the tasks level and finally the project base level. Resource (materials, equipment, and labour) can be shared between projects using a shared resource pond. Every resource have its own calendar with their own time. Multiple activities are assigned to multiple projects with each task assigned with many resources. Resources categories as Work, Cost, and Materials.

### 1.4 Objectives of the study

The objectives of this study are given below:

- ➢ To represent construction activities for a Residential Bungalow construction.
- ➢ To calculate the quantities for every activity by estimation and also calculate quantities of material and labour by rate analysis.
- ➢ To develop planning and scheduling using Microsoft project 2013 software.
- ➢ To compare between planned duration and actual duration.
- ➢ To track the progress of the project to a certain day of completion and analyze delay.
- ➢ Ensure cost variance in the project.

### 2. LITERATURE REVIEW

**Prof. R. G. Rathod and Prof. A. R. Patil (2016)** in this paper, they made an effort in comparison study using MS Excel and MS Project for planning, scheduling and delay analysis updating of the various task. In this paper the project was under residential apartment with two blocks with B+G+4 ever floor with 60 flats in total, every block in floor has 12 flats. Every floor with a floor area of 12,596 Sft. The actual cost of the project was Rs. 4,93,12,027/- but due to delay the cost increased to Rs. 3,71,100/- therefore the delay of cost can be minimized with proper planning, scheduling and execution work taken in a project.

**Mrs. Sangeetha H. M., Mr. Rajeeva S. J., Dr. G. Narayana (2017)** this paper establishes a residential building worked on planning, scheduling, and tracking of that project which is located in New town, Yelahanka Bangalore. Which has 116 flats (G+4) where construction is ongoing. This paper also fortifies a comparison between the baseline duration and baseline cost to the actual duration of the project using

project management software Primavera P6. As they planned Project duration 433 days and original completion days was 503 days. The Performance index such as Schedule performance index is 0.98, hence it is less than 1, and the project is lagging behind the schedule. From all this statement they concluded planning is a very important key function in any sector.

**Ch. Chowdeswari, D. Satish Chandra and S. S. Asadi (2017)** this paper analyzes how to work on planning and scheduling of a multistoried building (G+8) using Microsoft project (MSP) software. They said labour productivity must be given extreme importance in calculating the activity duration as well plan, and knowing the well founded methods in the computation of various labour efficiency and for its improvement. They have noticed the critical path and critical activities of the project and scheduled based on the project start and finish date. Lastly they identified the risks involved while planning by following certain techniques like SWOT analysis like what is the probability?, what was the mistake?, What will be the loss?, What can best one do about it?

**Shubham Laddha, Prerna Chanda and Sneha Khedekar (2017)** They carried on an online study concentrating on every one of the partners identified with the project with a view to acquiring a thought of different task administration hones in the development business. In conclusion, they presumed that Construction of building utilizing Traditional route turns out to be uneconomical and expends additional time with numerous complexities and huge mistake which real execution of the Project. MSP is the cutting edge instrument of Project Management that guide beat the hindrances confronted inferable from the conventional method for Planning and Management.

**Chidambarakumar M. G., Gomathi Sankar G. and Ashok Manikandan. S. (2017)** they described that planning and scheduling are vital in a development or construction project. Proper planning, scheduling, and tracking are the significant parameter in the development business. In view of the examination they finished up between the manual planning and Primavera scheduling, Primavera is effective for scheduling the undertaking and furthermore to streamline the days by utilizing Primavera. The postponement of the development project is because of inappropriate planning and scheduling. Consequently, this undertaking infers that the postponement can be amended by appropriate scheduling and tracking throughout the project.

### 3. METHODOLOGY

### 3.1 Project detail:

The proposed project for case study work is construction of Residential Bungalow of Suresh Algundi at Sahyadari Nagar,

Taluk and District Belagavi, State: Karnataka. The construction of the work is in progress. The Residential Bungalow project consists of G+2 floors which contains 2BHK. Residential building have total site area 40 feet x 60 feet (2400 ft$^2$/223 m$^2$. The soil is of hard strata with 25t/m$^2$ SBC. The estimated cost is Rs. 75,30,500/-. The project started on 20/12/2017 whose estimated completion date is 17/07/2018 (7 months). The total number of task are 77. The activity name, duration, predecessor and resources are entered in the Microsoft Project 2013 software which give the total duration of about 175 working days for the completion of the project.

## 3.2 Research methodology

### 3.2.1 First Stage

This stage is known as pre data collection where it consists of setting out the objectives, literature review, and based on the area of research, the Residential Bungalow is taken as a case study.

### 3.2.2 Second Stage

*3.2.2.1 Site Supervision:* working status and understanding the working on the site is considered here. The work which are carried here should be understood by every individual like organization of structure, degree of quality used in work, safety aspects, rules etc. Dimension, equal, alignment, cross section should be with accordance to all work.

*3.2.2.2 Drawing Details:* In every planning task drawing is an important role. There are various drawings which are obsereved during the construction work like architectural drawings and structural drawings. According to the drawings all the tasks are identified to reduce the sequential order.

*3.2.2.3 Details Estimation:* For all engineering work it is necessary to know beforehand the cost of construction known as the estimated cost. The subject of estimating is easy, nothing much to understand, but the knowledge of drawings is very important.

*3.2.2.4 Material And Labour Calculation:* The cost of quantities of materials, the cost of laboures, and other miscellaneous is determined by rate per unit of a particular item work is known as analysis of rate.

### 3.2.3 Third Stage

This stage is also known as post data collection, whatever data is collected is analyzed in Microsoft project 2013, where planning, scheduling, and tracking of the project is done.

3.2.3.1 Representing Project Calendar

A working calendar represents the working days in a week and the working hours. The standard calendar which consists of working hours from Monday to Friday 8AM to 5AM with one hour break.

### 3.2.3.2 Selection of Task Mode and Inserting task

The Task mode gives an option whether a task is scheduled automatically or manually. The task is step by step entered in auto schedule mode in the Microsoft Project software.

### 3.2.3.3 Organizing Work Breakdown Structure

Work breakdown structure is created after a complete planning of a project. Where work breakdown structure is defined as to organize the project element with different elements.

### 3.2.3.4 Scheduling the Project work

After all the task are entered along with their respective duration, the data of activity dependencies is specified by specifying predecessor of each of the task.

### 3.2.3.5 Assigning Materials and labours.

A material and labour can be explained as the quantity of material and number of people that is required to finish the task and is assigned to an activity.

### 3.2.3.6 Critical Path

The critical path through a scheduled network is a long time duration direction through the network.

### 3.2.3.7 Creation of Baseline

Baseline is a complete image of a construction project plan that can be used to compare the current schedule to calculate progress.

### 3.2.3.8 Tracking of Project

The first step is planning in managing the project. Once planning is succeeded, performance of the construction project starts. Tracking is a process of collecting the informative data, entering the actual values from the site and analyzing actual project performance.

## 4. RESULTS AND DISCUSSION

### 4.1 Working Drawing

There were many correction in drawings during and after the work had started. The client made the changes and some changes were made by the engineer. As drawings play an important role for assigning the task so it should be completed properly with a better understanding.
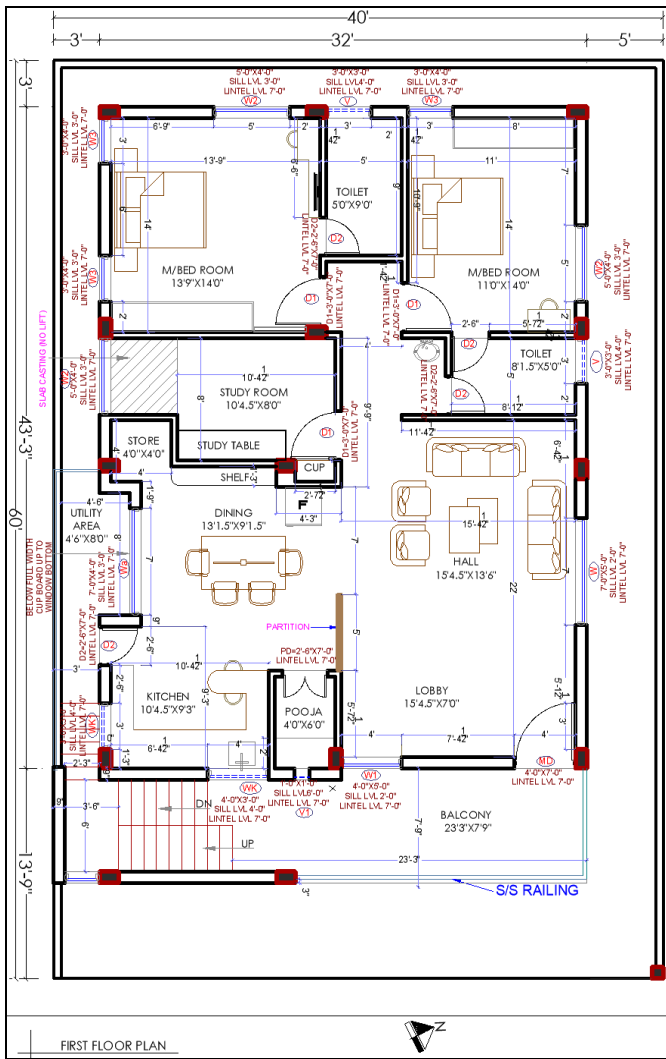
**Fig -1:** First Floor plan of the Residential Bungalow

## 4.2 Detailed Estimation, material and labour calculation

The finalized drawing helps to calculate Study of Detailed estimate contains the quantities of various items of activities. The estimation work was carried out in MS Excel. The quantity of each item which is found during estimate helps us to calculate material and labour quantity which is further useful in our project. The total estimated cost of the project is Rs. 75,30,500/-

From detailed estimation we have calculated the quantity of each item now that quantity helps to find out the material and labour quantity by rate analysis through MS Excel. The rate of material according to market rate and labour rate according to SR 2016-17.

## 4.3 Estimated Time and Cost Overrun

After adding actual changes in the site it may be delay of work due to material or labour, what will be the actual cost, remaining cost, cost variance and duration is compared with planned cost and baseline duration. Below figures shows the above data.
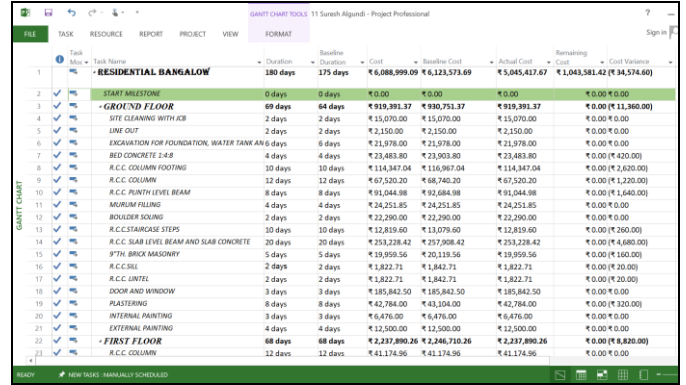


**Fig -2:** Showing estimated cost and duration.

The below report shows the cost overrun occurred due to cement material. The report also shows the percentage completion of work, cost, baseline cost and cost variance.
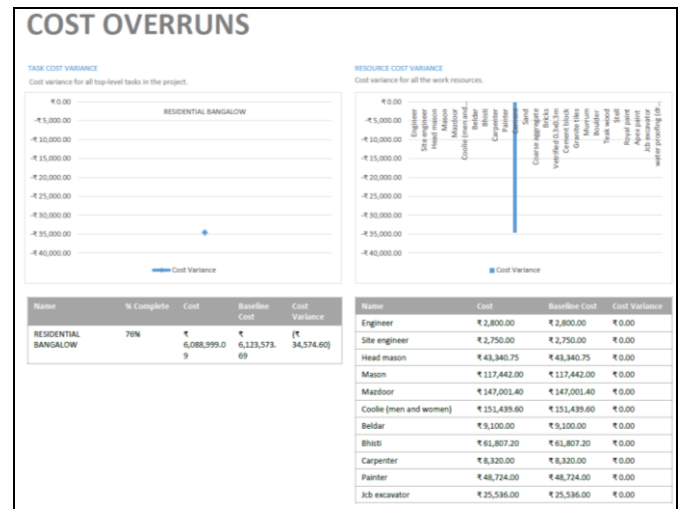


**Fig -3:** Showing report of Cost Overruns.

As the work was in progress, the project was tracked to the date 20/05/2015. The below figure shows the resource overview report in which actual work, remaining work and baseline work is given in terms of hours with respect to labours. It also shows each labour work completion to that date in percentage.
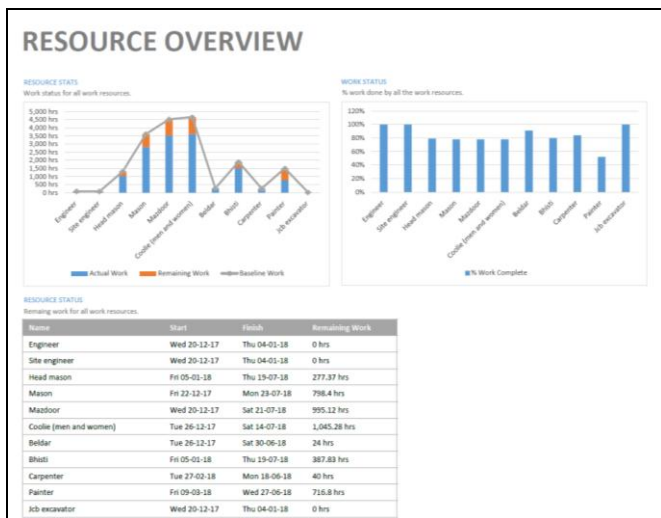
**Fig -4:** Showing report of Resource Overview.

## 5. CONCLUSION

- ➢ In this study it is found that planning, scheduling and tracking of the work was easy process as compared to the conventional method. Where Microsoft project 2013 software helped to do the work faster and tracks the progress and find out the results.
- ➢ Construction of a Residential Bungalow was planned on date 20/12/2017 and scheduled completion date was 17/07/2018.
- ➢ The project is suffering from time overrun. In the project, it has been found that many tasks are delayed from their original schedule.
- ➢ On 20/05/2018 the project was tracked in which the running and not running task were tracked and their percent completion of work was known. On the basis of this tracking, it was found that the project percent completion on 20/05/2018 was 76%.
- ➢ As the completion time increases the estimated time of 175 days to 180 days, the cost decreased from Rs. 61, 23,574/- to Rs. 60,88,999/- thus cost variance is Rs. 34,575/- and duration variance of 5 days.
- ➢ The increase in duration is due to delay in work that is revised drawings before the work had started and after the work had started during excavation and during construction of brickwork.
- ➢ The decrease in the cost is due to improper communication with the site engineer that the rate of cement was put in resource sheet initially was more later check found that it was incorrect and that found to be less and the cost of project decreased.
- ➢ In this study it is also understood that, during the input of data in the software, if any mistake in entry

and not been checked or neglected, the cost of the project may increase or decrease that may affect in budget.
- ➢ If the problem has been rectified well before execution, then the changes are made with respect to software, which is one more advantage compared to conventional method, where the loss of cost and time can be gained.

## REFERENCES

[1] Prof. R. G. Rathod and Prof. A. R. Patil, "Efficient Planning Scheduling and Delay Analysis of Residential Project", International Journal of Engineering Research and Application, ISSN: 2248-9622, Vol. 6, Issue 9, (Part -3) September 2016, pp. 39-45.

[2] Mrs. Sangeetha H. M., Mr. Rajeeva S. J., Dr. G. Narayana, "Planning, scheduling, tracking of residential building using primavera software p6", IJARIIE-ISSN(O)-2395-4396, Vol-3 Issue-4 2017, pp. 2361-2368.

[3] Ch. Chowdeswari, D. Satish Chandra and S. S. Asadi, "Optimal planning and scheduling of high rise buildings", International Journal of Civil Engineering and Technology (IJCIET) Volume 8, Issue 1, January 2017, pp 312–324.

[4] Shubham Laddha, Prerna Chanda and Sneha Khedekar, "Planning and scheduling of a project using Microsoft Project (msp)" International Journal of Advance Research ISSN: 2320-5407, pp.161-168.

[5] Chidambarakumar M. G., Gomathi Sankar G. and Ashok Manikandan S., "Construction Scheduling Using Project Management Software", SSRG International Journal of Civil Engineering- (ICRTCETM), "ISSN: 2348 – 8352, April 2017, pp. 256-260.

## BIOGRAPHIE

Ms. Padma Athani, M.Tech. (Construction Technology) scholar from Jain College of Engineering, Belagavi. Ms. Padma Athani working as a Lecturer in Government Polytechnic, Hubballi.