

# OPTIMIZED PROJECT PLANNING AND SCHEDULING OF MULTISTOREY BUILDING

B. Arun Kumar<sup>1</sup>, S. Santhosh<sup>2</sup>, G. Balaji<sup>3</sup>, T.G. Ram Kumar<sup>4</sup>

<sup>1,2,3</sup>UG Student, Department of Civil Engineering, Sethu Institute of Technology, Kariapatti-626 115, Virudhunagar, Tamil Nadu, India.

<sup>4</sup>Assistant Professor in Civil Engineering, Sethu Institute of Technology, Kariapatti-626 115, Virudhunagar, Tamil Nadu, India.

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**Abstract** - Generally, in the Construction Projects, it involves many complexities in the Project such as maintaining the Work flow, Resources and the Cost of the Project. To avoid or to Reduce the complexities in the Project, The Project Management Tools are used. The management Software tools generally used are Microsoft Project and Primavera. In this Project we adopt Microsoft Project for Planning and Scheduling of the Multi-Storey Buildings. The building is of G+16 in which Stilt Floor is used for Parking and the remaining Sixteen floors are utilised for flats, These Sixteen Floors are Typical. The building consists of Thirty-Two 3BHK flats and Thirty-Two 4BHK flats. Entirely it consists of Sixty-Four Flats.

**Key Words:** Scheduling, Microsoft Project, Scheduling of Multi-storey Building, Estimation.

## 1. INTRODUCTION

Scheduling is the way to actually manage the project, without scheduling the project gets delay. Scheduling describes the guidance and pathway for a project to run it defines certain milestone and deliverables which need to be achieved on a timely basis for successful completion of project. Monitoring the project schedule can provide an idea of the impact the current problems on the project and provide opportunities to reduce the scope of phase in the project. Project scheduling is used to organize and complete the project within a time and achieve the quality of the project with the support of finance need, project scheduling carefully. The effective project scheduling plays a crucial role in ensuring project success to follow the project schedule on track set the realistic time frame, assign resources appropriately and manage the quality to reduce the cost and achieve the target within the project duration.

### 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 fulfilment 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 Project scheduling system

Scheduling is a process of needs to assign the resources and time for assigning the jobs. It is one part of prediction and one part of expectation management. The planning and scheduling problems are in many cases such as a problem of combinatorial optimization and to find the optimum schedule. The scheduling problem frequently involves various types of choices this choice could be ordering among the job's dependency relation, choosing the available resources that satisfies need of the job, selecting the proper time for during the execution process.

### 1.3 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.

### 1.4 Work breakdown structure

A work-breakdown structure (WBS) in project management and systems engineering, is a deliverable-oriented breakdown of a project into smaller components. A work breakdown structure is a key project deliverable that

organizes the team's work into manageable sections. The Project Management Body of Knowledge (PMBOK 5) defines the work-breakdown structure "A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables."

A work-breakdown structure element may be a product, data, service, or any combination thereof. A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.

## 1.5 Microsoft Project

Microsoft Project is a project management software product, developed and sold by Microsoft. It is designed to assist a project manager in developing a schedule, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads.

Microsoft Project was the company's third Microsoft Windows-based application. Within a few years after its launch, it became the dominant PC-based project management software. It is part of the Microsoft Office family but has never been included in any of the Office suites. It is available currently in two editions, Standard and Professional. Microsoft Project's proprietary file format is .mpp. Microsoft Project and Microsoft Project Server are the cornerstones of the Microsoft Office enterprise project management (EPM) product.

## 2. OBJECTIVES

- To minimize the duration of the project
- To minimize the cost of the project
- To maintain the work flow of the project
- To maintain the robustness of the project
- To facilitate quick evaluations using Gantt chart
- Coordinates different activities of departments
- Provides stability
- Helps to control activities

## 3. METHODOLOGY

### 3.1 Project Details

The proposed project for case study work is construction of Residential Apartment of Appaswamy Real Estates Ltd., Chennai at Semmencherry. The construction of the work is in progress. Building has total site area 175 feet x 125 feet (21875 ft<sup>2</sup>) The Built-up area is 10720 ft<sup>2</sup>. The Residential Apartment project consists of G+16 floors which contains 3BHK and 4BHK Flats. The estimated cost is Rs. 89,05,96,000/-. The project started on 15/02/2019 whose estimated completion date is 17/11/2020 (21 months). The activity name, duration, predecessor and resources are

entered in the Microsoft Project software which give the total duration of about 588 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 Apartment 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 observed 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 labours, 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 analysed in Microsoft project, where planning, scheduling, and tracking of the project is done. 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.

### 3.2.3.1 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 manually schedule mode and the activities are in auto scheduled mode in the Microsoft Project software.

### 3.2.3.2 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.

### 3.2.3.3 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.

### 3.2.3.4 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.

### 3.2.3.5 Critical Path

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

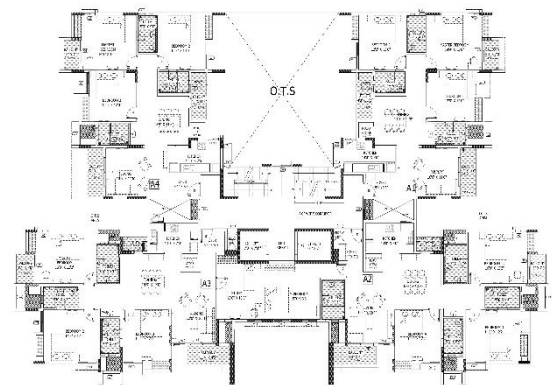
### 3.2.3.6 Creation of Baseline

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

## 4. RESULTS AND DISCUSSION

### 4.1 Working Drawing

There were many corrections in drawings during and after the work had started. The Architects made some changes. As drawings play an important role for assigning the task so it should be completed properly with a better understanding.



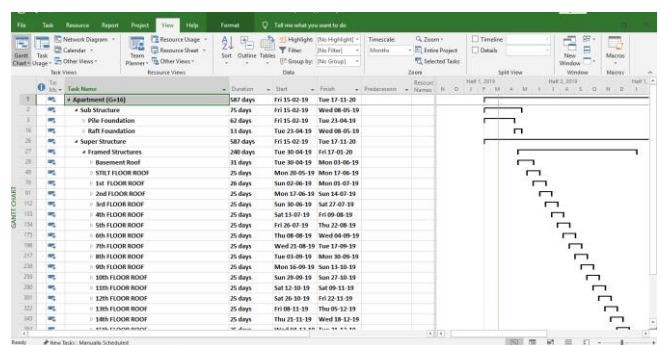
### 4.2 Detailed Estimation, material and labour calculation

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. 89,05,96,000/-

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 2018-19.

### 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.



## 5. CONCLUSION

Construction of building using Traditional way proves to be uneconomical and consumes more time with many complexity and enormous error which actual execution of the Project. Traditional way of planning doesn't sub divide

the main task which future gets the hurdle of over allocation of resources, improper judgment of resources for particular activities etc. Microsoft Project is the modern tool of Project Management that aid to overcome the obstacles faced owing to traditional way of Planning and Management. It helps for the optimum and effective organization of activities which helps to give the vision to complete the project in planned duration and within the Economy. The estimated cost using Microsoft Project is Rs. 89,05,96,000/-. The project started on 15/02/2019 whose estimated completion date is 17/11/2020 (21 months)

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