

Planning of Multi-Storey Building Using Advance Tools and Techniques

¹Mr. Shrikant R Kate, ²Vikramsing Cahvan, ³Shubham Karanawat Yash Lalwani, ⁴Mahesh Mahamuni, ⁵Nilesh Patil

¹Assistant Professor, ²⁻⁵Research Scholar

¹⁻⁵Civil Engineering Department

¹⁻⁵Trinity Academy of Engineering, Pune, India

Abstract : Attributable to an augmenting context of environment, Construction industry is ever upfront for the development and advancement in tools and equipment features, tools of communication, techniques of efficient management, educating the human resources about it. This unique specialization necessitates highly focused whose construction was planned to start at in India. Project Planning and Controlling tools or techniques. In the current study we implemented the computer-based Project Management software/tool for the Planning, Scheduling and Allocation of resources for a building. It helps to know the resemblance between the planned the planned progress of construction work and actual progress of the performed work. Thus, the essentiality and the advantages of using planning software will be outlined through the data results obtained. The acceptance of the software's as a platform of scheduling is been on a boom in Multi National Construction Companies, but due to ignorance and lack of Project Management concepts and discourage towards the use of computer-based programs, small and medium scale Indian construction companies confront various issues such as inefficient planning, project delays, inefficiency of resources and many other issues. Therefore, we compare the planning of building through different software and find the usefulness of software in planning of multistore building in construction

IndexTerms - Project planning, Microsoft Project (MSP), Primavera, construction activity, cost optimization, time optimization, High rise building, Scheduling.

1. INTRODUCTION

In today's world construction industry is one of the most widely used and rapidly booming industry of our nation and across the world. Hence, it is the second largest industry of India in terms of generating huge amount of revenue and employment. Though the construction and infrastructure industry being second largest industry of our nation (India), the identity and recognition of this industry has not been grown in all dimensions of the country. Especially, at the remote places like small villages, rural places and the large part our country has small villages and rural habitats. Therefore, there is a requirement of certain tools and techniques for the improvement of national economic upliftment, adequate land use and their environment planning to manage with the level of improvement in town and urban areas and the time required to tackle this goal can be shortened. There is an intense necessity for effective Project Management

This study will focus on the comparison of construction scheduling technique application in utility projects, such as Gantt chart, CPM, MSP, Primavera and indicate advantages and disadvantages of each technique. It use different software, estimate the interference time based on the historical production rate, and adjust the construction schedule to satisfy the construction constraints. It helps to avoid the construction interruption, keep the continuity of crew work, and avoid the delay of construction and cost overruns. Project Management is a flexible scheduling software package with many capabilities. The software is easy to learn and has a user interface like many other windows-based programs.

1.2 PROBLEM STATEMENT

Nowadays, almost every construction industry in India is experiencing delay problem. The problem occurs from assorted reasons; the extensive sources are caused by the construction activity which has been executed not according to planning and scheduling efficiently decided before actual execution of the project. Apparently, contractor will require time extension to accomplish the project. The Extension of time will be given to the delay in problem not caused due to lack of proper care (incautious, unaware) and mistake by the contractor, but it's normally caused by major forces such as inconvenience in supplying construction materials, variation order (VO) by customer owing to the nature disaster such as rainy season. Regarding to the extension of time in a project life, it will incur the cost increase to both associates, either the client or contractors.

Furthermore, as the construction industry become more stringent and expand in growth, therefore it's is difficult to the project manager to monitor and control abortion caused by ineffectiveness in scheduling and inadequacy of construction information

1.3 OBJECTIVES

1. To study and analysis of planning and scheduling for High-Rise buildings
2. Planning and schedule the list of activities using software MSP and Primavera.
3. Application and comparative study of conventional method with relation to MSP and Primavera

1.4 SCOPE OF PROJECT

1. The study of the project is limited to planning of the project with respect to time only.



Fig 1. Project Management

1.5 WBS

WBS is defined as “deliverable-focused, hierarchical grouping of project elements that organizes and defines the total project scope”. Deliverables are tangible, measurable parts of a project which cannot be further broken-down. Task is not a WBS element, but a set of tasks produce a deliverable. Some of the last WBS elements could be tasks, but most probably it is not considered. The Phases and their criteria in WBS. In general, a Project is broken down into various sub-projects or breaking down the project into various levels of deliverables until it reaches single deliverable.

WBS can be broken down in many ways depending on the requirement of the project. Of such, creating a WBS based on trade (which has been followed traditionally over the past years) is shown in the Figure. Breaking down WBS into trade-wise has gone all wrong because it holds good only for certain level of planning where there were contractors to take only a sub-head. The advantage of this type of WBS is that a whole sub-head can be contracted to a single contractor, so the distribution for contractor or project team members this would hold good. But this breaking down has a big flaw i.e., it doesn't cover interdependencies between different trades. Also, this type of breakdown cannot be adopted in Microsoft Project as it creates a loop while planning activities which are under different sub-heads.

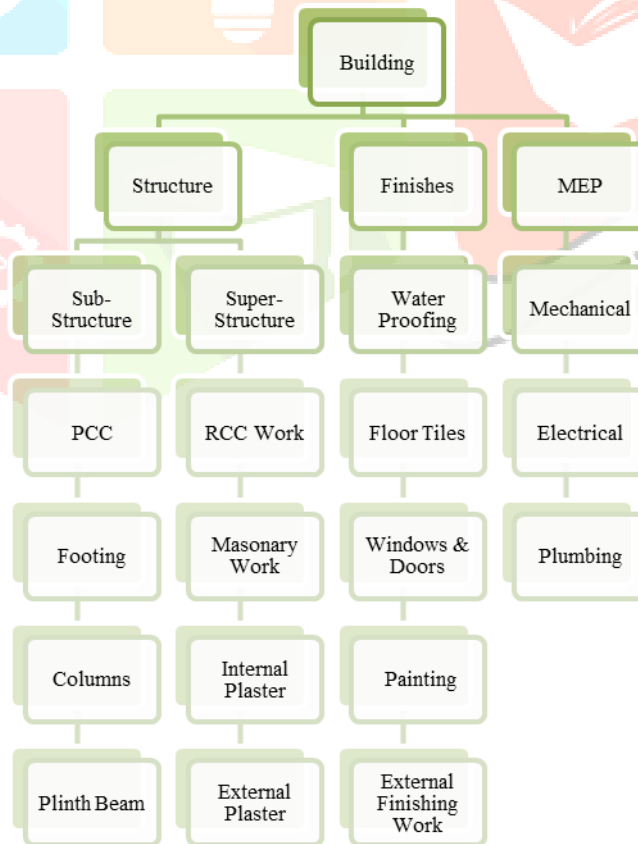


Fig No. 2. Work Breakdown Structure of Multi-Storey Building

1.6. MICROSOFT PROJECT (MSP)

Microsoft Project (MSP) is a project management software program developed by Microsoft organization, which is intended to help a project manager in any type of project to improve a plan, to allocate resources, to track the improvement, to accomplish the budget and to examine the amount of work. Budgets in a project are based on the assigned work and the cost of resources. Resources viz., labour, material, and equipment can be shared among the projects using a mutual resource pond. Every

resource has its individual calendar in which days and time are represented for the availability. Resource assigned costs are calculated based on resource rates. MSP application can create critical path schedules, and these can be resource leveled and task networks are pictured in the form of Gantt charts

1.7 PRIMAVERA

Generally Primavera P6 do works on the methodology of dynamic scheduling. Which indeed provides the Project Management office with a clear route map, which is intended to establish the best possible optimized plan of the project by using ‘what-if’ scenarios risk extenuation methods. Despite, the fact that it exhibits the Project Manager’s capability to produce management change possibilities for the Project Management team to select from the when variances by the proposed project Baseline are being noticed.

The method of dynamic scheduling frames the base or the platforms for the project scheduling which is designed to support the team of Project Management with certain official philosophies, policy, guidelines, terminology, templates and procedures which could include the coaching and training tool or platform through which a particular timeline of events, steps, and the project milestones are accomplished. Dynamic scheduling methodology is based on the below mentioned some indirect activities which are executed by the various Project Management team and its stakeholders.

1.8 CONVENTIONAL METHOD

Conventional construction is the most familiar as well as easy construction method also most popular. With Smart Building the conventional construction is cheaper by 5% – 15% from the market due to achieving low prices because of mass number of purchases. the drawback of this methods is that we cannot predict exact finishing dates of site as well as if there are any mishaps at the site they can coverup the left-over work by execution of extra people to work when it is needed to get it done. We have collected the database from the site and made bar charts of the same which helped us to find out the finishing date of the project as with respect to time but as the project is not complete with various still left incomplete.

2. METHODOLOGY



Fig 3. Methodology Flow Chart

3. CASE STUDY

Software has been extensively used for Planning and Scheduling of our project. The plan with an area of 576 m2 has been divided into two phases for RCC works. The schedule has been so constructed that the activities which are interdependent of one other start together, hence saving a commendable amount of time in the construction process. It has been looked after that activities like Brickwork, Plastering, Painting, Tiling, Sanitation and Electrical works are so linked that there is no considerable float or wastage of time. The following Plan has been considered by us for Planning and Scheduling of Project via Primavera and MS Project.

For planning and scheduling, we took an ongoing plan and elevation to make our project unique. As it is like any ongoing projects, we have made a list of all the activities by doing extensive surveys and interviews with the site supervisor. We made a work breakdown structure with starting activity like site clearing, excavation and ongoing with further activity from the sub-structure to the super-structure and finishing work and handing over the flat to the costumer. We took an ongoing site of ‘‘Pietra Enclave’’ situated near katraj lake. As we observed the details from the starting of the project to the end as the site was under construction. The conventional method was being seen and the compared to the Microsoft project (MSP) and Primavera and found the results and compared to the merits and demerits of the different software.

Case study details

- Name of the project: “Pietra Enclave” residential project Highrise building
- Location: Sr. No. 30 Beside Utkarsh housing soc. Katraj Pune 411046.
- Type of the project: Residential apartment
- No of stories: G+11 with basement
- Start of the project: 13 March 2015
- Completion of project: 31 July 2018
- Site Area: 6000 Sq. Ft
- Type of construction: RCC framed structure

4. RESULT AND DISCUSSION

As we studied the working of various tools used and techniques in the field of civil engineering we learnt how efficient are we and compared our efficiency with different tools and techniques.

This project helped us to know, calculate and compare the working efficiency of a person with respect to his/her specified work. We started with a simple building considering that it will be easy project to study and will have only limited activity, but after studying each aspect of construction work, technology used, work speed and many more we came to a conclusion that no construction work is small and if we use advance tools and techniques we can plan each and every aspect of a construction site

- The project completion date according to the planned schedule is 31/07/2018 by using primavera and MSP.
- According to traditional method the project is running late.
- Total of 463 primavera activities and 574 MSP activities are involved with these projects from initial to the final stage of the project with various steps.
- The critical path in both the software is determined by which the critical activity is known.
- Primavera seems difficult in beginning as compare to MSP but is user-friendly.
- WBS is created whose advantages are each project is divided into activities which helps to understand process of work.
- Use of software helps in knowing the delay of the project.
- By using software before starting the project the completion date is predicted.

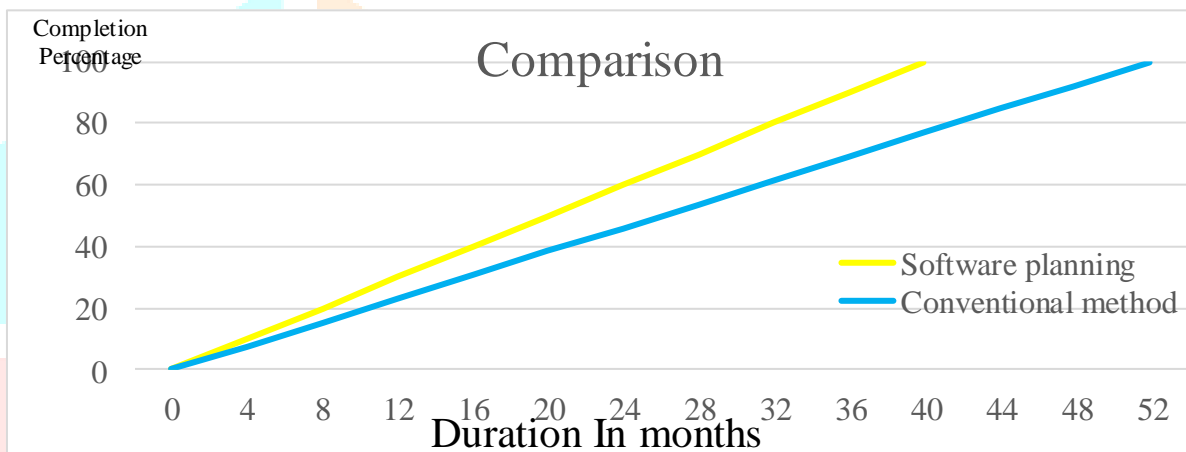
Table No 1. Difference Between Primavera & MS Project

| Sr.no | Objective | MSP | Primavera |
|-------|----------------------|--|--|
| 1 | Baselines | In MS Project only 11 baselines can be created. | In Primavera unlimited baselines can be created. |
| 2 | Multiple User Access | MS Project doesn't allow multiple users to work on a single project at the same time. | In Primavera you can even specify what features of Primavera a particular user can use, and which he cannot. |
| 3 | Issues & Risks | MS Project lacks the feature of tracking project issues or risks. | In Primavera, we can record issues and risks. |
| 4 | Web Support | MS Project doesn't have such option. | Primavera schedule, documents and other information can be converted to HTML directly from the software. |
| 5 | Steps | This useful feature is missing in MS Project. | Steps in Primavera allows you to create sub-activities (steps) of an activity. Each step can have its own start and finish date, and a completed step can be marked as Completed. |
| 6 | Expenses | MS Project we cannot add this information with many properties as we can in P6. | Besides Costs, in Primavera project expenses e.g. training, travel, etc. can also be added |
| 7 | Custom Fields | MS Project even allows us to define complex formulas and assign the values to user-created column field. | In Primavera we can create a blank custom field, but we cannot define formulas as detailed and complex to the columns as we can do in MS Project |
| 8 | Columns | MS Project, there are only around 30 columns, giving the user with much less information about the project that we can view in Primavera. | Primavera P6 has many useful columns. It comes installed with over 250 columns, each giving you different information. Some column category to name include EVM, Budgeting, Costs, variances, dates etc. |
| 9 | Calendars | In MS Project as we can create diverse types of work day or non-work day patterns. We can also define range for the recurrence to fall between. These demanded options | Customized Project and resource calendars can be created in both MS Project and Primavera. But perhaps, however these can still be done in Primavera manually, which is time consuming. |

| | | | |
|----|--------------------------------|---|--|
| | | are not available in Primavera | |
| 10 | Multiple Activity Relationship | This website is very valuable feature and is not present in MS Project. | In Primavera P6, more than one type of relationship can be established between activities e.g. we can have FF and SS between the same two activities |

5. CONCLUSION

1. Traditional way of construction proves to be uneconomical so use of software is more helpful for planning and analysis of construction project.
2. Advance tools and techniques of MSP and Primavera of project management that helps to overcome the obstacle faced during the traditional way of planning and management.
3. MSP and Primavera helps for the optimum and effective organization of activities which helps to give an idea to complete the project within deadline.
4. Out of the two studied MSP and Primavera MSP stands out to be more simple but primavera stands to be more user friendly.
5. Primavera has options to work on multiple projects simultaneously.
6. So as per study and analysis it is observed that Primavera is efficient and easy to use in construction industries for planning and scheduling.



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