

PLANNING AND SCHEDULING OF RESIDENTIAL BUILDING USING MICROSOFT PROJECT

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Abstract— *The term construction management is the process of organizing and managing resources such that the project is completed within the defined scope, quality, time and cost factors. A project is a temporary and single attempt undertaken to create a unique product or service, which provides beneficial change or added value. The processes and operations of the system of being a short-term and single undertaking contrast with the permanent or semi-permanent ongoing functional work to create the same product or service over and over again. The management of these two types of works is often very different and also requires varying technical skills and philosophy, hence requiring the development of construction management. The object of the present work is to study the scheduling techniques and construction sequence of work for multistorey buildings and to perform the application of Microsoft project software in planning and scheduling of a RCC building construction. To achieve the above objectives a hypothetical RCC residential G+5 building is considered. The complete planning and scheduling of this building is studied by traditional method used by Architects, Engineers and contractors and is compared by modern software method. For this approach Microsoft project software is used for planning and scheduling the RCC building. Observation shows that Microsoft project software serves as an effective tool for generating Gantt chart for the schedule of a construction project and provides the minimum duration of construction time by schedule crunching and project crashing methods in software. Present work presents good information about the application of Microsoft project software for the planning and scheduling of building construction.*

Keywords— *Planning, Scheduling, Crunching, Crashing, Microsoft Project, Duration.*

I. INTRODUCTION

Every person is a manager of projects of their own life. From an employee to CEO of an organization, from a student to administrator, we all do work on various tasks with different deadlines. Project management is the application of techniques, knowledge, and skills to the activities of a task to reach the project necessities. It is a systematic ability to make success for the organizations enabling to patch the project results to the goals of the organization and further to compete in their respective markets. It also can be defined as the process of planning, scheduling, organizing, monitoring and controlling of resources, protocols and procedures for achieving specific goals. A project is an impermanent agenda planned to produce a distinctive service or product through a clear start time and finish time.

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Construction of a multistorey building is a project in which a huge number of activities are to be performed by different teams belonging to various age groups, cadre, level of skills and expertise. Also the number of activities to be performed is highly varying and complicated in nature. Accordingly it is especially important to harmonies the different resources on the site for efficient and timely completion of a project. Project management skills are of great use while managing such project. Management can be defined as the science and art of planning, organizing, leading and controlling the work of organization members and of using all available organization resources to reach stated organizational goals.

Construction management provides the economical utilization of the resources available in the least possible time duration for successful completion of construction project. 'Men', 'materials', 'machinery' and 'money' are termed as resources in construction Management.

Planning, scheduling is an important part of the construction management. The process of planning and scheduling of the construction activities helps engineers to complete the project in time and within the budget. The term construction does not only denote physical activities involving men, materials and machinery but also covers the entire extent of activities from conception to realization of a construction project. Hence the management of resources such that men, materials, machinery requires effective planning and scheduling of each activity.

II. OBJECTIVES

The objectives of the present research are to apply Microsoft Project for planning and scheduling located in Indore (M.P.), the followings are listed below:

1. To study the scheduling techniques using network models (CPM).
2. To collect the data of the construction sequence of work for a multistory building.
3. Application of Microsoft project software in planning and scheduling of a multistory building.

III. METHODOLOGY

A detailed analysis of the materials, man power, machinery, other resources used, and the sequence of activities (dependent or independent) executed from the beginning of the construction to its completion.

The methodology adopted to attain the project objective is as below:

1. Inception of ideas.
2. Literature study, for this the following sources are explored:
 - a. Review of past study.
 - b. Study of published books, technical and research papers, reports, etc.
3. Site visit.
4. Collection of raw data from visiting various sites.
5. Studied the data. On the basis of it, prepared the plan and scheduled manually.
6. Learnt the project management software- Microsoft Project.
7. By using various modules of software planning and scheduling is prepared.
8. Finally, understood the ease, sufficiency & flexibility that the project management software offers us.

IV. DATA COLLECTION AND ANALYSIS

Construction of a multistorey building is a project in which a huge number of activities are to be performed by different teams belonging to various age groups, cadre, level of skills and expertise. Also the number of activities to be performed is highly varying and complicated in nature. Hence for efficient and timely completion of a project it is very important to harmonies the different resources on the site.

The object of the present work is to study the scheduling techniques using network models and construction sequence of work for RCC building, and also to understand the application of Microsoft project software in planning and scheduling of a multistorey building. For this purpose a residential G+5 building of plot area 39'9" x 55'8" is considered hypothetically under consideration of zone Indore (M.P.). It is not similar to any ongoing projects, a list of all the activities are made by doing extensive surveys and interviews with the professionals. According to early statement project management skills are of great use while managing such project. The different activities involved in the construction process of a building are listed out. Then found out the relationship between the different activities and calculated the project duration and critical path. Further by use of software Microsoft project schedule crunching and project crashing is performed to reduce the duration of project completion. For this purpose the schedule of project has been so developed that the activities which are interdependent of one other start together, hence saving a commendable amount of time in the construction process. It is observed that activities such as brickwork, plastering, painting, tiling, sanitation and electrical works are so linked that there is no considerable float or wastage of time.

V. RESULTS AND DISCUSSIONS

Project scheduling is the process in which the step wise planned activities are determined, assigning realistic durations to each activity and determining the start and finish dates of each activity. The project schedule provides a graphical representation of predicted task, milestone, dependencies, resources requirement, task duration and deadlines. The schedule of the project should be detailed to show each WBS to be performed, the name of the person responsible to completing the task, the start and end date of each task, and the expected duration of the task. Like the development of each of the project plan components, developing a schedule is an iterative process. Milestone can recommend additional task, task may require additional resources, and task completion may be measured by additional milestone. For large, complex project, detailed sub-schedules may be required to show an adequate level of detail for each task. Below mentioned are the graphs generated in the present study after scheduling the activities.

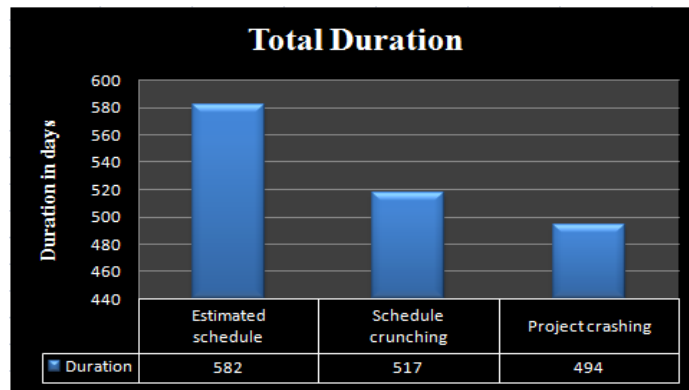


Fig. 1 Comparison of total duration

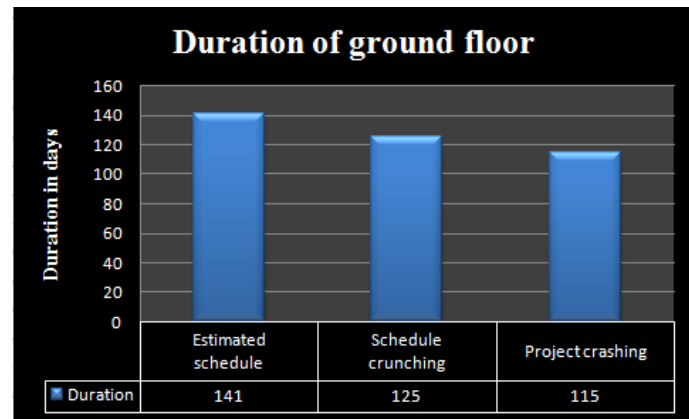


Fig. 2 Comparison of ground floor duration

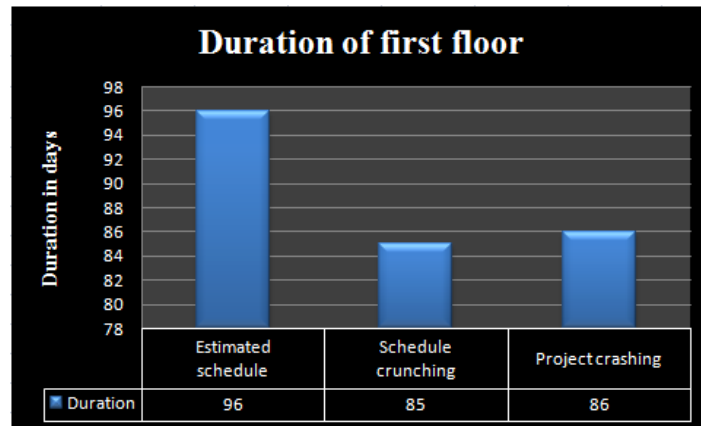


Fig. 3 Comparison of first floor duration

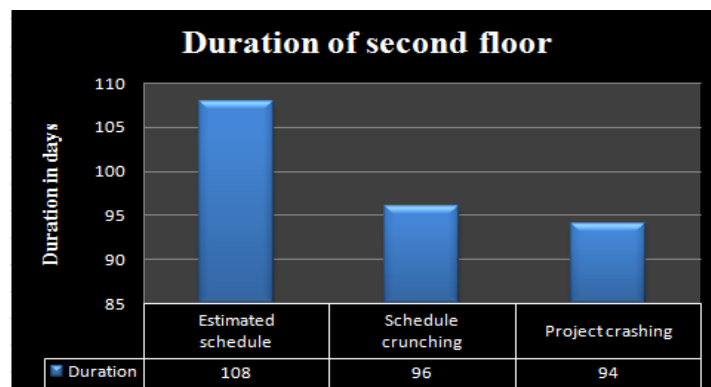


Fig. 4 Comparison of second floor duration

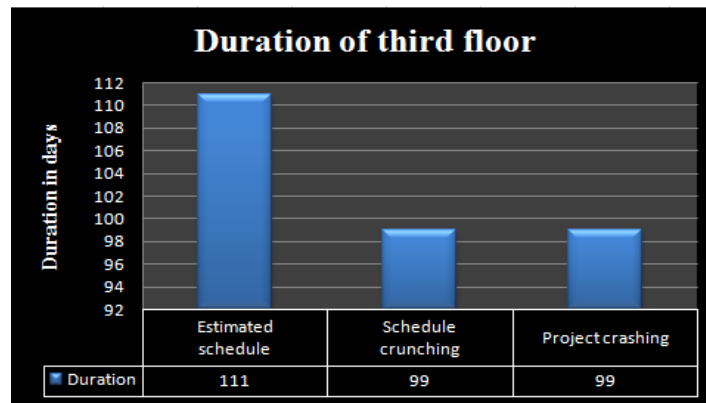


Fig. 5 Comparison of third floor duration

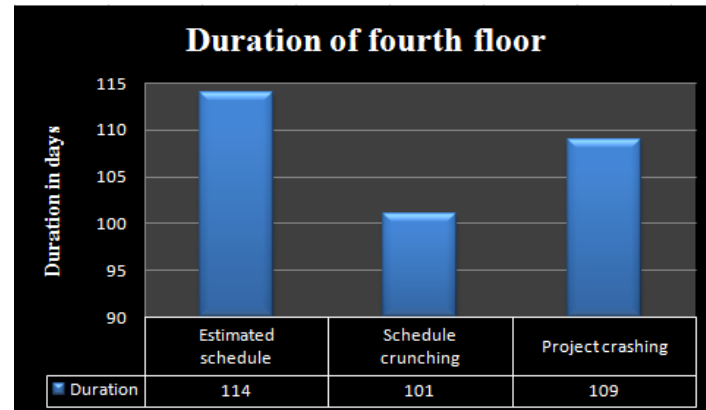


Fig. 6 Comparison of fourth floor duration

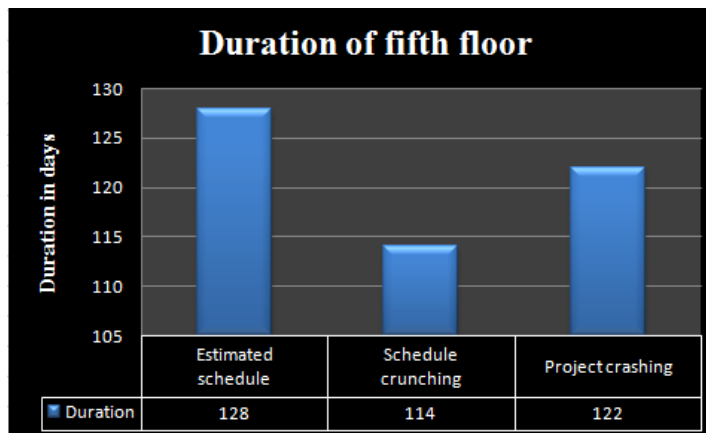


Fig. 7 Comparison of fifth floor duration

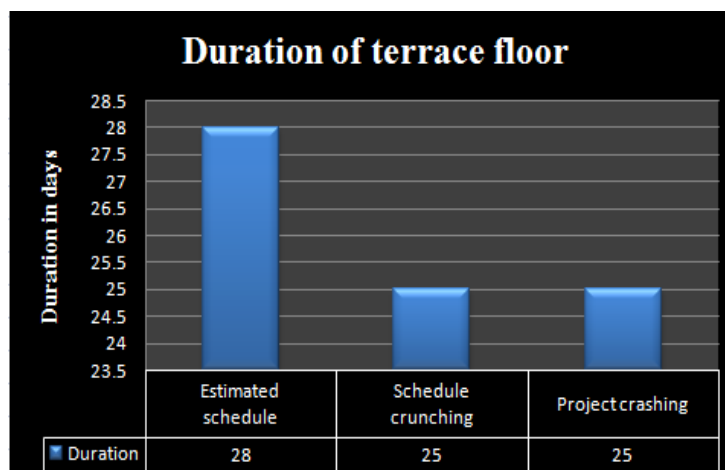


Fig. 8 Comparison of terrace floor duration

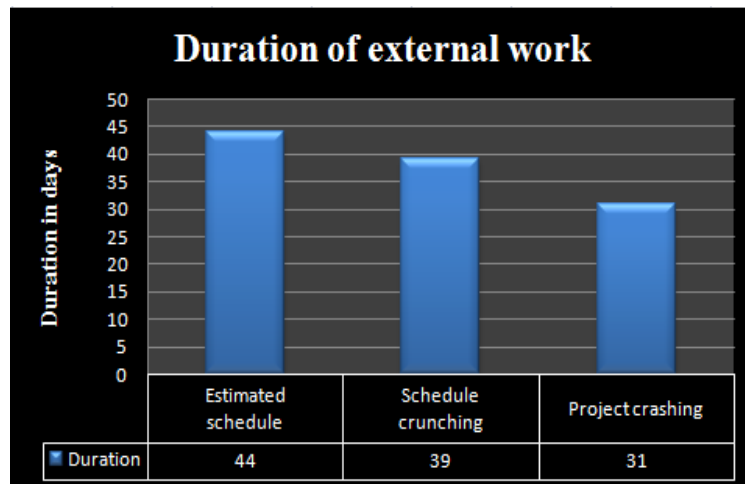


Fig. 9 Comparison of external work duration

Crunching is a period of time in which one must make an effort quickly in order to finish the project. In this technique increased duration and cost of a project can be reduced. But Crunching should be of optimum, otherwise it leads to poor in quality. In the present work project crunching is done by increasing the working time per day. For the estimated schedule working time was 8 a.m. to 5 p.m. with a lunch break of 1 hour. For project crunching working time is increased 1 hour daily i.e., 8 a.m. to 6 p.m. By this crunching total duration of the project is reduced by 65 days. Starting date of estimated project was 18/9/2017 and finish date was 27/7/2019. After crunching the schedule, starting date is 18/9/2017 and the finish date is 14/5/2019. Hence project crunching can reduce the duration for construction of a project.

Crashing means adding of additional resources to a project in order to finish the project in a specific deadline. But adding of resources should be optimum it should not affect the cost of the project. There are a number of standard and typical approaches to attempting to crash a project schedule. Project crashing is the generally utilized method which involves increasing the assignment of resources on schedule activities. This essentially means decreasing the time it takes to perform individual activities by increasing the number of people working on those activities.

In the present work project for the crashing of project resources are increased by percentage. By increasing the resources duration of the construction project is reduced to 88 days. Starting date of estimated project was 18/9/2017 and finish date was 27/7/2019. After crashing the project, starting date is 18/9/2017 and the finish date is 17/4/2019. Hence project crashing can reduce the duration for construction of a project.

VI. CONCLUSIONS

Within the scope of present work following conclusions are drawn:

1. Microsoft project software works on Gantt chart concept. This gives the easy understanding of the progress of work with scheduled time.
2. Many project managers suffer to finish the project within the duration and estimated cost. They may add more resources or increase working hours to finish the project within the duration.
3. Schedule crunching is most effective technique in optimization of time and cost. But quality is not guaranteed in this technique because the efforts are done quickly in order to finish the project.
4. In order to achieve quality project crashing is a good technique. Thus optimization of time is achieved.

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