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A REVIEW PAPER ON BUILDING PLANNING AND SCHEDULING USING MICROSOFT

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A B S T R A C T

Construction Firms in India, Construct the Projects in a Traditional ways, this sometimes proves Uneconomical & Tedious too. Traditional way also proves to be Time Consuming and Confusing. The presented work will provide them an Opportunity to clearly observe the difference between the Microsoft Project (MSP) and the Traditional Planning Techniques which speeds up Construction and also make the Project Cost Effective with Proper Planning.

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, level of skills and expertise. Also, the number of activities to be performed is highly varying and complicated in nature. Project management skills are of great use while managing such project.

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 multistorey RCC building construction. 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.

Keywords*: Planning, Scheduling, Crunching, Crashing, Microsoft Project, Project Management*

1. INTRODUCTION

Without any kind of planning, we can't do anything. Planning is the most important too any kind of work. Planning can be thought of as determining "what" is going to be done, "how", "when" by "whom", and "when. Project management is the application of techniques, knowledge, and skills to the activities of a task to reach the project necessities It also can be defined as the process of planning, scheduling, organizing, monitoring and controlling of resources, protocols and procedures for achieving specific goals. 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 Men", „materials", „machinery" and „money" are termed as resources in construction Management.

The process of planning and scheduling of the construction activities helps engineers to complete the project in time and within the budget. . Project Management aid the project in better efficiency to deliver services.

1.1 Microsoft Project Basic Information

Microsoft Project is a project management software product, developed and sold by Microsoft. It is designed to assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analysing workloads. MS project can be used as a standalone tool for tracking project progress or it can be used for tracking complex project distributed in many geographical areas and managed by a number of project managers

Benefits of Microsoft projects:

MS Project can help you in

- Visualize your project plan in standard defined formats.
- Schedule tasks and resources consistently and effectively.
- Track information about the work, duration, and resource requirements for Your project.

- Generate reports to share in progress meeting

RELEVANCE

Large construction projects are likely to fail if there isn't an effective project plan or schedule in place from the beginning. Construction management software can aid efficient planning and scheduling by creating an integrated work environment

Construction scheduling allows you and the project team to control quality measures, as well as manage resource allocation in each phase of construction.

Time is money; a reliable schedule gives opportunity to allocate time to all activities to avoid delays and cost overruns. The planning process is a key component that continues through project closeout.

Project construction is complicated, extensive, and varies in size and type. By adopting proper planning and scheduling the delays, cost overruns can be minimised. Microsoft project help to plan, schedule and to control varies activities in project.

2. LITERATURE REVIEW

Manish S Darekar, Dr. Navnath V Khadake (2020) "Construction Management Multi-Storeyed Building by MS Project"
A Case Study", The aim of this project is to complete the project within a given time and a budget, and also to achieve the other objectives. The constraints that are observed in every project is time overrun and cost overrun. With a proper sequence of activities with assigned durations and resource, scheduled is prepared. In this project critical path and critical activities are studied with the use of MS-Project 2016, so that activities should be properly observed while execution, so that there will be no delay of time in the project, and also, stay focused on the wastage of materials thus lead to the proper optimization of materials and reduction of cost.

Shruti Singh, Shweta Istape, Avinash Singh, Sangram More (2018) "Planning and scheduling of Multi storeyed Building by using MSP"
In this study the Planning and Scheduling has been done and the site were located near Karjat, Mumbai, India. According to the estimation they got 20 months to complete this building as per their planning. For this building they have done CPM and PERT analysis for Planning. After MSP work the project time was completed in 18 months by proper allocation. Hence, they concluded that the MSP method of planning and scheduling is more scientific.

Rashmi J.V. and Amey A. Kelkar (2017) A. Kelkar (2017)
They analysed the planning and scheduling of multi-storeyed building in two phases by conventional execution approach & again analysis of same building was carried out by applying MSP to compare the result for justification. For their study they considered G+3 with basement and the type of RCC frame structure, to estimate the overall cost and time required to execute a multi-storeyed residential building. The result of their study showed that proper manage of project management skills and technique reduces the time by 23.2% and cost by 3.14%.

Nikhil R. Mahajan and M. V. Bhogone (2017)
The methodology adapted by them was to compare Microsoft Project and Traditional Method. Schedule was prepared for both conventional and prefabrication method. A residential building was taken for comparison. The software used was MSP, the duration required for completion of project was collected from respective company. The comparison was made by comparing the total time required for completion by using critical path method with MSP project.

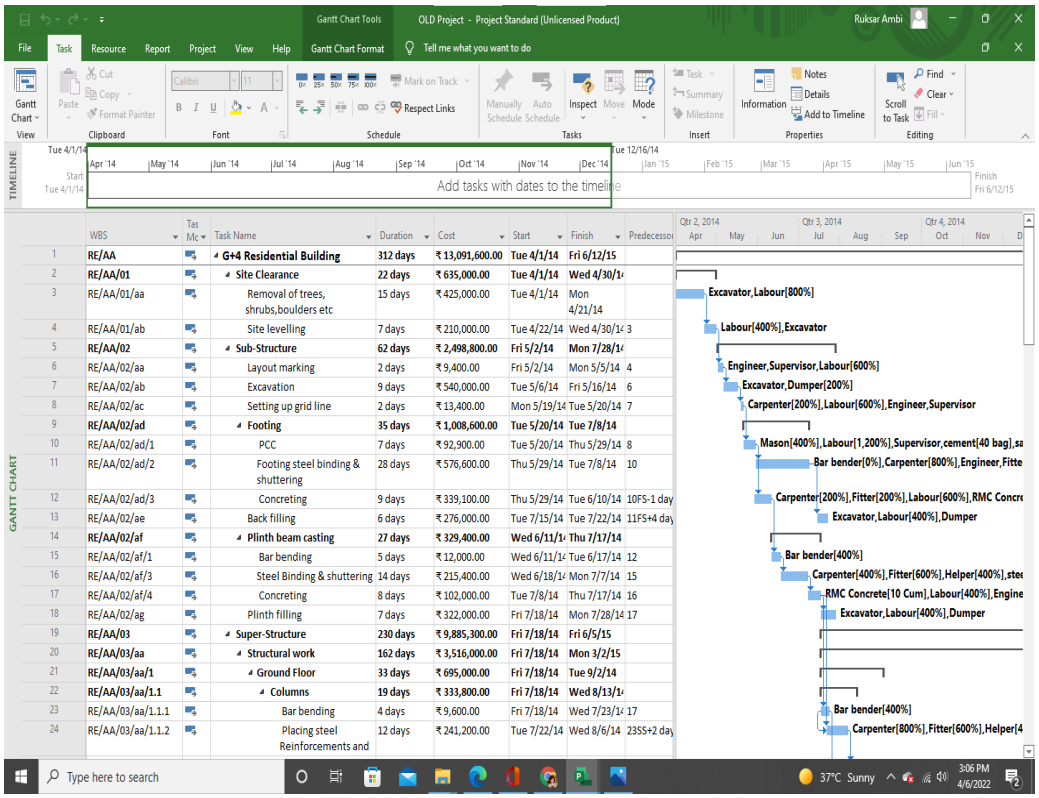
Suresh Kumar and S. Krishnamoorthi (2015)
In their study they focused on the scheduling using MSP for an apartment building. Thereby time required for the process of cost overrun is avoided. Project schedule is considered as core of the project plan, and the purpose of the project schedule is to show the organization how the work will be performed to uncover the mistakes. After completion of project, it has been observed that there is more difference between budget cost and actual cost, cost increases as the material price increases.

STUDY ANALYSIS

1 Plan A- Conventional approach for execution

The data obtained from the construction site was analysed and incorporated into MS project application to obtain a detailed result of the cost and duration planned for construction of the G+4 building.

As a result, A duration of 312 days and cost 1,30,91,600/- has been estimated for executing activities by conventional approach which shown in fig below:



	WBS	Task Name	Duration	Cost	Start	Finish	Predecessor
1	RE/AA	G+4 Residential Building	312 days	₹ 13,091,600.00	Tue 4/1/14	Fri 6/12/15	
2	RE/AA/01	Site Clearance	22 days	₹ 635,000.00	Tue 4/1/14	Wed 4/30/14	
3	RE/AA/01/aa	Removal of trees, shrubs,boulders etc	15 days	₹ 425,000.00	Tue 4/1/14	Mon 4/21/14	
4	RE/AA/01/ab	Site levelling	7 days	₹ 210,000.00	Tue 4/22/14	Wed 4/30/14	3
5	RE/AA/02	Sub-Structure	62 days	₹ 2,498,800.00	Fri 5/2/14	Mon 7/28/14	
6	RE/AA/02/aa	Layout marking	2 days	₹ 9,400.00	Fri 5/2/14	Mon 5/5/14	4
7	RE/AA/02/ab	Excavation	9 days	₹ 540,000.00	Tue 5/6/14	Fri 5/16/14	6
8	RE/AA/02/ac	Setting up grid line	2 days	₹ 13,400.00	Mon 5/19/14	Tue 5/20/14	7
9	RE/AA/02/ad	Footing	35 days	₹ 1,008,600.00	Tue 5/20/14	Tue 7/8/14	
10	RE/AA/02/ad/1	PCC	7 days	₹ 92,900.00	Tue 5/20/14	Thu 5/29/14	8
11	RE/AA/02/ad/2	Footing steel binding & shuttering	28 days	₹ 576,600.00	Thu 5/29/14	Tue 7/8/14	10
12	RE/AA/02/ad/3	Concreting	9 days	₹ 339,100.00	Thu 5/29/14	Tue 6/10/14	10FS-1 day
13	RE/AA/02/ae	Back filling	6 days	₹ 276,000.00	Tue 7/15/14	Tue 7/22/14	11FS+4 day
14	RE/AA/02/af	Plinth beam casting	27 days	₹ 329,400.00	Wed 6/11/14	Thu 7/17/14	
15	RE/AA/02/af/1	Bar bending	5 days	₹ 12,000.00	Wed 6/11/14	Tue 6/17/14	12
16	RE/AA/02/af/3	Steel Binding & shuttering	14 days	₹ 215,400.00	Wed 6/18/14	Mon 7/7/14	15
17	RE/AA/02/af/4	Concreting	8 days	₹ 102,000.00	Tue 7/8/14	Thu 7/17/14	16
18	RE/AA/02/ag	Plinth filling	7 days	₹ 322,000.00	Fri 7/18/14	Mon 7/28/14	17
19	RE/AA/03	Super-Structure	230 days	₹ 9,885,300.00	Fri 7/18/14	Fri 6/5/15	
20	RE/AA/03/aa	Structural work	162 days	₹ 3,516,000.00	Fri 7/18/14	Mon 3/2/15	
21	RE/AA/03/aa/1	Ground Floor	33 days	₹ 695,000.00	Fri 7/18/14	Tue 9/2/14	
22	RE/AA/03/aa/1.1	Columns	19 days	₹ 333,800.00	Fri 7/18/14	Wed 8/13/14	
23	RE/AA/03/aa/1.1.1	Bar bending	4 days	₹ 9,600.00	Fri 7/18/14	Wed 7/23/14	17
24	RE/AA/03/aa/1.1.2	Placing steel Reinforcements and	12 days	₹ 241,200.00	Tue 7/22/14	Wed 8/6/14	23SS+2 day

Figure (a) Plan A- Conventional approach for execution

2 Plan B – Project management approach:

From plan A: conventional execution approach, we obtain the data of construction, this was analysed and a plan was prepared again in MS Project with the application of project management skills and techniques, to get the clear picture of the duration and cost for the construction of the building.

This approach was being carried out to present an idea about, accurate planning and scheduling of project by prevailing over the problems that occurred during actual conventional construction execution practices like:

a) construction activities were not planned and scheduled accurately which resulted in extension of project date and increase in cost.
b) The activities were not executed as per the prepared plan due to various unplanned sources and non-consideration of uncertainties, which resulted in delay
c) Over allocation of various resources due to improper resource management, which resulted in delay for completion of project.
d) Labour fatigue owing to over time of the work causing labour inefficiency.
e) Improper identification of parallel activities which would have been started simultaneously.
f) Slack time and non-critical activities were not recognized, which could be crushed t

As a result, a duration of 209 days and cost of Rs. 11,053,400.00/- has been estimated for executing activities by project management approach which is shown in fig below:

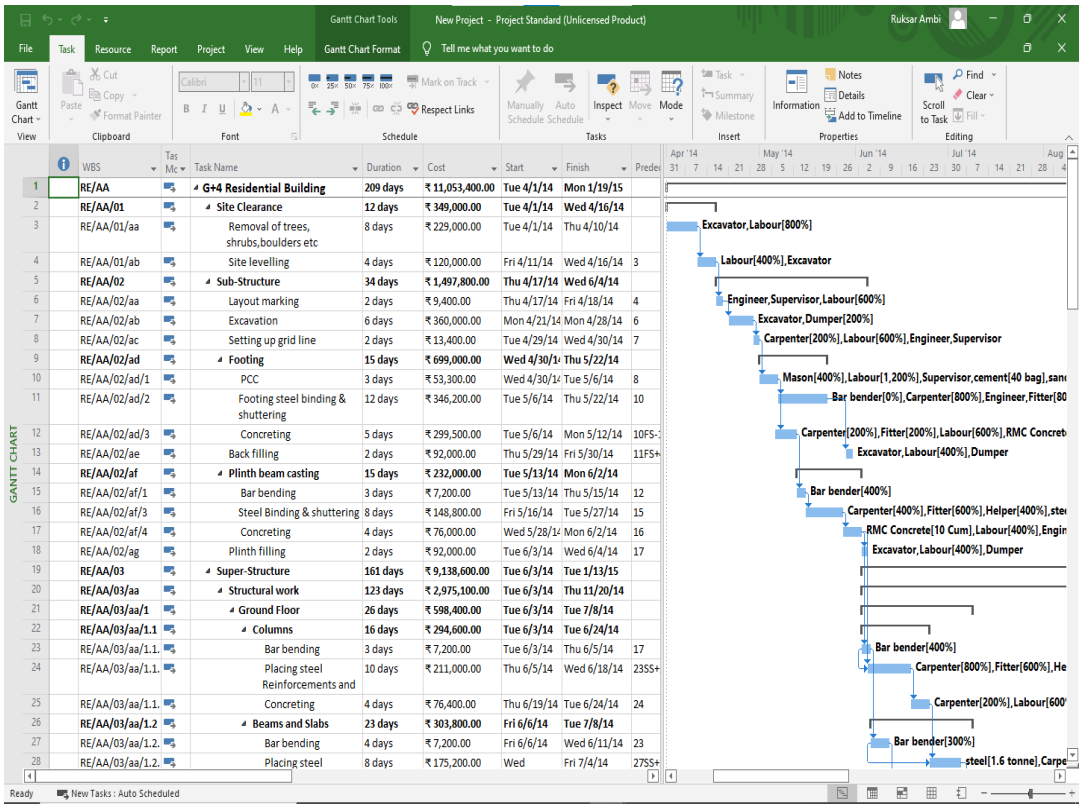
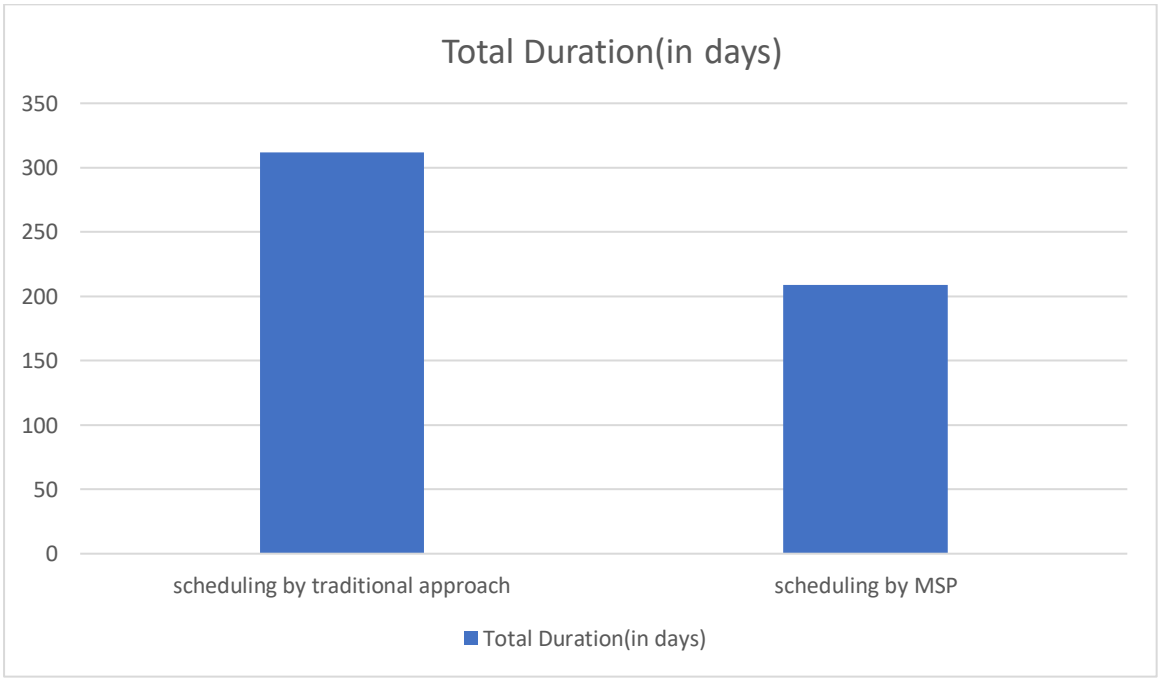
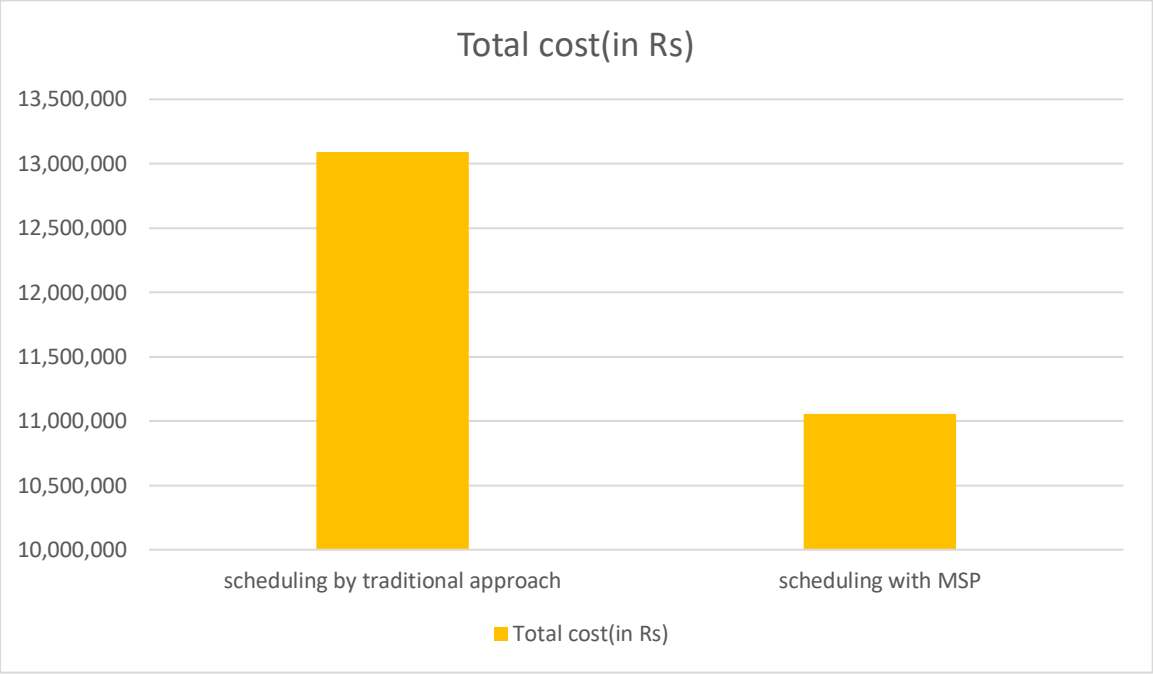


Figure (b) Plan B- Project management approach

3. RESULT AND CONCLUSION

RESULT





4. CONCLUSION

We had used MS software for planning and scheduling of material as well as labour, which gives us brief information about the activities in construction project, showing their start and finish time, and material and labour requirement as well as project duration.

We have done CPM analysis for Planning. The result obtained by our planning shows that the estimated time of completion of this project is 312 day and estimated cost is 1,30,91,600 approximately; highlighting the critical activities and critical path duration required for completion for some activities are more than software result.

Which indicate that some activities are delayed. We have done resource allocation for those labour, material and activities which are delaying the project, then we calculated the time required for completing the project using software. Then the comparison between the result obtained by the software and on actual site was done.

Hence, it was concluded that time required for completing the project as per our planning and scheduling using Microsoft project is 209 day and cost is 1,10,53,400/- .Hence our method of planning and scheduling is more scientific.

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