

Construction Project Time Management Aid of Software Application

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Abstract— *The main objective of the project is to do effective management in the time for the construction activities of an apartment building located at Sankarankovil near Tirunelveli. This study is to be managing the issues due to unexpected delays with very optimum time. The project management tool used is Microsoft Project 2013. Microsoft Project is used to do the planning, scheduling, resource allocation and costing for the construction activities in this project. The Gantt chart was drawn based on the sequence of activities in the construction site with the corresponding duration. After the listing of activities and allocation of resources, scheduling is done by both the methods i.e., manually and by using Microsoft Project software and they are compared. By using this software, scheduling of the building was resulted based on the control of duration.*

Keywords— *effective management; delays; scheduling; Microsoft Project; Gantt chart; resource allocation; efficient;*

I. INTRODUCTION

Project is a non-repetitive one-time venture to build something of lasting value, amidst formidable uncertainties to be overcome. It is a job that has a beginning and an end (time), a specified outcome (scope), at started level of quality (performance) and a budget (cost). Organization performs work. Project management is an art and science of mobilizing and managing people, material, equipment and money to complete the assign project of work on time within the budgeted cost and by specified technical performance standards. There is always a dynamics link between these three forces. The key objective of the construction project management is to complete the project with the allotted time, resources and within the budgeted cost. Project gets starts at the right way but as it proceeds further, gets off the track. The project leads to some delays in the construction site which can be managed

by additional resource allocations and appropriation of overtimes for the labours thereby resulting in the uncertainty of cost. Some of the delays that makes the MS Project estimation modified when compare to the manual estimation are shown.

- a) Unexpected recess
- b) Weather conditions
- c) Labour Strike,
- d) Changes made to the existing design etc..

A project is essentially a set of operations or activities to be completed in logical order. In project management, a schedule is a listing of a project's milestones, activities, and deliverables, usually with intended start and finish dates. . The schedule is a management tool used to predict project completion, and thereby ensure timely completion by adjusting resources applied to the work.

II LITERATURE REVIEW

A. **Gulghane.A.A & Khandve. P.V(2015) explained that,**

In recent trends a wide range of building materials is available for the construction of civil engineering structures. The total cost of materials may be up to 60% or more of the total cost incurred in construction project dependent upon the type of project. Effective construction materials management is a key to success for a construction project. Construction waste is another serious problem in construction industry. A large and various types of construction waste with different characteristics are created at all the stages of construction. Construction industries have a larger part in contributing environmental problems. One of the major problems in delaying construction projects is poor materials management. This paper presents a review on systematically investigation of the management of construction materials and construction waste,

material management techniques, control of construction waste and existing situation of construction management and construction waste in the industry.

B. Wale. P. M et al., (2015) conversed that,

The project may have a simple goals that does not require many people or a great deal of money or it may be quite complex, calling for diverse skills and plethora of resources. But the bottom line is that every one of us manages projects. A project is a temporary aim designed to produce a special product, service or result with a defined starting and end (usually time-constrained, and often constrained by funding or deliverables), undertaken to meet eccentric goals and objectives, typically to bring about beneficial change or added value. Project gets started at the right way but as it proceeds further, gets off the track. The temporary nature of projects stands in contrast with business as usual (or operations), which are recurring, permanent, or semi-permanent functional activities to produce products or services.

III CONTROLLING OF DELAYS

The cost can be affected mainly due to delays in the project due to various reasons. The causes for the delays can be indentified and are listed below.

Some of the delays are delay in submission of drawings, space constraints, and delay in payment by client, delay in material supply and local problems like strikes.

Delays in the project

In this construction project, the cost issues are due to unexpected holidays and shortage of resources. The unexpected holidays are listed below.

1. May Day
2. Pooja holidays
3. Deevali holidays
4. Chief Minister death
5. Demonetarization
6. Pongal holidays
7. New Year holidays

The calendar is set in the MS Project with considering the delays. The delays can be controlled by conferring the overtimes for the labours and also giving additional resources to complete the project within the scheduled time. The holidays are compensated by giving the overtime to the labours so that the scheduling can be controlled within the limited time without any delay to the customers. The overtime is given for the Sundays after the long delay due to the demonetarization. The problem with the

material deficiencies are control by exchanging the activities having the enough materials and equipment.

The holidays that are not included in the manual scheduling are shown below as in the MS project.

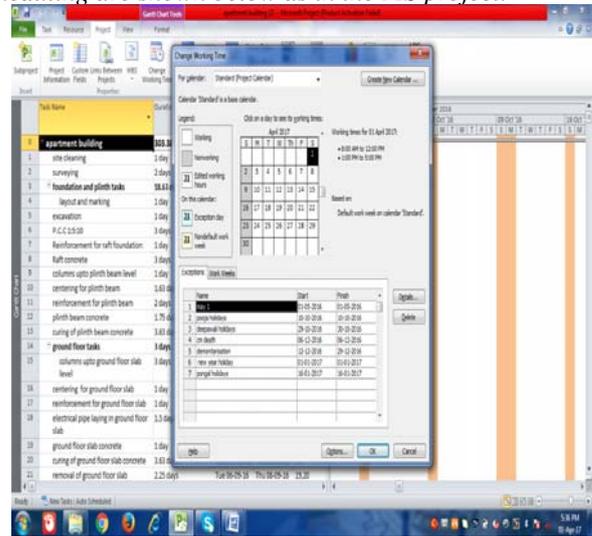


Fig. 1 Exceptions of working days

The overtime on the Sundays are shown below as in the Ms Project.

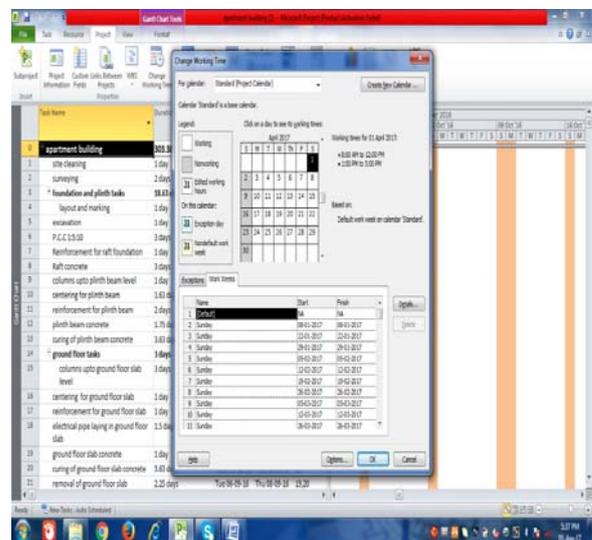


Fig. 2 Overtime days

In the overtime days like Sundays the same working is allotted (from 8 am to 5 pm). These overtime days requires additional resources to complete the project. So that the cost can be increase due to the rate increasing fo the additional resources and delay for the labours who are present on the overtime days. The manual estimation is done by not considering the

unexpected delays. So the cost would be lower when compare to the MS Project estimation.

IV MANUAL SCHEDULING BEFORE TRACKING

The initial scheduling of our construction project is done using Microsoft Office Excel 2007. This is done by giving regular delays that causes issues in the future scheduling. The assumed problems that cause delays in the scheduling are holidays and weather conditions. The manual scheduling is replaced by the Microsoft Project scheduling that includes the actual delays that caused the issues in the construction site. The manual scheduling is shown below covering the activities and duration.

TASK NAME	DURATION
apartment building	209 days
1. site clearing	2 days
2. site marking	2 days
3. ground wall foundation	1 day
4. excavation	2 days
5. P.C.C. 1:1:10	2 days
6. Transformation for slab foundation	1 day
7. Wall concrete	2 days
8. columns and floor beams level	1 day
9. casting for plinth beam	1.00 days
10. reinforcement for plinth beam	2 days
11. plinth beam concrete	1.75 days
12. casting of plinth beam concrete	3.00 days
13. columns and ground floor slab level	3 days
14. casting for ground floor slab	2 days
15. reinforcement for ground floor slab	1 day
16. electrical pipe for ground floor slab	1.5 days
17. ground floor slab concrete	1 day
18. casting of ground floor slab concrete	1.00 days
19. removal of ground floor slab concrete	2.75 days
20. removal of ground floor beam concrete	1 day

Fig. 3 Scheduling (contd.)

21. casting the ground floor slab concrete	3 days
22. back work on ground floor	3 days
23. electrical wiring for ground floor	2 days
24. internal W/S sanitary lines	2 days
25. plastering on ground floor	2 days
26. cement concrete mosaic flooring	1 day
27. cement tile flooring	2 days
28. 1st and 2nd cut of floor plinth on ground floor	2.00 days
29. columns and 1st floor slab level	4 days
30. reinforcement of 1st floor slab level	2.00 days
31. casting of 1st floor slab concrete	1 day
32. electrical pipe for 1st floor slab	1.5 days
33. 1st floor slab concrete	1 day
34. casting of 1st floor slab concrete	3 days
35. removal of 1st floor slab concrete	1 day
36. removal of 1st floor beam concrete	1 day
37. casting of 1st floor slab concrete	2 days
38. back work and fixing of floor frames in 1st floor	3 days
39. electrical drops and boxes fixing in 1st floor	3.00 days

Fig. 4 Scheduling (contd.)

41. internal W/S sanitary lines	2 days
42. plastering in 1st floor	3 days
43. cement concrete mosaic flooring	1 day
44. cement tile flooring	2 days
45. casting of flooring	3 days
46. 1st and 2nd cut of floor plinth in 1st floor	2 days
47. columns and 2nd floor slab level	3 days
48. reinforcement of 2nd floor slab level	1 day
49. casting of 2nd floor slab level	1 day
50. electrical pipe for 2nd floor slab	1.5 days
51. 2nd floor slab concrete	1 day
52. casting of 2nd floor slab concrete	3 days
53. removal of 2nd floor slab concrete	1 day
54. removal of 2nd floor beam concrete	1 day
55. casting of 2nd floor slab concrete	3 days
56. back work and fixing of floor frames in 2nd floor	3 days
57. electrical drops and boxes fixing in 2nd floor	3 days
58. internal W/S sanitary lines and plastering in 2nd floor	2 days
59. electrical wiring	3 days
60. preparation of surfaces and primer on wall and ceiling of 2nd floor	2 days

Fig. 5 Scheduling (contd.)

61. applying coat of distemper and 2nd coat of white wash in floor	3 days
62. fixing of P.V.C. flooring	2 days
63. back plastering of floors	2 days
64. fixing of string, back coat painting, distemper and white wash in all floors	3 days
65. cleaning of site	1 day
66. treatment of site	2 days
67. treatment sand fill and cement concrete 1:1:10	1 day
68. fixing of electrical drops and boxes on wall	1 day
69. fixing of floor plaster to ground floor	2 days
70. one coat of paint on floor slabs	1 day
71. electrical wiring	2 days
72. cement concrete mosaic flooring	1 day
73. cement tile flooring	1 day
74. casting of flooring	3 days
75. 1st and 2nd cut of floor plinth in 2nd floor	4 days
76. 1st coat of distemper and 2nd coat of white wash	3 days
77. plastered wall construction	3 days
78. external wall plastering	1 day
79. fixing of aluminum render, weather proof, electrical W/S and sanitary lines, drainage materials	4 days
80. slab protection	3 days

Fig. 6 Scheduling (contd.)

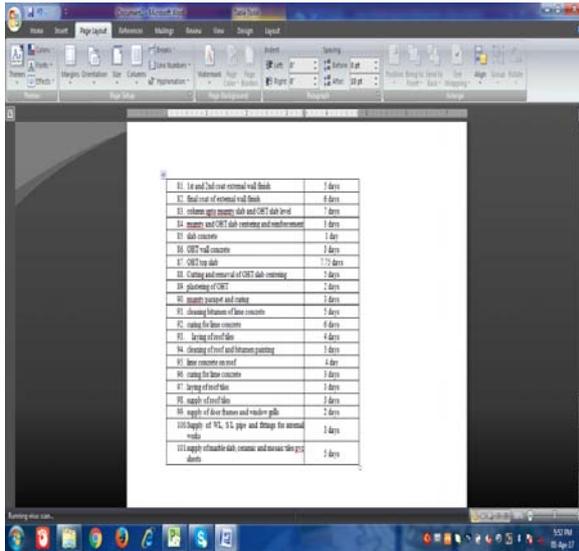


Fig.7 Scheduling (contd.)

VII. MICROSOFTT PROJECT SCHEDULING

In our project, we tracked the schedule which caused the delays in the construction at the site due to the unexpected holidays and other problems. The Gantt chart shows the scheduling for critical (red bars) and non critical activity (blue bars).

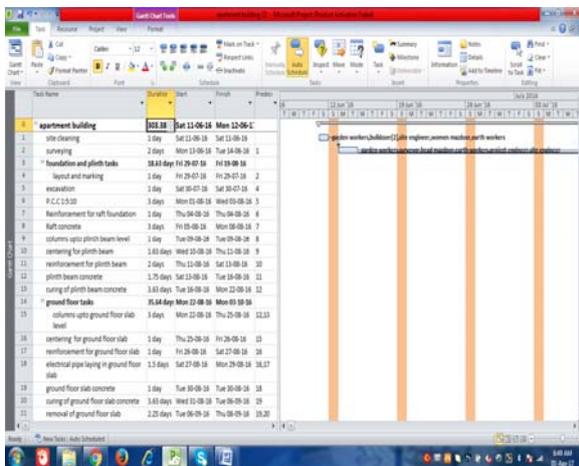


Fig.8 MSP Scheduling (at initial stage)

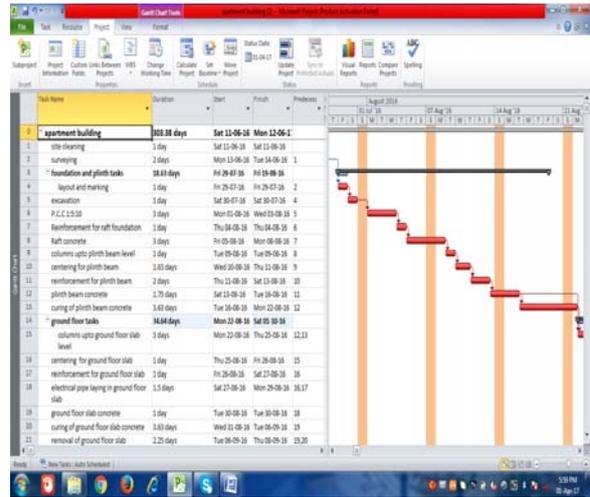


Fig.9 MSP Scheduling (critical path)

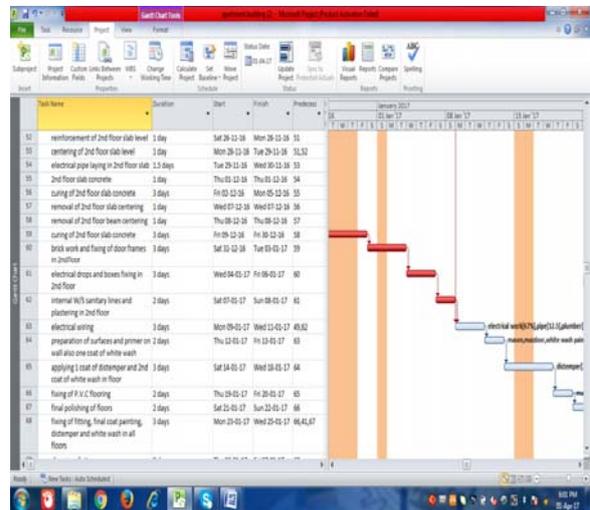


Fig.10 MSP Scheduling (critical and non critical path)

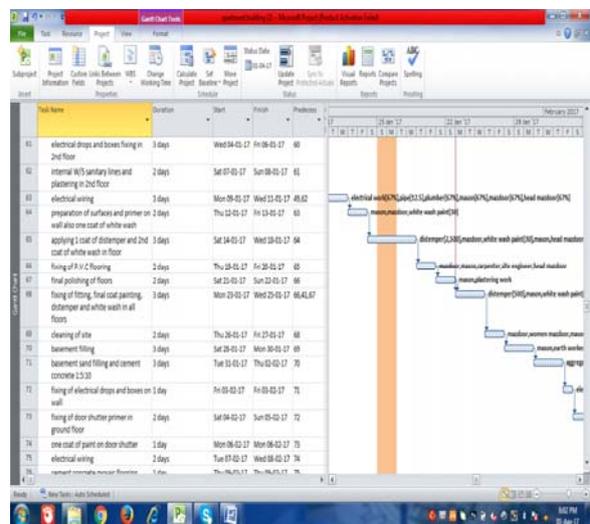


Fig.11 MSP Scheduling (non critical path)

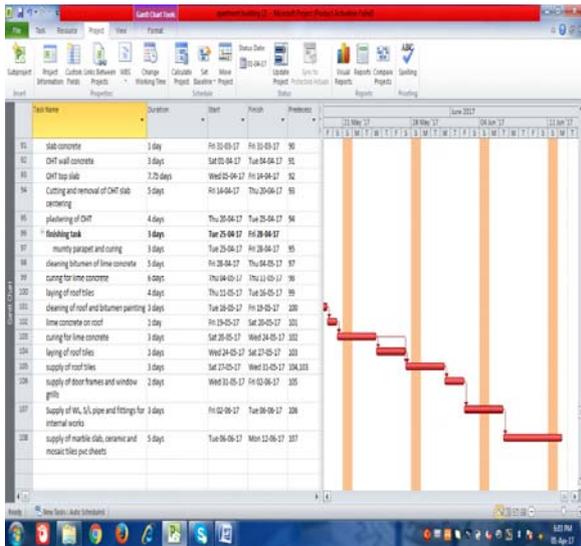


Fig.12 MSP Scheduling (at final stage)

VIII CONCLUSION

BASED ON BOTH THE METHODS (MANUAL AND MS PROJECT) OF SCHEDULING, THE FOLLOWING CONCLUSIONS ARE ARRIVED.

This manual scheduling consists of time of the activity and the name of the activity to be performed. Activity represents its schedule of work. The start of the manual scheduling marks the commencement of the activity and the end of the completion. The manual scheduling shows that the project would be completed within 309 days. The

References

[1]. K.K. Chirkara “Construction Project Management - Planning, Scheduling and Controlling” Tata McGraw-Hill Publishing Company

[2]. Dr. B.C. Punmia and K.K. Khandelwal “Project Planning and control with PERT and CPM”

[3]. B.N. Dutta “Estimating and Costing in Civil engineering” UBS Publishers & Distributors Ltd

[4]. Sambasivan. M & Soon. Y (2013), “Causes and effects of delays in Malaysian construction industry” Journal of Project Management, 25 (5). ISSN 0263-7863; ESSN: 1873-4634, Vol.6, Issue 3, (Part-2), pp.517-526.

time of the activity includes the weekly leave i.e. Sunday. Other unexpected leaves are not included in the manual scheduling. Here the scheduling is done by considering the unexpected holidays and the duration have been lowered by providing overtime and the project have been completed within the expected duration i.e. 303 days with some extra resources. The project is completed with both critical and non critical paths. The tracking of the project is done from 11.06.2016 to 30.03.2017. The remaining portion of the overheat tank are to be complete and these can also be tracked in this project. On this comparison between the manual and software methods of scheduling, it is concluded that “Computer Aided Scheduling” is most efficient and time saving one and also makes the project, cost effective with Proper Planning.

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[5]. Subramani. T et al., (2014) “Causes of Cost Overruns in Construction”, IOSR Journal of Engineering (IOSRJEN), ISSN (e): 2250-3021, ISSN (p): 2278-8719 Vol. 04, Issue 06, (Part-2),pp 01-07.

[6]. Indhu. B & Ajai. P (2014) “Study of Delay Management in a Construction Project - A Case Study” International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459), ISO 9001:2008 Certified Journal, Vol.4, Issue 5, (Part-2), pp.45-65.

[7]. Gulghane. A. A & Prof Khandve. P. V (2015) “Management for Construction Materials and Control of Construction Waste in Construction Industry: A Review” Vol. 5, Issue 4, (Part -1), pp.59-64.

[8]. Gulghane. A. A & Prof Khandve. P. V (2015) “Management for Construction Materials and Control of Construction Waste

in Construction Industry: A Review” Vol. 5, Issue 4, (Part -1), pp.59-64.

- [9]. Ron Winter et al., (2015) “MS PROJECT for construction schedulers analyzing project management research” Vol.4, Issue 5, (Part-3) pp.435–446.
- [10]. Wale. P. M et al, (2015) “Planning and scheduling of a building using Microsoft Project” IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320-334X, Vol.12, Issue 3, (Part-1), pp.57-63.
- [11]. Shujaa Safdar Gardezia. S et al., (2014) “Time Extension Factors in Construction Industry of Pakistan” Journal of Procedia Engineering 77 Vol. 3, Issue 5, (Part -1), pp 196 – 204.
- [12]. Sandip Pawar1 et al., (2012) “Time and Cost Planning in Construction Project” International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064, Vol.6, Issue 3, (Part-3), pp.56-78.