



Application of MSP in planning and design of G+10 building

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Abstract: Project management is the research and practice of a project's design, execution, control, & closure to ensure that the project's aims and goals are attained. The traditional construction approach often proves inefficient, time-consuming, and error-prone, leading to complexities in execution. This research advocates for the adoption of Microsoft Project as a modern Project Management tool to surmount challenges posed by conventional planning and management methods. This software optimally organizes project activities, offering a clear path to project completion within the defined timeframe and budget. The study demonstrates the application of Microsoft Project in the context of construction management, encompassing planning, scheduling, resource allocation, tracking, & more. The research also emphasizes efficient resource utilization and waste reduction during construction projects. By comparing software-generated results with on-site outcomes, the study establishes the effectiveness of the proposed method. Notably, the study showcases Microsoft Project's influence on cost savings through meticulous planning, scheduling, resource allocation, and tracking. The goal of current research is to use the Microsoft project in effective planning & implementation of construction projects. The project implementation plan, cost overview, resource allocation are presented for G+10 story building. The maximum cost is incurred by the TM mixer machine, i.e., ₹ 14,050,000, and minimum cost is incurred by concrete mixer machine. The actual cost of work performed is Rs 27,162,425, whereas the actual cost is Rs 56202804.59. Using the MSP, the cost savings of Rs29,040,379.59 is achieved due to proper planning, scheduling, resource allocations, levelling, tracking, etc. From the MSP data, it can be concluded that the maximum work hours required for male labour force, i.e., 70000hrs.

Index Terms –MSP, planning, G+10

I. INTRODUCTION

Managers of projects use their expertise and methods to ensure that their efforts provide the desired results. It's a competitive advantage for businesses to be able to effectively complete projects and align those outcomes with their overall strategic objectives. It's the act of figuring out what has to be done and how to get it done, whether it's an issue in science or something you encounter every day.



Figure 1: Phases of project management

Projects are short-term endeavours with well-defined beginnings and endings, undertaken to achieve unique aims and objectives and, in most cases, to effect positive change or create value. Projects are short-term endeavours, in contrast to the ongoing, permanent, or semi-permanent character of business as usual in the creation of goods and services.

II. LITERATURE REVIEW

Rashmi J V et al. [1] examined the time and money needed to build a multi-story home using traditional construction methods against those built using project management principles. They dug deep into the methods of time, money, and resource management that went into carrying out the project. Information gathered on the job site is referred to as the "Conventional Execution Approach"

in this study. Planning and scheduling for the same multi-story structure were analysed once again using project management expertise and M.S. Project software in order to achieve a comparison with plan 'A'- Conventional execution method. This alternative method of handling a project is known as "Plan B." According to the findings, effective project management decreases building expenses and timeliness without sacrificing quality or performance. Microsoft Project software may be used to create a timeline for all of the project's tasks and then check for any cost or time overruns against that baseline.

Abhishek Sharma and K.K.pathak [2] This research looked at how a residential block was built in Bhopal's mahadev parisar and how the labour force was planned, scheduled, and monitored. An unfinished six-story (G+6) skyscraper in Shivaji Nagar, Bhopal, Madhya Pradesh. With the help of Microsoft Project, they compared the estimated time and budget for the project to the actual time and money spent on staffing. They reviewed the report and figured out what was taking so long. According to the findings, the project's multitasking operations were delayed because to a lack of labour, a lack of shuttering material, the contractor's failure to initiate those activities, and the activity's sloppy execution on the job site. This research suggests that Microsoft Project 2013 is the go-to software for effective project management. The programme also contributes to the project manager's efficiency in preventing and reducing resource waste during building.

Chourajit K Sharma et.al. [3] Research interests have shifted towards this area because of the growing complexity of building projects. Any project's outcome is heavily dependent on three factors: time, quality, and cost. The researchers conclude, based on their actual experience of management gained in the field, that resource scheduling is the most significant aspect of project management. The writers investigated the features, processes, and applications of MS Project, a programme used for managing projects. They identified the overall project management process that would benefit most from using MS Project software. MS Project was used during the development of a villa in Anand, which was under consideration at the time. To better plan, schedule, monitor, and control both small and large projects, the final report recommended using the project management software MS Project. Time and cost management software like Microsoft's Project might be used to keep villas under check.

E. Suresh Kumar and S. Krishnamoorthi [4] According to the authors, construction scheduling is essential for meeting deadlines and making the most efficient use of available resources. Estimation, activity sequencing, resource allocation, and timetabling are all part of scheduling using MSP software. Scheduling with the aid of MSP software becomes useful in bringing about effective management and a transparent timetable for a project. Scheduling for an apartment complex was done by the authors utilising MSP and EV Analysis. Using EV analysis, you can determine how far along a project is at any given moment, how much it will ultimately cost, and how much of a deviation there will be in the project's schedule and budget. Process time and expense excess may be avoided with the use of MSP and EV Analysis. The developers of the building's timetable and financial study reached this conclusion after factoring in unexpected costs. The cost differential is a result of an increase in both the price of materials and the pay of workers. Construction schedules were impacted by natural disasters.

Raj Thakur and Harish Kumar Dwivedi [5] Their key goals were (1) to examine methods of scheduling and construction sequencing in multi-story buildings, & (2) Using Microsoft Project for RCC building scheduling and planning. They made an imaginary RCC five-story apartment structure. Architectural, engineering, and construction (AEC) industry veterans and software experts compare and contrast their respective approaches to the building's overall planning and scheduling processes. The authors found that Microsoft Project was a useful tool for making a Gantt chart to display a construction project's timetable. It also gives the shortest possible building time via the use of schedule crunching and project crashing techniques. The authors stress the use of Microsoft project software for construction planning and scheduling. [6]

III. OBJECTIVE

The objective of current research is to use the Microsoft project in effective planning and implementation of construction projects. The project implementation plan, cost overview, resource allocation are presented for G+10 story building.

IV. METHODOLOGY

Project Initialization

- Define the project's scope, objectives, and key deliverables.
- Identify the project team members and their roles.
- Set up the project file in Microsoft Project by specifying project start date, scheduling method, and working calendar.

Work Breakdown Structure

- Create a hierarchical breakdown of the project's tasks using the WBS feature.
- Organize tasks into logical phases, sub-phases, and activities

Task Sequencing

- Determine task dependencies (predecessors and successors) to establish the order in which tasks should be executed.
- Create boundaries by establishing links between events, such as beginnings and endings.

Resource Allocation

- Assign project team members, equipment, and materials to specific tasks
- Adjust resource availability and allocation to avoid overloading or underutilization

Estimating Task Durations and Effort

- Applying past data, expert opinion, or industry standards, predict how long and how much work will be needed to complete each activity.
- Input estimated task durations into Microsoft Project's task properties.

V. RESULTS AND DISCUSSION

The project is G+10 story building. In the 1st column, the task information is provided. The work includes different types such as designing, architecture drawings, surveys, site surveying, site cleaning, layout, excavation, sand filling, DPC etc. The next column presents data on overall duration to complete the task. The total time duration to complete the task is 2547 days.

Table 1: Gantt Chart

| Task Mode | Activity | Duration | Start | Finish | Predecessors | Resource Names | Cost |
|---------------------------|-----------------------------|-------------------|--------------------|---------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Auto Scheduled | Start of Project | 2547 days? | Mon 1/2/23 | Sat 6/3/28 | | | ₹ 56,202,804.59 |
| Auto Scheduled | Start the Project | 1 day? | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | Design | 20 days | Sat 1/7/23 | Mon 1/23/23 | | | ₹ 30,000.00 |
| Auto Scheduled | Architecture Drawings | 20 days | Sat 1/7/23 | Mon 1/23/23 | 5 | Drawing Engg | ₹ 30,000.00 |
| Auto Scheduled | Survey | 3 days | Mon 1/2/23 | Wed 1/4/23 | | | ₹ 15,800.00 |
| Auto Scheduled | Site Surveying | 1 day | Mon 1/2/23 | Tue 1/3/23 | 2 | Site Engineer, Supervisor | ₹ 1,700.00 |
| Auto Scheduled | Site Cleaning | 2 days | Tue 1/3/23 | Wed 1/4/23 | 6 | Excavator,Labour Male[200%],Supervisor,Site Engineer | ₹ 10,300.00 |
| Auto Scheduled | Layout | 1 day | Tue 1/3/23 | Tue 1/3/23 | 6 | Labour Male[400%],Site Engineer,Supervisor,Drawing Engg | ₹ 3,800.00 |
| Auto Scheduled | Foundation | 92 days | Wed 1/4/23 | Thu 3/16/23 | | | ₹ 1,675,800.00 |
| Auto Scheduled | Excavation | 5 days | Wed 1/4/23 | Sat 1/7/23 | 8 | Excavator,Labour Male[400%],Labour Female[200%],Site Engineer,Drawing Engg | ₹ 61,000.00 |
| Auto Scheduled | Sand Filling | 2 days | Sat 1/7/23 | Mon 1/9/23 | 10 | Excavator,Site Engineer,Labour Male[400%],Labour Female[200%] | ₹ 21,400.00 |
| Auto Scheduled | PCC | 3 days | Mon 1/9/23 | Wed 1/11/23 | 11 | Supervisor,Site Engineer,Excavator,Labour Male[400%],Labour Female[200%] | ₹ 34,200.00 |
| Auto Scheduled | Footing Shuttering | 20 days | Wed 1/11/23 | Thu 1/26/23 | 12 | Supervisor,Labour Male,Bar Bender[400%] | ₹ 44,000.00 |
| Auto Scheduled | Footing Concrete | 30 days | Fri 1/27/23 | Sat 2/18/23 | 13 | TM Mixer Machine,Concrete Lifter,Mistry[200%],Labour Male[400%],Labour Female[200%],Cement[1,000] | ₹ 1,173,000.00 |
| Auto Scheduled | Pedestal Shuttering | 8 days | Mon 2/20/23 | Sat 2/25/23 | 14 | Mistry[200%],Labour Male[400%],Bar Bender[200%] | ₹ 21,600.00 |
| Auto Scheduled | Pedestal Coloum Concrete | 10 days | Sat 2/25/23 | Sat 3/4/23 | 15 | TM Mixer Machine,Concrete Lifter,Labour Male[400%],Vibrator[200%] | ₹ 287,000.00 |
| Auto Scheduled | Back Filling | 14 days | Mon 3/6/23 | Thu 3/16/23 | 16 | Labour Male[400%],Supervisor,Labour Female[200%] | ₹ 33,600.00 |
| Auto Scheduled | Sub Structure | 15 days | Thu 3/16/23 | Tue 3/28/23 | | | ₹ 78,000.00 |
| Auto Scheduled | Brick Work upto Ground Beam | 15 days | Thu 3/16/23 | Tue 3/28/23 | 17 | Mason[400%],Labour Male[400%],Labour Female[800%] | ₹ 78,000.00 |
| Auto Scheduled | Ground Beam Work | 54 days | Tue 3/28/23 | Tue 5/9/23 | | | ₹ 413,400.00 |
| Auto Scheduled | Brick Work upto DPC Bottom | 25 days | Tue 3/28/23 | Sat 4/15/23 | 19 | Mistry[200%],Mason[400%],Labour Male[800%],Labour Female[1,000%],Bhisti (Kuli)[400%],Site Engineer | ₹ 245,000.00 |
| Auto Scheduled | DPC | 5 days | Mon 4/17/23 | Thu 4/20/23 | 21 | Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Labour Female[400%] | ₹ 18,000.00 |
| Auto Scheduled | Ground Beam Shuttering | 9 days | Thu 4/20/23 | Thu 4/27/23 | 22 | Mistry[400%],Labour Male[800%],Site Engineer,Bar Bender[200%] | ₹ 52,200.00 |
| Auto Scheduled | Bitumin Coat | 2 days | Thu 4/27/23 | Fri 4/28/23 | 23 | Bitumin[10],Labour Male[400%],Labour Female[200%] | ₹ 53,400.00 |
| Auto Scheduled | Plinth Filling | 10 days | Fri 4/28/23 | Sat 5/6/23 | 24 | Mistry[200%],Labour Male[400%],Labour Female[200%],Bhisti (Kuli)[200%] | ₹ 31,000.00 |
| Auto Scheduled | Floor PCC | 3 days | Sat 5/6/23 | Tue 5/9/23 | 25 | Concrete Mixer,Mistry[200%],Labour Male[400%],Labour Female[200%] | ₹ 13,800.00 |
| Auto Scheduled | Super Structure | 2547 days? | Mon 1/2/23 | Sat 6/3/28 | | | ₹ 53,989,804.59 |
| Auto Scheduled | Slab Level | 215 days | Tue 5/9/23 | Mon 10/23/23 | | | ₹ 13,411,850.00 |
| Auto Scheduled | Coloum Concret Shuttering | 15 days | Tue 5/9/23 | Sat 5/20/23 | 26 | Mistry[600%],Labour Male[600%],Labour Female[300%],Bhisti (Kuli),Bar Bender[200%] | ₹ 87,000.00 |
| Auto Scheduled | Coloum Concrete | 150 days | Sat 5/20/23 | Thu 9/14/23 | 29 | Bar Bender[200%],TM Mixer Machine[200%],Concrete Lifter,Site Engineer,Supervisor,Labour Male[400%],Vibrator[200%],Cement[1,000] | ₹ 7,890,000.00 |

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|---------------------------|----------------------------------------------|-------------------|---------------------|---------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Auto Scheduled | Slab Beam Work | 12 days | Thu 9/14/23 | Sat 9/23/23 | 30 | Bar Bender[200%],Mistry[400%],Labour Male[600%],Labour Female[300%] | ₹ 59,400.00 |
| Auto Scheduled | Slab Concrete Shuttering | 12 days | Sat 9/23/23 | Tue 10/3/23 | 31 | Bar Bender[200%],Mistry[400%],Labour Male[600%],Labour Female[400%],Bhisti (Kuli)[200%],Steel[70,000] | ₹ 4,618,400.00 |
| Auto Scheduled | Slab Concrete | 1 day | Tue 10/3/23 | Tue 10/3/23 | 32 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[800] | ₹ 398,300.00 |
| Auto Scheduled | One Line Brick Work upto Slab Beam | 25 days | Wed 10/4/23 | Mon 10/23/23 | 33 | Site Engineer,Mistry[300%],Mason[600%],Labour Male[1,000%],Labour Female[2,000%],Bhisti (Kuli)[400%] | ₹ 358,750.00 |
| Auto Scheduled | Stair Case | 16 days | Mon 10/23/23 | Sat 11/4/23 | | | ₹ 247,850.00 |
| Auto Scheduled | Stair Case Shuttering | 14 days | Mon 10/23/23 | Thu 11/2/23 | 34 | Site Engineer,Supervisor,Drawing Engg,Mistry,Steel[400],Labour Male[200%],Labour Female,Bar Bender | ₹ 62,750.00 |
| Auto Scheduled | Stair Case Concrete | 2 days | Fri 11/3/23 | Sat 11/4/23 | 36 | TM Mixer Machine[300%],Concrete Lifter,Mistry,Labour Male[200%],Cement[100] | ₹ 185,100.00 |
| Auto Scheduled | Plumbing | 10 days | Sat 11/4/23 | Sat 11/11/23 | | | ₹ 482,000.00 |
| Auto Scheduled | All Plumbing Works | 10 days | Sat 11/4/23 | Sat 11/11/23 | 37 | Supervisor,Drawing Engg,Plumber[400%],Plumber Helper[800%],Plumber Equipments[8] | ₹ 482,000.00 |
| Auto Scheduled | Fitting (All Type of Fittings) | 8 days | Mon 11/13/23 | Sat 11/18/23 | | | ₹ 341,100.00 |
| Auto Scheduled | Door | 2 days | Mon 11/13/23 | Tue 11/14/23 | 39 | Supervisor,Drawing Engg,Carpainter[200%],Carpainter Helper[400%],Door[35] | ₹ 253,400.00 |
| Auto Scheduled | Window | 3 days | Tue 11/14/23 | Thu 11/16/23 | 41 | Supervisor,Carpainter[200%],Carpainter Helper[400%],Labour Male[800%],Window[20] | ₹ 79,900.00 |
| Auto Scheduled | Vantilation | 3 days | Thu 11/16/23 | Sat 11/18/23 | 42 | Carpainter[200%],Carpainter Helper[400%],Labour Male[200%] | ₹ 7,800.00 |
| Auto Scheduled | MEP (Mech, Electrical & Plumbing) | 1133 days | Sat 11/18/23 | Fri 4/17/26 | | | ₹ 1,218,000.00 |
| Auto Scheduled | Mechanical Work | 59 days | Sat 11/18/23 | Tue 3/24/26 | 43 | Lift Mechanical,Labour Male[400%],Supervisor,Site Engineer,Bhisti (Kuli)[200%] | ₹ 1,002,000.00 |
| Auto Scheduled | Electrical Work | 15 days | Wed 3/25/26 | Sat 4/4/26 | 45 | Drawing Engg,Site Engineer,Electrician[400%],Electrician Helper[400%],Bhisti (Kuli)[400%] | ₹ 106,500.00 |
| Auto Scheduled | Plumbing Work | 16 days | Mon 4/6/26 | Fri 4/17/26 | 46 | Drawing Engg,Supervisor,Plumber[400%],Plumber Helper[400%],Bhisti (Kuli)[200%] | ₹ 109,500.00 |
| Auto Scheduled | Finishing Works | 1686 days? | Mon 1/2/23 | Tue 8/4/26 | | | ₹ 4,812,000.00 |
| Auto Scheduled | Wall Layer (Assemblies) | 90 days | Fri 4/17/26 | Fri 6/26/26 | 47 | Site Engineer,Supervisor,Wall Assembler[200%],Bhisti (Kuli)[400%] | ₹ 3,843,000.00 |
| Auto Scheduled | Plaster | 10 days | Fri 6/26/26 | Sat 7/4/26 | 49 | Mistry[800%],Supervisor,Labour Male[400%],Labour Female[800%],Bhisti (Kuli)[400%],Cement[500] | ₹ 235,000.00 |
| Auto Scheduled | Paint | 20 days | Sat 7/4/26 | Mon 7/20/26 | 50 | Painter[400%],Painter Helper[400%],Paint[1,000] | ₹ 314,000.00 |
| Auto Scheduled | Tiles | 20 days | Mon 7/20/26 | Tue 8/4/26 | 51 | Tiles[1,800],Mistry[800%],Labour Male[800%],Bhisti (Kuli)[400%],Labour Female[200%] | ₹ 420,000.00 |
| Auto Scheduled | | 1 day? | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | 1ST Floor Work | 30 days? | Mon 1/2/23 | Tue 1/24/23 | | | ₹ 2,993,029.59 |
| Auto Scheduled | Coloum Work | 90 days | Wed 8/5/26 | Tue 10/13/26 | 52 | Site Engineer,Drawing Engg,Mistry[1,000%],Labour Male[1,000%],Labour Female[600%],Bhisti (Kuli)[400%],Bar Bender[400%] | ₹ 248,479.59 |
| Auto Scheduled | Coloum Concrete | 15 days | Wed 10/14/26 | Sat 10/24/26 | 55 | TM Mixer Machine,Concrete Lifter,Vibrator[200%],Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Cement[350] | ₹ 556,500.00 |
| Auto Scheduled | Slab Beam Work | 10 days | Mon 10/26/26 | Mon 11/2/26 | 56 | Bar Bender,Mistry[400%],Labour Male[200%],Labour Female[200%],Bhisti (Kuli)[200%],Site Engineer | ₹ 47,000.00 |
| Auto Scheduled | Slab Concrete | 1 day | Mon 11/2/26 | Tue 11/3/26 | 57 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[700] | ₹ 368,300.00 |
| Auto Scheduled | Brick Work | 20 days | Tue 11/3/26 | Wed 11/18/26 | 58 | Drawing Engg,Supervisor,Mason[400%],Labour Male[800%],Labour Female[400%],Bhisti (Kuli)[200%],Bricks[50,000] | ₹ 462,000.00 |
| Auto Scheduled | Electrical Work | 15 days | Wed 11/18/26 | Mon 11/30/26 | 59 | Drawing Engg,Supervisor,Electrician[400%],Electrician Helper[400%],Labour Male[200%] | ₹ 96,000.00 |
| Auto Scheduled | Water Supply | 15 days | Mon 11/30/26 | Fri 12/11/26 | 60 | Drawing Engg,Supervisor,Plumber[400%],Plumber Helper[400%],Labour Male[200%],Bhisti (Kuli) | ₹ 114,750.00 |
| Auto Scheduled | Plaster Work | 30 days | Fri 12/11/26 | Mon 1/4/27 | 61 | Supervisor,Mason[600%],Labour Male[600%],Labour Female[600%],Bhisti (Kuli)[300%],Cement[200] | ₹ 292,500.00 |
| Auto Scheduled | Finishing Works (Tile & Others) | 20 days | Mon 1/4/27 | Tue 1/19/27 | 62 | Supervisor,Mistry[400%],Labour Male[400%],Labour Female[400%],Bhisti (Kuli)[200%],Cement[100],Tiles[2,000] | ₹ 434,000.00 |
| Auto Scheduled | Fitting (Door, Window, ETC) | 10 days | Wed 1/20/27 | Wed 1/27/27 | 63 | Supervisor,Site Engineer,Carpainter[400%],Carpainter Helper[400%],Labour Male[200%],Bhisti (Kuli)[200%],Labour Female,Door[35],Window[20] | ₹ 373,500.00 |

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|---------------------------|---------------------------------|-----------------|-------------------|--------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Manually Scheduled | | 1 day | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | 2ND Floor Work | 30 days? | Mon 1/2/23 | Tue 1/24/23 | | | ₹ 2,876,550.00 |
| Auto Scheduled | Coloum Work | 82 days | Mon 1/2/23 | Sat 7/29/23 | 64 | Site Engineer,Drawing Engg,Mistry[1,000%],Labour Male[1,000%],Labour Female[600%],Bhisti (Kuli)[400%],Bar Bender[400%] | ₹ 132,000.00 |
| Auto Scheduled | Coloum Concrete | 60 days | Mon 1/2/23 | Thu 9/14/23 | 67 | TM Mixer Machine,Concrete Lifter,Vibrator[200%],Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Cement[350] | ₹ 556,500.00 |
| Auto Scheduled | Slab Beam Work | 60 days | Fri 1/27/23 | Sat 7/20/24 | 68 | Bar Bender,Mistry[400%],Labour Male[200%],Labour Female[200%],Bhisti (Kuli)[200%],Site Engineer | ₹ 47,000.00 |
| Auto Scheduled | Slab Concrete | 8 days | Wed 1/25/23 | Tue 2/24/26 | 69 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[700] | ₹ 368,300.00 |
| Auto Scheduled | Brick Work | 101 days | Mon 1/2/23 | Thu 5/14/26 | 70 | Drawing Engg,Supervisor,Mason[400%],Labour Male[800%],Labour Female[400%],Bhisti (Kuli)[200%],Bricks[50,000] | ₹ 462,000.00 |
| Auto Scheduled | Electrical Work | 50 days | Wed 1/4/23 | Mon 2/3/25 | 71 | Drawing Engg,Supervisor,Electrician[400%],Electrician Helper[400%],Labour Male[200%] | ₹ 96,000.00 |
| Auto Scheduled | Water Supply | 75 days | Mon 1/2/23 | Fri 2/14/25 | 72 | Drawing Engg,Supervisor,Plumber[400%],Plumber Helper[400%],Labour Male[200%],Bhisti (Kuli) | ₹ 114,750.00 |
| Auto Scheduled | Plaster Work | 69 days | Mon 1/2/23 | Tue 4/15/25 | 73 | Supervisor,Mason[600%],Labour Male[600%],Labour Female[600%],Bhisti (Kuli)[300%],Cement[200] | ₹ 292,500.00 |
| Auto Scheduled | Finishing Works (Tile & Others) | 95 days | Mon 1/2/23 | Fri 7/25/25 | 74 | Supervisor,Mistry[400%],Labour Male[400%],Labour Female[400%],Bhisti (Kuli)[200%],Cement[100],Tiles[2,000] | ₹ 434,000.00 |
| Auto Scheduled | Fitting (Door, Window, ETC) | 60 days | Mon 1/2/23 | Tue 12/16/25 | 75 | Supervisor,Site Engineer,Carpainter[400%],Carpainter Helper[400%],Labour Male[200%],Bhisti (Kuli)[200%],Labour Female,Door[35],Window[20] | ₹ 373,500.00 |
| Manually Scheduled | | 1 day | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | 3RD Floor Work | 30 days? | Mon 1/2/23 | Tue 1/24/23 | | | ₹ 2,876,550.00 |
| Auto Scheduled | Coloum Work | 92 days | Mon 1/2/23 | Wed 2/21/24 | 76 | Site Engineer,Drawing Engg,Mistry[1,000%],Labour Male[1,000%],Labour Female[600%],Bhisti (Kuli)[400%],Bar Bender[400%] | ₹ 132,000.00 |
| Auto Scheduled | Coloum Concrete | 75 days | Mon 1/2/23 | Fri 4/19/24 | 79 | TM Mixer Machine,Concrete Lifter,Vibrator[200%],Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Cement[350] | ₹ 556,500.00 |
| Auto Scheduled | Slab Beam Work | 60 days | Wed 2/15/23 | Thu 8/8/24 | 80 | Bar Bender,Mistry[400%],Labour Male[200%],Labour Female[200%],Bhisti (Kuli)[200%],Site Engineer | ₹ 47,000.00 |
| Auto Scheduled | Slab Concrete | 8 days | Wed 1/25/23 | Wed 2/25/26 | 81 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[700] | ₹ 368,300.00 |
| Auto Scheduled | Brick Work | 108 days | Mon 1/2/23 | Wed 6/24/26 | 82 | Drawing Engg,Supervisor,Mason[400%],Labour Male[800%],Labour Female[400%],Bhisti (Kuli)[200%],Bricks[50,000] | ₹ 462,000.00 |
| Auto Scheduled | Electrical Work | 60 days | Mon 1/16/23 | Wed 2/26/25 | 83 | Drawing Engg,Supervisor,Electrician[400%],Electrician Helper[400%],Labour Male[200%] | ₹ 96,000.00 |
| Auto Scheduled | Water Supply | 90 days | Mon 1/2/23 | Mon 3/10/25 | 84 | Drawing Engg,Supervisor,Plumber[400%],Plumber Helper[400%],Labour Male[200%],Bhisti (Kuli) | ₹ 114,750.00 |
| Auto Scheduled | Plaster Work | 109 days | Mon 1/2/23 | Fri 12/12/25 | 85 | Supervisor,Mason[600%],Labour Male[600%],Labour Female[600%],Bhisti (Kuli)[300%],Cement[200] | ₹ 292,500.00 |
| Auto Scheduled | Finishing Works (Tile & Others) | 95 days | Mon 1/2/23 | Tue 3/24/26 | 86 | Supervisor,Mistry[400%],Labour Male[400%],Labour Female[400%],Bhisti (Kuli)[200%],Cement[100],Tiles[2,000] | ₹ 434,000.00 |
| Auto Scheduled | Fitting (Door, Window, ETC) | 60 days | Mon 1/9/23 | Tue 6/9/26 | 87 | Supervisor,Site Engineer,Carpainter[400%],Carpainter Helper[400%],Labour Male[200%],Bhisti (Kuli)[200%],Labour Female,Door[35],Window[20] | ₹ 373,500.00 |
| Manually Scheduled | | 1 day | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | 4TH Floor Work | 30 days? | Mon 1/2/23 | Tue 1/24/23 | | | ₹ 2,876,550.00 |
| Auto Scheduled | Coloum Work | 101 days | Mon 1/2/23 | Mon 3/4/24 | 88 | Site Engineer,Drawing Engg,Mistry[1,000%],Labour Male[1,000%],Labour Female[600%],Bhisti (Kuli)[400%],Bar Bender[400%] | ₹ 132,000.00 |
| Auto Scheduled | Coloum Concrete | 81 days | Mon 1/2/23 | Tue 8/6/24 | 91 | TM Mixer Machine,Concrete Lifter,Vibrator[200%],Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Cement[350] | ₹ 556,500.00 |
| Auto Scheduled | Slab Beam Work | 60 days | Mon 2/27/23 | Wed 8/28/24 | 92 | Bar Bender,Mistry[400%],Labour Male[200%],Labour Female[200%],Bhisti (Kuli)[200%],Site Engineer | ₹ 47,000.00 |
| Auto Scheduled | Slab Concrete | 8 days | Thu 1/26/23 | Thu 2/26/26 | 93 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[700] | ₹ 368,300.00 |
| Auto Scheduled | Brick Work | 117 days | Tue 1/17/23 | Fri 7/3/26 | 94 | Drawing Engg,Supervisor,Mason[400%],Labour Male[800%],Labour Female[400%],Bhisti (Kuli)[200%],Bricks[50,000] | ₹ 462,000.00 |
| Auto Scheduled | Electrical Work | 60 days | Fri 1/27/23 | Fri 3/21/25 | 95 | Drawing Engg,Supervisor,Electrician[400%],Electrician Helper[400%],Labour Male[200%] | ₹ 96,000.00 |

| | | | | | | | |
|---------------------------|---------------------------------|-----------------|-------------------|--------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Auto Scheduled | Water Supply | 90 days | Fri 1/13/23 | Wed 4/2/25 | 96 | Drawing Engg,Supervisor,Plumber[400%],Plumber Helper[400%],Labour Male[200%],Bhisti (Kuli) | ₹ 114,750.00 |
| Auto Scheduled | Plaster Work | 116 days | Mon 1/2/23 | Wed 11/5/25 | 97 | Supervisor,Mason[600%],Labour Male[600%],Labour Female[600%],Bhisti (Kuli)[300%],Cement[200] | ₹ 292,500.00 |
| Auto Scheduled | Finishing Works (Tile & Others) | 80 days | Fri 1/13/23 | Thu 1/22/26 | 98 | Supervisor,Mistry[400%],Labour Male[400%],Labour Female[400%],Bhisti (Kuli)[200%],Cement[100],Tiles[2,000] | ₹ 434,000.00 |
| Auto Scheduled | Fitting (Door, Window, ETC) | 60 days | Tue 1/17/23 | Fri 4/17/26 | 99 | Supervisor,Site Engineer,Carpainter[400%],Carpainter Helper[400%],Labour Male[200%],Bhisti (Kuli)[200%],Labour Female,Door[35],Window[20] | ₹ 373,500.00 |
| Manually Scheduled | | 1 day | Mon 1/2/23 | Mon 1/2/23 | | | ₹ 0.00 |
| Manually Scheduled | 5TH Floor Work | 30 days? | Mon 1/2/23 | Tue 1/24/23 | | | ₹ 2,876,550.00 |
| Auto Scheduled | Coloum Work | 96 days | Fri 1/13/23 | Tue 4/16/24 | 100 | Site Engineer,Drawing Engg,Mistry[1,000%],Labour Male[1,000%],Labour Female[600%],Bhisti (Kuli)[400%],Bar Bender[400%] | ₹ 132,000.00 |
| Auto Scheduled | Coloum Concrete | 76 days | Mon 1/2/23 | Sat 8/24/24 | 103 | TM Mixer Machine,Concrete Lifter,Vibrator[200%],Mistry[200%],Labour Male[400%],Bhisti (Kuli)[200%],Cement[350] | ₹ 556,500.00 |
| Auto Scheduled | Slab Beam Work | 60 days | Mon 2/27/23 | Tue 9/17/24 | 104 | Bar Bender,Mistry[400%],Labour Male[200%],Labour Female[200%],Bhisti (Kuli)[200%],Site Engineer | ₹ 47,000.00 |
| Auto Scheduled | Slab Concrete | 8 days | Fri 1/27/23 | Thu 2/26/26 | 105 | TM Mixer Machine[600%],Concrete Lifter,Mistry[400%],Vibrator[200%],Site Engineer,Supervisor,Labour Male[600%],Labour Female[200%],Cement[700] | ₹ 368,300.00 |
| Auto Scheduled | Brick Work | 87 days | Mon 1/23/23 | Tue 5/5/26 | 106 | Drawing Engg,Supervisor,Mason[400%],Labour Male[800%],Labour Female[400%],Bhisti (Kuli)[200%],Bricks[50,000] | ₹ 462,000.00 |

In the tracking Gantt chart, the starting data of the task is provided along with the task mode. Most of the task are auto scheduled whereas some task is manually scheduled. Floor 1-10, and Roof Top are the floors where work need to be planned by hand as shown in table 2.

Table 2: Tracking Gantt chart

| Task Mode | Activity | Duration | Start |
|---------------------------|-------------------------|-------------------|-------------------|
| Auto Scheduled | Start of Project | 2547 days? | Mon 1/2/23 |
| Auto Scheduled | Start the Project | 1 day? | Mon 1/2/23 |
| Manually Scheduled | Design | 20 days | Sat 1/7/23 |
| Auto Scheduled | Architecture Drawings | 20 days | Sat 1/7/23 |
| Auto Scheduled | Survey | 3 days | Mon 1/2/23 |
| Auto Scheduled | Site Surveying | 1 day | Mon 1/2/23 |

The resource sheet is generated which enables to manage and allocate the resources for the project. The resources include materials, equipment's, people. The resource sheet is shown in table 3.

Table 3: Resource sheet

| Resource Name | Type | Material Label | Initials | Group | Max. Units | Std. Rate | Ovt. Rate | Cost/Use | Accrue At |
|--------------------|----------|----------------|----------|-------|------------|-----------------|-----------|----------|-----------|
| Aggregate | Material | | A | Bags | | ₹ 20.00 | | ₹ 0.00 | Prorated |
| Sand | Material | | S | CuFt | | ₹ 30.00 | | ₹ 0.00 | Prorated |
| Cement | Material | | C | CuFt | | ₹ 300.00 | | ₹ 0.00 | Prorated |
| Bricks | Material | | BK | No. | | ₹ 6.00 | | ₹ 0.00 | Prorated |
| Steel | Material | | ST | KG | | ₹ 65.00 | | ₹ 0.00 | Prorated |
| Paint | Material | | P | Ltr. | | ₹ 250.00 | | ₹ 0.00 | Prorated |
| Tiles | Material | | TL | Sqft | | ₹ 150.00 | | ₹ 0.00 | Prorated |
| Paint Supliments | Material | | PS | KG | | ₹ 1,000.00 | | ₹ 0.00 | Prorated |
| Bitumin | Material | | BIT | | | ₹ 5,000.00 | | ₹ 0.00 | Prorated |
| TM Mixer Machine | Work | | T | | 700% | ₹ 25,000.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Concrete Mixer | Work | | CM | | 100% | ₹ 2,000.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Concrete Lifter | Work | | CL | | 100% | ₹ 1,500.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Excavator | Work | | E | | 100% | ₹ 1,000.00/hr | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Vibrator | Work | | V | | 300% | ₹ 500.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Mistry | Work | | M | | 1,000% | ₹ 450.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Labour Male | Work | | LM | | 3,000% | ₹ 300.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Labour Female | Work | | L | | 2,000% | ₹ 250.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Bar Bender | Work | | BB | | 600% | ₹ 300.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Bhisti (Kuli) | Work | | B | | 500% | ₹ 250.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Mason | Work | | MM | | 1,000% | ₹ 500.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Electrician | Work | | E | | 400% | ₹ 600.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Electrician Helper | Work | | EH | | 400% | ₹ 300.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Painter | Work | | PT | | 600% | ₹ 500.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Painter Helper | Work | | PH | | 600% | ₹ 300.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Carpainter | Work | | CP | | 400% | ₹ 400.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Carpainter Helper | Work | | CH | | 600% | ₹ 300.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Plumber | Work | | P | | 400% | ₹ 800.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Plumber Helper | Work | | PH | | 1,000% | ₹ 350.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Site Engineer | Work | | SE | | 200% | ₹ 1,000.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |

| | | | | | | | |
|--------------------|----------|-----|------|-----------------|-----------|--------|----------|
| Supervisor | Work | SUP | 100% | ₹ 700.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Drawing Engg | Work | DE | 200% | ₹ 1,500.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Lift Mechanical | Work | L | 200% | ₹ 30,000.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Wall Assembler | Work | WA | 800% | ₹ 20,000.00/day | ₹ 0.00/hr | ₹ 0.00 | Prorated |
| Solar Pannel | Material | SP | | ₹ 100,000.00 | | ₹ 0.00 | Prorated |
| Plumber Equipments | Material | PE | | ₹ 50,000.00 | | ₹ 0.00 | Prorated |
| Door | Material | D | | ₹ 7,000.00 | | ₹ 0.00 | Prorated |
| Window | Material | W | | ₹ 3,500.00 | | ₹ 0.00 | Prorated |

The cost overruns occur in the project management. The reason is when the project cost exceeds the estimated cost. The resource cost variance plot is generated as shown in figure 1. From the plot it is evident that maximum cost variance is obtained for TM mixer machine.

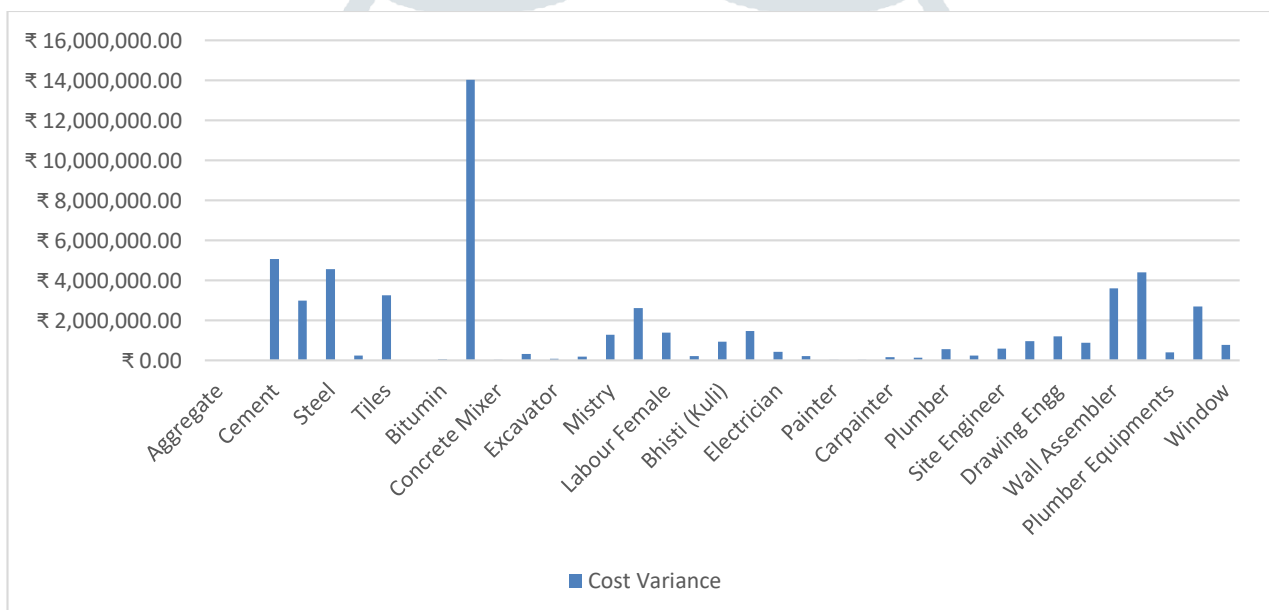


Figure 2: Resource cost variance

VI. CONCLUSION

Traditional planning methods don't break down large projects into smaller ones, which creates problems like overspending and poor resource allocation down the road. When problems arise as a result of sticking to antiquated methods of planning and management, Microsoft Project may help smooth things up. As a result, the project's operations may be better organised, giving the team a clearer picture of how to get the job done in the allotted time and within budget. Our solution makes use of Microsoft Project (MSP), the most widely utilised and effective construction management programme which is used today by all construction organisations.

- To ensure the project's success, many activities like planning, scheduling, resource allocations, levelling, tracking, etc. were carried out.
- When a construction project is well-managed, resources are used efficiently and wasted materials are kept to a minimum.
- Software results were compared to those acquired on-site, and the results showed that our technique was more accurate.
- The maximum cost is incurred by the TM mixer machine i.e. ₹ 14,050,000 and minimum cost is incurred by concrete mixer machine.
- The actual cost of work performed is Rs 27,162,425 and whereas the actual cost is Rs 56202804.59. Using the MSP, the cost savings of Rs29,040,379.59 is achieved due to proper planning, scheduling, resource allocations, levelling, tracking, etc
- From the MSP data it is can be concluded that the maximum work hours is required for male labour force i.e. 70000hrs.

REFERENCES

- [1] Rashmi J V, Amey A Kelkar, Vishwanath K G, Planning and scheduling of a multi-storeyed residential building with conventional execution approach as compared with application of project management techniques, International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395-0056 and p-ISSN: 2395-0072, July, 2017, pp. 2682-2685.
- [2] Abhishek Sharma and K.K. Pathak, Manpower Planning, Scheduling and Tracking of a Construction Project Using Microsoft Project Software, Journal of Today's Ideas – Tomorrow's Technologies, ISSN Print: 2321-3906 and ISSN Online: 2321-7146, December, 2015, pp. 161-169.

- [3] Chourajit K Sharma, Jay A Mistry, Ravi V Gohel, Vishal B Chauhan, Amit N Bhavsar, Study of MS Project Software and Its Application in Construction Project and Case Study at Anand, International Journal of Advance Research and Innovative Ideas in Education (IJARIE), ISSN(O): 2395-4396, 2016, pp. 2862-2870.
- [4] E. Suresh kumar and S. Krishnamoorthi, Scheduling and Financial Analysis of a High Rise Building, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), e-ISSN: 2278-1684, p-ISSN: 2320-334X, Nov. - Dec., 2015, pp. 01-06.
- [5] Raj Thakur and Harish Kumar Dwivedi, Planning and Scheduling of Residential Building Using Microsoft Project, International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES), e-ISSN: 2455-2585, February, 2019, pp. 368-373.
- [6] Dipti R. Shetye and Dr. S.S.Pimplikar, Cash Flow of High Rise Residential Building, International Journal of Engineering Research and General Science, ISSN 2091-2730, June-July, 2014, pp. 465-478.
- [7] E. Suresh Kumar and S. Krishnamoorthi (2015) In their study they focused on the scheduling using MSP and earns value analysis for an apartment building.
- [8] Hoang, Nhat Minh Shrestha, Swastik (2014) hinted that the main function of a software is to offer help, and enhance the quality of output with less effort than manual ways.
- [9] J. Jayalakshmi (2014), This study compared time performance of the conventional method of construction for high- rise residential and Industrial Building System (IBS) method by overall construction period.

