

# Integration of Cost And Work Breakdown Structures In The Management of Construction Projects Considering A Case Study of Commercial Structure In Indore

Shailendra Kumar Patel<sup>1</sup>, Hitesh Kodwani<sup>2</sup>

<sup>1</sup>Dept of Civil Engineering

<sup>2</sup>Assist. Professor, Dept of Civil Engineering

<sup>1, 2</sup> Sam Global University, Raisen-464551, Madhya Pradesh, India

**Abstract-** Effectively organising the progress is a crucial component of project management. Every task in the management industry begins with planning. Planning is the foundation for carrying out, overseeing, managing, and wrapping up a project. In order to manage the project, a work breakdown structure is used to hierarchically decompose the target objectives, activities, sub-activities, and work packages. A commercial building project in Indore, India, serves as the focus of this study, which investigates the integration of Work Breakdown Structure (WBS) and Cost Breakdown Structure (CBS) in construction project management. Project scope, scheduling, and cost control must all be in harmony for construction projects to be managed effectively and provide results on time and under budget. Coordination and risk management have been difficult since CBS and WBS have always been viewed as distinct frameworks.

*In summary, the study shows that using integrated breakdown structures in a strong project management tool greatly improves construction projects' accuracy, efficiency, and success. This information is helpful for researchers and practitioners in the field.*

**Keywords-** Planning, scheduling, Microsoft project, work breakdown structure.

## I. INTRODUCTION

In the infrastructure and real estate industries, construction projects are some of the most intricate and resource-intensive endeavours. Many stakeholders, a lot of interconnected tasks, strict deadlines, and large financial outlays are all common in these projects. Therefore, it is essential to manage construction projects effectively in order to guarantee that project goals—like on-time completion, budget compliance, and quality standards—are fulfilled.

The instruments and frameworks used to plan and manage tasks and expenses are essential to project management. A project's overall scope is broken down into manageable, hierarchical components using the Work Breakdown Structure (WBS), which makes planning, allocating resources, and tracking progress easier. In the meanwhile, the Cost Breakdown Structure (CBS) allows for thorough budgeting, forecasting, and financial control by methodically classifying project expenses.

Historically, WBS and CBS have been handled as distinct frameworks, which can cause project activities and related expenses to be out of sync. The ability of project managers to precisely monitor progress, predict overruns, and make well-informed decisions is frequently hampered by such fragmentation. As the construction industry develops, the significance of combining WBS and CBS to improve project control is becoming increasingly apparent.

Industry classification systems like OmniClass and UniClass, as well as international standards like ISO 12006-2, are in line with the integration of these breakdown structures. Additionally, Microsoft Project and other project management software innovations offer useful platforms for successfully implementing such integration. With Microsoft Project, project managers can create intricate hierarchical task structures, allocate expenses to work packages directly, and produce thorough reports for in-the-moment schedule and budget performance tracking.

## OBJECTIVES OF THE RESEARCH

The objectives of this study are:

- To identify construction sequence for a commercial construction considering a case study.

- To work out the practical durations required to carry out the activities.
- To identify scheduling technique used by the organization on developing plan and scheduling.
- To explore the theoretical and practical foundations of integrating Cost Breakdown Structure and Work Breakdown Structure in construction project management.
- To develop and implement an integrated CBS-WBS framework using Microsoft Project for a commercial building project in Indore.
- To evaluate the impact of this integration on project performance metrics including schedule adherence, cost control, and resource optimization.
- To track the project and analyses the reasons for delays, and increase in estimated budget etc.
- To investigate defects in the planning and scheduling procedure of the organization and suggest suitable improvements in their method.

## II. LITERATURE REVIEW

**Aigul Zhasmukhambetova et.al (2025)** reviewed risk assessment and scheduling methods in highway construction in detail, highlighting the difficulties that uncertainty presents in project planning and decision-making. Alongside conventional scheduling tools like the Critical Path Method and Program Evaluation and Review Technique, it critically assesses well-known risk assessment techniques like Probability–Impact analysis, Monte Carlo Simulation, Fuzzy Set Theory, and the Analytical Hierarchy Process. Even if traditional methods are still widely used, they clearly fall short when it comes to handling dynamic project uncertainties, which emphasises the importance of sophisticated and hybrid approaches. Although methods like MCS, FST, and AHP improve decision-making, they must be appropriately adjusted. In contrast, Bayesian networks show great promise because of their capacity to combine quantitative and qualitative data, which increases schedule dependability and cost effectiveness in the face of uncertainty. In order to move towards more reliable and flexible procedures for industry application, the evaluation ends with suggestions for creating clever, risk-based scheduling frameworks.

**Krit Sahni (2025)** An examination of Larsen & Toubro's (L&T) project management procedures offers important insights into how the business effectively completes major infrastructure projects in the intricate and ever-changing Indian environment. By balancing localised execution models that are adapted to labour constraints, legal issues, cultural settings, and environmental uncertainties with global project management frameworks like PMBOK, PRINCE2, and EVM,

L&T accomplishes this. Utilising Primavera, SAP ERP, and BIM to improve real-time monitoring, cost estimating, and project predictability, the study highlights the company's capabilities in digital adoption, risk management, cost control, and rigorous planning. Additionally, by strategically coordinating global standards with regional practices and prioritising sustainability, safety, and stakeholder participation, L&T establishes itself as a leader in morally sound, effective, and technologically advanced project management.

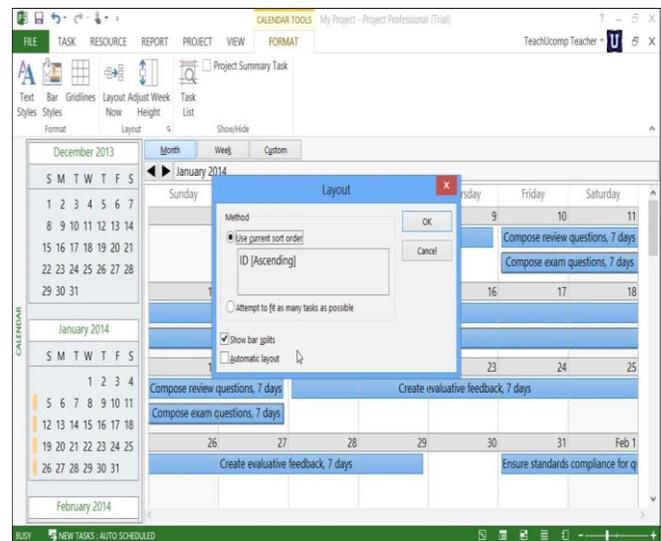
## III. METHODOLOGY

The major steps involved in our work using Microsoft project software are

### Step 1- Assigning Project Calendar

The calendar is the main tool used to manage when each job and resource can be scheduled for use in a project. Tasks are automatically scheduled using the project calendar. The project generates unique resource calendars for every resource you submit, taking into account the parameters in the provided standard calendar. A work schedule is established that outlines the working days and hours of each week.

Calendar used- 24 Hrs Calendar



**Fig Applying Project Calendar**

Assigning Calendar Time of work: -10:00-14:00  
15:00-18:00 (Lunch Break: - 14:00-15:00)  
Non-working Days – On every Sunday

### Step 2- Selection of Task Mode

One fundamental factor that dictates how tasks are scheduled and managed during the course of a project is the choice of Task Mode in Microsoft Project. There are two main task modes available in Microsoft Project: manually scheduled and automatically scheduled. The project manager has complete control over the start date, end date, and duration of each work while using the Manually Scheduled method. When there may be a lack of information and flexibility is needed, this method is very helpful in the early or proposal stages of a project. The Auto Scheduled option, on the other hand, uses Microsoft Project's scheduling engine to automatically calculate task dates and durations based on project calendars, task linkages, resource availability, and limitations. As project complexity grows, this automated method minimises the chance of discrepancies, expedites scheduling, and decreases manual data entry. In order to accommodate different project management approaches and evolving requirements, users can define a preferred default mode for all new projects or specify the task mode for particular tasks or entire projects. A key choice for efficient project scheduling and control in the software environment is the task mode chosen, which has a direct impact on the project manager's degree of control, accuracy, and flexibility.

to reflect project phases and encourages a logical, hierarchical arrangement of work packages. The project's scope is established by this fundamental task, which also forms the basis for scheduling optimisation, progress tracking, and resource allocation over the course of the project.

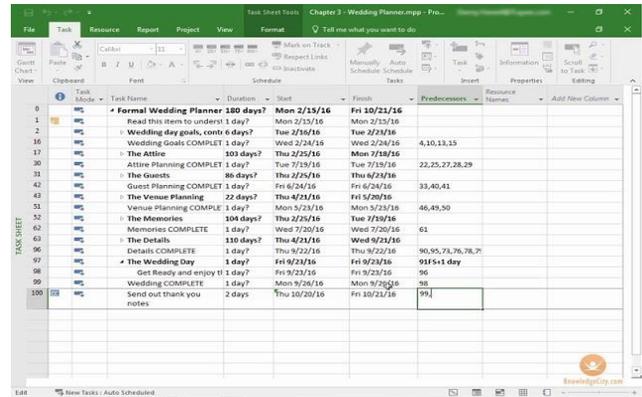


Fig Applying Task

Step 4- Critical Path

The order of tasks in Microsoft Project that establishes the project's minimal completion time is known as the Critical Path. Since the tasks in this path have no slack or float, any delays in completing these crucial tasks will inevitably result in an extension of the project's total duration. Critical path analysis is made easier with MS Project, which automatically calculates it and shows it visibly on Gantt charts and network diagrams, usually in red. Utilising forward and backward pass methods, the software determines the earliest and latest potential start and finish dates for each work based on input characteristics such task durations, dependencies, and limitations. Project managers can ensure efficient use of resources and on-time project delivery by determining the critical path, which provides insight into the tasks that need careful monitoring and prioritisation. In the MS Project environment, critical route analysis is a crucial component of risk reduction and project schedule management because of this capability.

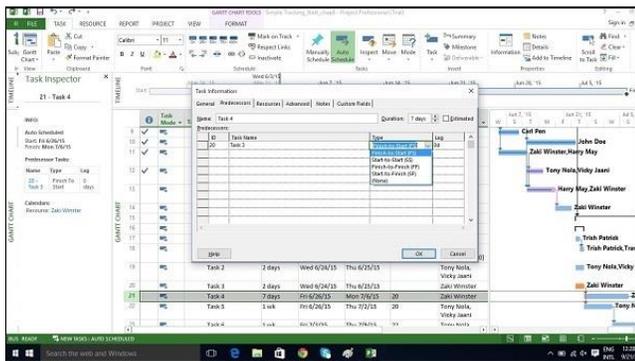


Fig Selection of Task as per mode

Step 3- Entering the Task

A crucial first step in creating an extensive project plan is entering tasks in Microsoft Project. Tasks are entered consecutively into the entry table or Gantt chart view after the fundamental project information has been configured. Task titles are brief yet descriptive to improve clarity and make tracking easier in the future. Typing each task into a new row and assigning suitable durations and, if needed, dependencies or precedence relationships with other tasks are the usual steps in the process. Instead of manually defining start and stop dates for each task in this situation, it is best to let MS Project's scheduling engine determine these values based on the project's overall timetable and task interdependencies. In addition, task structuring can be improved by using indentation to create summary tasks and subtasks, which helps

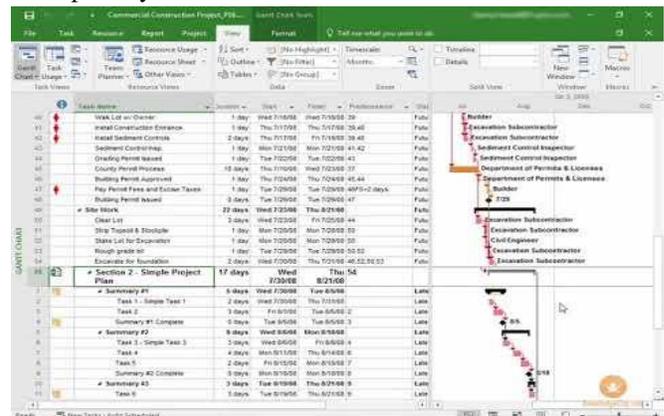
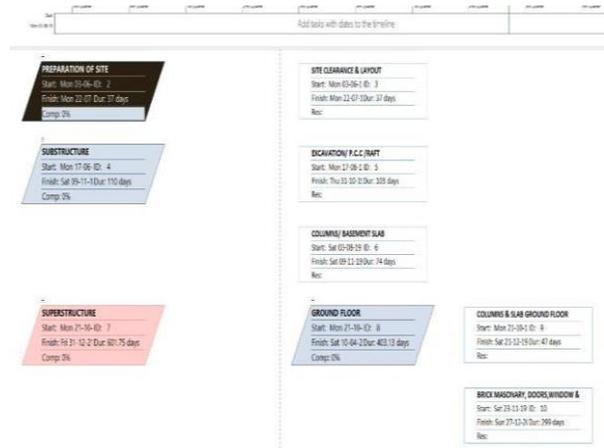


Fig Critical Path

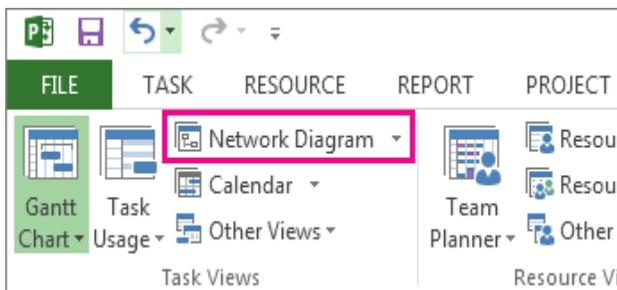
**Step 5- Network Diagram**

A network diagram is a visual depiction of the project's tasks in Microsoft Project that shows their logical dependencies and sequencing. By showing tasks as nodes or boxes connected by arrows that indicate the precedence relationships between them, this diagrammatic tool helps users understand the sequence and flow of actions needed to finish the project. In order to help project managers identify important paths, possible bottlenecks, and the overall project workflow, the network diagram helps to highlight job interdependencies. Every node in Microsoft Project represents a distinct task, and arrows show dependencies like finish-to-start, start-to-start, finish-to-finish, or start-to-finish. This technique is called the Precedence Diagramming Method (PDM), or activity-on-node. Detailed schedule analysis is made easier by this visualisation, which also helps stakeholders understand the project structure. In the MS Project environment, the network diagram improves project planning, monitoring, and control procedures by converting complicated task data into an understandable, connected map.

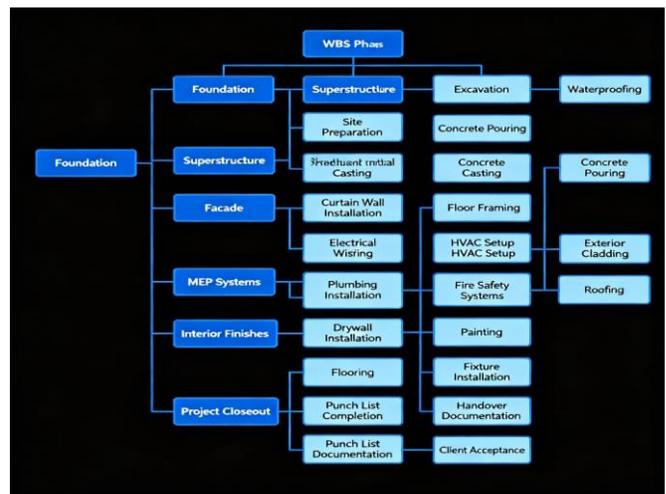
expectations is ensured by this organised approach, which also improves project communication and the capacity to monitor and manage complicated projects methodically.



**Fig Network Diagram with WBS Structure**



**Fig Network Diagram**



**Fig WPS Structure**

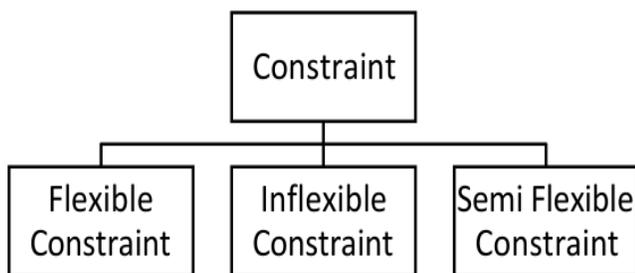
**Step 6- Work Breakdown Structure**

A hierarchical breakdown of the whole scope of work that the project team must do in order to achieve the project's goals and produce its deliverables is known as the Work Breakdown Structure (WBS) in Microsoft Project. It divides the entire work into ever smaller and more specific components, called summary tasks and subtasks, which facilitates the organisation of the project into manageable parts. Summary tasks serve as containers for related subtasks, combining their resources, expenses, and duration; subtasks, on the other hand, are the discrete, implementable work packages required to finish a project. The WBS offers a structured framework that graphically depicts task relationships, facilitating effective resource allocation, progress tracking, and risk management. This makes it easier to plan and manage projects. With the top-level summary task serving as a representation of the entire project, the WBS is produced in MS Project by indenting tasks to establish a hierarchy. Alignment with project goals and stakeholder

**Step 7- Constraints and Recurring Tasks**

Constraints are scheduling limitations that are applied to activities in Microsoft Project that specify or restrict the start or finish dates according to certain project requirements or outside variables. The project schedule is controlled and influenced by these limitations, which take precedence over the task scheduling that is automatically generated from dependencies and duration calculations. There are eight different kinds of constraints in Microsoft Project that can be classified as flexible, semi-flexible, or inflexible. These include "As Soon As Possible" (both the default and flexible option), "As Late As Possible," "Start No Earlier Than," "Start No Later Than," "Finish No Earlier Than," "Finish No Later Than," "Must Start On," and "Must Finish On." These constraint types allow project managers to balance schedule logic and flexibility while reflecting real-world conditions like

resource availability, contractual deadlines, or milestone requirements within the schedule. While the schedule engine cannot alter hard constraints, which impose set dates, soft constraints permit some flexibility based on task linkages and float. On the other side, recurring tasks are those that happen repeatedly over the course of the project, like weekly status meetings or recurring inspections. By defining the recurrence pattern, length, and frequency, Microsoft Project enables the development of repeating tasks that streamline repetitive job management and integrate it into the overall project plan without manual duplication. Recurring activities and limitations are both necessary components for developing accurate, reasonable, and realistic project schedules in Microsoft Project.

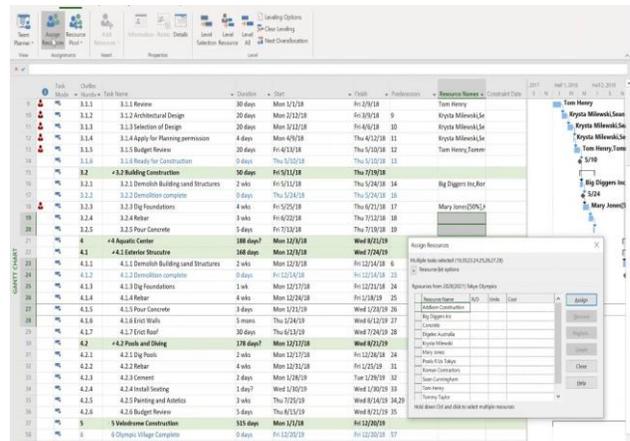


Deadline – In the event that you fail to finish a task by the due date, setting a deadline date for your project gives you a visual reminder. A task that repeats at specific intervals is called a recurring task. The user has the option to set a repeating activity that either terminates on a given date or repeats for a predetermined number of times. Frequently occurring tasks are a common feature of projects.

**Step 8- Designing and Assigning Resources**

The process of designing and allocating resources in Microsoft Project is essential to guaranteeing the effective use of people, tools, and material resources for a project's successful completion. The first step entails defining resources in the Resource Sheet, which includes information on resource names, types (material, work, or cost), availability, maximum units, and related costs. Realistic capacity limits, work schedules, and cost rates that take into account the true capabilities and limitations of resources are all part of proper resource design. Resources are allocated to certain tasks within the project schedule after they have been determined, creating a clear division of labour and accountability. By connecting resources to tasks, Microsoft Project makes this assignment easier and enables dynamic modification of task duration, effort, and resource allocation according to project requirements. For resource assignment to be effective, it is also necessary to keep an eye out for overallocations, which occur when resource demand outpaces supply, and to use

levelling strategies to settle disputes and balance workloads without sacrificing project deadlines. Project success in complicated situations is greatly aided by this methodical approach to resource management, which promotes efficient scheduling, cost control, and team efficiency.



**Fig Assigning Resources**

**Step 9- Resource Analysis and Allocation**

In order to maximise project execution and guarantee balanced utilisation, resource analysis and allocation in Microsoft Project include crucial procedures that weigh the demand for resources against their availability. Evaluating the amount, kind, and accessibility of resources needed to complete particular project activities, determining whether resources are underutilised or overlocated, and spotting discrepancies between resource supply and project demands are all part of resource analysis. In order to help project managers visualise and predict resource constraints and bottlenecks, Microsoft Project integrates resource capacity profiles and demand profiles. The term "allocation" describes the methodical distribution of available resources among tasks in a way that ensures workloads are balanced to avoid overloads and inefficiencies while still respecting the project timetable. MS Project's resource levelling and optimisation features allow for changes to work schedules or resource assignments, which help to resolve conflicts and boost productivity. This methodical approach to resource management closely matches resource capabilities with project requirements throughout the project lifetime, which greatly aids in realistic project scheduling, cost control, and risk avoidance.

0	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Div. Rate	Cost/Use	Accrued At	Base Calendar	Code
1	G.C. General Management	Work		G		100%	\$80.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
2	G.C. Project Management	Work		G		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
3	Steel Erection Contractor Management	Work		S		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
4	Roofing Contractor Management	Work		R		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
5	Elevator Contractor Management	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
6	Plumbing Contractor Management	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
7	Electric Contractor Management	Work		E		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
8	HVAC Contractor Management	Work		H		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
9	Electric Contractor	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
10	Plumbing Contractor	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
11	G.C. Survey Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
12	Site Grading Contractor	Work		S		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
13	G.C. Rough Carpenter Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
14	G.C. Concrete Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
15	G.C. Labor Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
16	Elevator Contractor	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
17	G.C. Finish Carpenter Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
18	HVAC Contractor	Work		H		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
19	Drywall Contractor	Work		D		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
20	Painting Contractor	Work		P		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
21	Carpet Contractor	Work		C		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
22	Landscape Contractor	Work		L		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
23	Tile Contractor	Work		T		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
24	G.C. Superintendent	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
25	G.C. Scheduler	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
26	G.C. Procurement	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
27	Steel Erection Contractor	Work		S		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
28	Paving Contractor	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
29	G.C. Accounting	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
30	Concrete	Material	ton	C			\$30.00		\$0.00	Prorated		
31	Painting Material	Material	Liter	P			\$15.00		\$0.00	Prorated		

Fig Resource Sheet

Step 10- Resource Leveling

Resource levelling is a scheduling approach in Microsoft Project that balances resource demand and supply by modifying task start and finish dates. This helps to address resource overallocation. To avoid resource conflicts, the levelling process divides or delays jobs when resources are over-allocated, which means they are given more work than they can handle, without altering the resource assignments. By distributing workloads evenly throughout the project timeline, this automatic or manual adjustment helps prevent bottlenecks and undue resource strain that could endanger project delivery. In order to minimise project duration extension while keeping realistic job assignments, the levelling method takes into account variables including task dependencies, priority, slack time, and limitations. While levelling might enhance the use of resources, it can also cause some activities to be delayed and, if there is not enough slack, may prolong the project's completion date. Project managers, therefore frequently employ a mix of resource levelling solutions, such as regulating the order of levelling and deciding between human and automatic levelling, to maximise project schedules and guarantee viable resource engagements throughout the project lifespan.

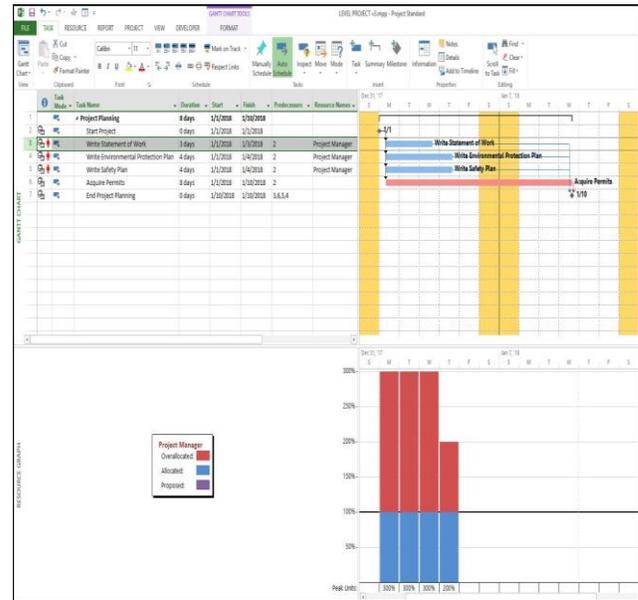


Fig Resource Leveling

Step 11- Tracking of Project

In order to make sure that project goals are fulfilled within the specified scope, time, and budget limits, tracking a project in Microsoft Project entails methodically keeping an eye on and overseeing the progress of planned tasks against the baseline plan. Project managers can compare projected progress with real-time data by using MS Project's powerful features to record and update actual start and finish dates, percentage completion, actual work hours, and costs for specific tasks. Through early detection of deviations, delays, or resource bottlenecks, this methodology makes it possible to take prompt corrective action. Features that improve project tracking include variance analysis, which shows discrepancies between planned and actual values, and baseline setting, which maintains the original timetable for performance evaluation. Furthermore, stakeholders may easily visualise the state of a project with the help of graphical representations such as dashboards, progress lines, and Gantt charts. Task progress, resource consumption, and expense monitoring are all integrated into Microsoft Project to provide thorough oversight and management. This improves decision-making, increases transparency, and raises the possibility that a project will be completed successfully.

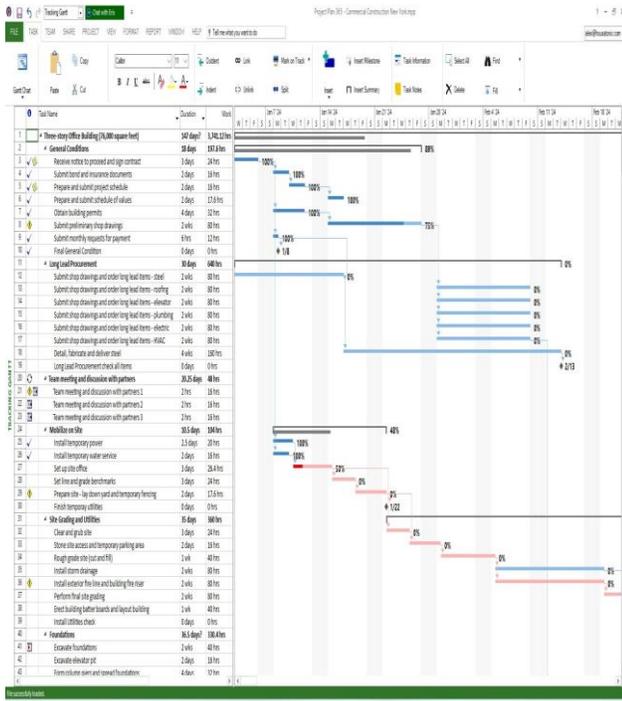


Fig Tracking Project

IV. CASE STUDY



Fig Current condition of Site

The G+6 commercial structure is situated in Nipania, Indore. The site is situated in the main road developed by Shree Kapishwar Builders & Developers. The total area of construction, recorded as 15,050 square feet, and the total saleable area, documented as 21,500 square feet, highlights the distinction between the constructed and marketable built-up space. The total construction cost is enumerated at Rs 10,00,00,000, which provides an overall financial scope for the completion of the project. In addition, the table specifies that the construction comprises six floors, reflecting the vertical scale of the development. The rate per square foot is cited as Rs 5000, offering a unit cost metric for comparative analysis against standard market rates and for facilitating cost

estimation in future planning. This structured tabulation enables a rapid assessment of project magnitude, economic expenditure, and pricing, supporting both technical and financial decision-making processes in construction management contexts.

V. RESULTS AND DISCUSSION

Table Data Collection

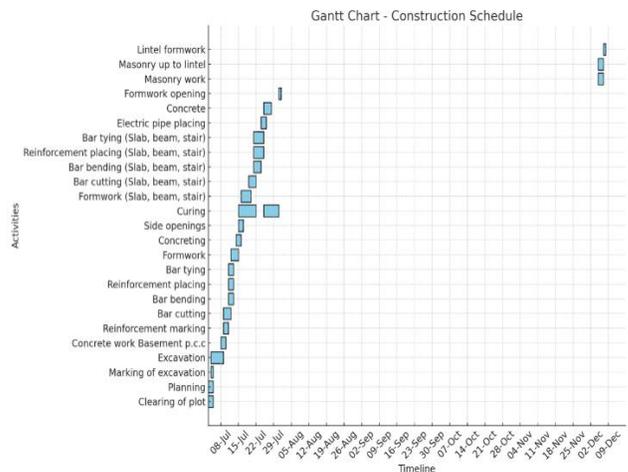
Activity name	Start date	End date
Clearing of plot	3/7/2025	4/7/2025
planning	3/7/2025	4/7/2025
Marking of excavation	4/7/2025	4/7/2025
Excavation	4/7/2025	8/7/2025
Concrete work		
Basement		
p.c.c	8/7/2025	9/7/2025
Footing, column and lift padi	9/7/2025	21/7/2025
Slab, beam, starter and stair	16/7/2025	31/7/2025
Ground floor		
column and lift padi	25/7/2025	4/8/2025
Slab, beam, starter and stair	1/8/2025	15/8/2025
1st floor		
column and lift padi	8/8/2025	20/8/2025
Slab, beam, starter and stair	15/8/2025	29/8/2025
2nd floor		
column and lift padi	23/8/2025	3/9/2025
Slab, beam, starter and stair	29/8/2025	13/9/2025
3rd floor		
column and lift padi	6/9/2025	19/9/2025
Slab, beam, starter and stair	13/9/2025	27/9/2025
4th floor		
column and lift padi	22/9/2025	3/10/2025
Masonry work		

Ground floor	5/12/2025	17/12/2025
1st floor	12/12/2025	27/12/2025
2nd floor	22/12/2025	7/1/2026
3rd floor	2/1/2026	18/1/2026
4th floor	12/1/2026	31/1/2026
5th floor	26/1/2026	12/2/2026
6th floor	6/2/2026	22/2/2026
7th floor	17/2/2026	6/3/2026

Formwork opening	31/7/2025	31/7/2025
Masonry work		
Ground floor		
Masonry up to lintel	5/12/2025	6/12/2025
Lintel formwork	7/12/2025	7/12/2025
Lintel bar cutting, bending and placing	8/12/2025	8/12/2025

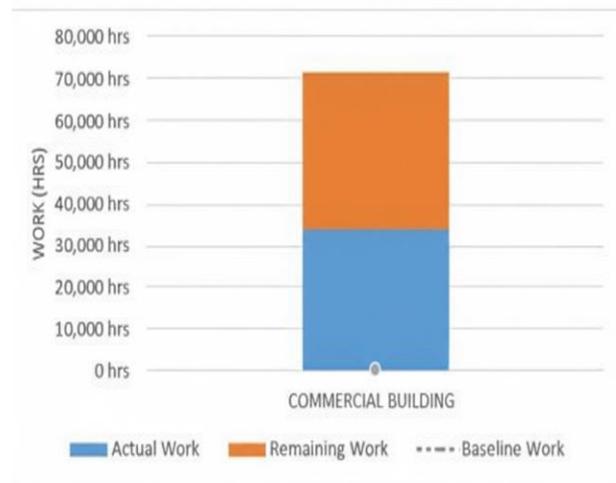
**Table Data Analysis**

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Concrete work		
Basement		
p.c.c	8/7/2025	9/7/2025
Footing, column and lift padi		
Reinforcement marking	9/7/2025	10/7/2025
Bar cutting	9/7/2025	11/7/2025
Bar bending	11/7/2025	12/7/2025
Reinforcement placing	11/7/2025	12/7/2025
Bar tying	11/7/2025	12/7/2025
Formwork	12/7/2025	14/7/2025
Concreting	14/7/2025	15/7/2025
Side openings	15/7/2025	16/7/2025
Curing	15/7/2025	21/7/2025
Slab, beam, starter and stair		
Formwork	16/7/2025	19/7/2025
Bar cutting	19/7/2025	21/7/2025
Bar bending	21/7/2025	23/7/2025
Reinforcement placing	21/7/2025	24/7/2025
Bar tying	21/7/2025	24/7/2025
Electric pipe and ceiling point placing	24/7/2025	25/7/2025
Concrete	25/7/2025	27/7/2025
Curing	25/7/2025	30/7/2025



**Fig Gantt Chart**

**WORK OVERVIEW**



**RESOURCE ALLOCATION AND COST CALCULATION**

i	Resource Name	Type	Initials	Std. Rate	Work	Cost
1	J.C.B	Work	J	₹500.00/hr	16 hrs	₹4,800.00
2	Excavator	Work	E	₹500.00/hr	48 hrs	₹26,000.00
3	Dumpers	Work	D	₹200.00/hr	250 hrs	₹26,000.00
4	Compactor	Cost	C			₹0.00
5	Bar cutter	Cost	B			₹0.00
6	Bar bending machine	Cost	B			₹0.00
7	Mixer	Cost	M			₹0.00
8	Silo	Cost	S			₹0.00
9	Concrete pump	Cost	C			₹0.00
10	Material lift	Cost	M			₹0.00
11	Vibrator	Cost	V			₹0.00
12	Breaker	Cost	B			₹0.00
13	Cutter	Cost	C			₹0.00
14	Core cutting machin	Work	C	₹200.00/hr	112 hrs	₹25,600.00
15	Drill machine	Cost	D			₹0.00
14	Reinforcement labour	Work	R	₹800.00/day	4,260 hrs	₹424,000.00
17	Formwork labour	Work	F	₹600.00/day	1,864 hrs	₹138,800.00
18	Karigar	Work	K	₹800.00/day	384 hrs	₹38,300.00
19	Bar bending and tying karigar	Work	B	₹800.00/day	2,180 hrs	₹218,000.00
20	Formwork placer	Work	F	₹600.00/day	1,860 hrs	₹132,800.00
21	Male labour	Work	M	₹300.00/day	2,150 hrs	₹80,250.00
22	Mason	Work	M	₹800.00/day	12,224 hrs	₹1,229,400.00
24	Mason labour	Work	M	₹300.00/day	16,788 hrs	₹627,050.00
25	Plumber	Work	P	₹1,200.00/day	3,072 hrs	₹259,500.00
26	Painter	Work	P	₹600.00/day	2,864 hrs	₹271,800.00
27	Aluminium worker	Work	A	₹1,200.00/day	288 hrs	₹42,000.00

Fig Calculation of resource allocation and cost analysis

OVERVIEW OF RESOURCES

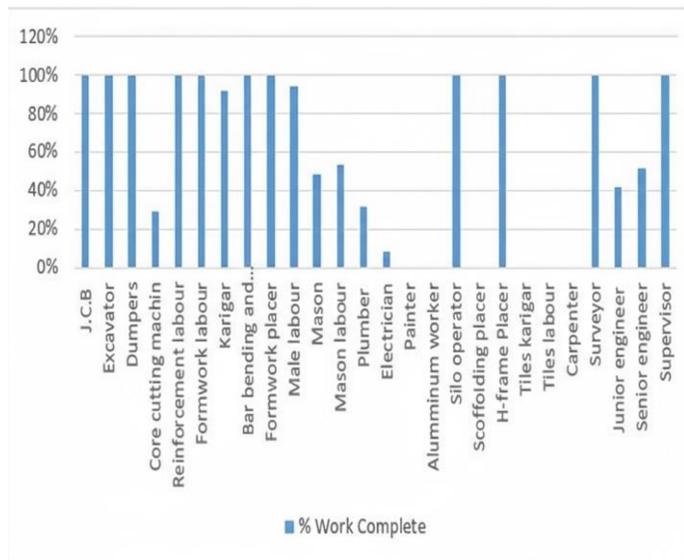


Fig Work completion bar graph

VI. CONCLUSION

- The timeline on the horizontal axis spans from early July to early December, indicating overlapping activities, the sequencing of tasks, and identifiable periods of project inactivity or dependency gaps. This comprehensive scheduling approach is essential for effective project tracking and resource management, facilitating systematic execution and monitoring of construction milestones.

VII. FUTURE SCOPE

- In light of the research findings, the following recommendations were made to improve the influence of Project on project scheduling performance. There should be continuous training and evaluation of project in private and public firms. This would ensure that the project

schedule has adequate technical skills require for their activities and effective of project. Project should also improve on their communication skills for adequate and effectiveness communication. Improve on inspections of project.

- There is more difference between budget cost and actual cost 2.The cost difference is due to the huge increase in the material's price and the labour's wages.
- The time lag in construction activity due to the natural disturbances.

## REFERENCES

- [1] Alberto Cerezo-Narváez, Andrés Pastor-Fernández, Manuel Otero-Mateo and Pablo Ballesteros-Pérez, [Integration of Cost and Work Breakdown Structures in the Management of Construction Projects], *Appl. Sci.* 2020, 10, 1386; doi:10.3390/app10041386.
- [2] Shreyash Anil Dhere, Shrihari Kishore Bhuskade, Prajwal Narendra Khandekar, Nishant Sham Rokade, Vinayak Dattaray Talkokulwar, Kartik Ramesh Shingne and Dr. Jayant Raut, [PROJECT PLANNING AND MANAGEMENT OF STRUCTURE USING PRIMAVERA P6 SOFTWARE], *International Research Journal of Modernization in Engineering Technology and Science*, Volume:03/Issue:06/June-2021, ISSN:2582-5208.
- [3] Paras Vairagade, LoveleshKhatarkar, Pakshal Shah, Shashank Shetye and Viren Chandanshive, [Development of Work Breakdown Structure for Residential Building Construction Project- A Case Study], *International Journal of Engineering Research & Technology (IJERT)*, ISSN: 2278-0181, 2021, Volume 9, Issue 3.
- [4] Samrudhi Kashid and Sandeep. S. Chavan, [Critical analysis On Cost Management of Commercial Buildings by Using Primavera Software], *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Volume 10 Issue VII July 2022, ISSN: 2321-9653.
- [5] Pravin Namdev Pharne, Nagesh Rajshekhar Wagdare, Nilesh Pratap Limbone and Jivan Dinkar Gaikwad, [Project Management Using Primavera P6], *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Volume 10 Issue V May 2022, SSN: 2321-9653.
- [6] Aigul Zhasmukhambetova, Harry Evdorides and RichardJ.Davies, [Integrating Risk Assessment and Scheduling in Highway Construction: A Systematic Review of Techniques, Challenges, and Hybrid Methodologies], *Future Transp.* 2025, 5, 85, <https://doi.org/10.3390/futuretransp5030085>.
- [7] Shreeraksha M R, Disha P G, Ashutosh Pasodi, Deepak B and Dr. Ananda V R, [Primavera Based - Approach To Project Management And Financial Integration In Residential Building], *International Journal of Creative Research Thoughts (IJCRT)*, Volume 12, Issue 12 December 2024 | ISSN: 2320-2882.
- [8] V Thirumalai, M Kothanda Ramjee, Senthilpandian M and Karthikeyan K, [Earned Value Management of villa construction project using Primavera P6], *International Research Journal of Engineering and Technology (IRJET)*, Volume: 08 Issue: 06 | June 2021, ISSN: 2395-0072.
- [9] Nur Hazimi Mahbob, Hanah Zakariah, Nur Khairul Faizah Mustafa, Naimah Yusof and Mohd Ashraf Mohd Fateh, [APPLYING GIS AND PRIMAVERA P6 FOR MONITORING CONSTRUCTION PROJECTS IN MALAYSIA], *International Journal of Infrastructure Research and Management Vol. 13 (S)*, March 2025, pp. 69 – 80.
- [10] S.A. Rao, S.B. Patel, P.N. Jain and V.M. Patel, [Effective Scheduling and Time Management of Dhamra Railway Project Using Primavera P6], *ASPS Conference Proceedings 1: 1165-1173 (2022)*.
- [11] Sumaia E. Eshim and Mohamed G. Elferjany, [Using Critical Path Method for Project Planning and Scheduling with Primavera P6], *American Journal of Engineering Research (AJER)*, Volume-13, Issue-10, pp-104-110, ISSN : 2320-0936, 2024.
- [12] Meet Pandya and S. S. Pimplikar, [APPLICATION OF COST ESTIMATION METHOD FROM WORK BREAKDOWN STRUCTURE], *Journal of Emerging Technologies and Innovative Research (JETIR)*, July 2020, Volume 7, Issue 7, ISSN-2349-5162.
- [13] Manjunatha, Vijay Kumar Rayabharapu, Abhay M, and Tharun Gangadhar B, [Project Management Analysis for a Multi-storey building using Analytical data and Primavera - A Comparison], *Journal of Physics: Conference Series 2779 (2024) 012053*, doi:10.1088/1742-6596/2779/1/012053.
- [14] Rahul Dumbre, Sumit Thakur and Swati Kshirsagar, [Performance Measurement of Cost and Schedule Analysis by using Earned Value Management for a Commercial Building in Primavera-P6], *International Journal of Advance Research, Ideas and Innovations in Technology*, (Volume 7, Issue 3 - V7I3-1869, ISSN: 2454-132X, 2021.
- [15] Krit Sahni, [PROJECT MANAGEMENT PRACTICES IN LARGE-SCALE INFRASTRUCTURE PROJECTS AT L&T], *INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)*, ISSN: 2583-1062, Vol. 05, Issue 05, May 2025, pp : 935-939.

- [16] Veerabhadragouda P Patil, Sushma R K, Bikesh Bhattarai, Mukesh Kumar, Chandra Bhusan Mahato and Md Imran Ansari, [Planning and Scheduling of College Building by using Primavera P6], International Journal of Engineering Research & Technology (IJERT), Volume 10, Issue 10, 2022, ISSN: 2278-0181.
- [17] Rajat and Masoom Reza, [Time and Cost Control using Primavera P6 in Construction of Buildings], International Journal of Engineering Research & Technology (IJERT), Vol. 8 Issue 11, November-2019, ISSN: 2278-0181.
- [18] Sd.Waleed Muhammad, Ch.Shravan Kumar, G.Gemini Kumar, D.Praveen Kumar, M.Thrinadh and U.Anjaneyulu, [STUDY ON CRITICAL PATH METHOD OF ANALYSIS & SCHEDULING FOR RESIDENTIAL BUILDING BY USING PRIMAVERA SOFTWARE], International Journal of Research in Engineering, IT and Social Sciences, ISSN 2250 0588, Impact Factor: 6.565, Volume 14 Issue 06, June 2024, Page 105-113.