ISSN 2277-2685
IJESR/April-June. 2026/ Vol-16/Issue-2/607-614
Mr. Mifzaal Mudassar *et. al.*, / International Journal of Engineering & Science Research
*Full Length Article*

# Planning, Scheduling And Resource Allocation Of A Small Commercial Building In Primavera P6

**Mr. Shyam Kumar[1] , Mr. Mohammed Jalaluddin[2], Mr. Mifzaal Mudassar [3], Mr. Mohammed Abdul Kabeer [4], Mr. Mohammed Abdullah Ather[5], Mr. Syed Faizaan Ahmed [6]**
[*1,2] Assistant Professor, Dept. Of Civil, Lords Institute Of Engineering And Technology
[*3, 4, 5, 6] B.E Student Dept. Of Civil, Lords Institute Of Engineering And Technology
***Accepted 21-04-2026***


***Abstract** :*
*Construction project management is one of the most critical disciplines in the civil engineering domain. The successful execution of a construction project depends largely on how effectively it is planned, scheduled, and monitored against defined objectives of time, cost, and quality. In developing economies like India, the construction sector contributes substantially to Gross Domestic Product (GDP) and is one of the largest employers of skilled and unskilled labour. Despite its scale, the industry continues to suffer from chronic delays, cost overruns, and poor resource utilisation problems that are largely attributable to inadequate planning tools and methods. This project presents a comprehensive study of planning, scheduling, and resource allocation for a small commercial building (Project ID: CM-4) using Oracle Primavera P6, one of the most powerful and widely used project management software solutions available in the construction industry today. The project spans from 02 April 2026 to 27 July 2027 and encompasses eighteen distinct Work Breakdown Structure (WBS) elements, covering the full construction lifecycle from General Conditions through Final Inspections. The study involves the development of a detailed project schedule within Primavera P6, including the creation of the Enterprise Project Structure (EPS), Organisational Breakdown Structure (OBS), Work Breakdown Structure (WBS), and a complete activity network with 176 logical predecessor-successor relationships across 126 activities. Resources including labour crews, specialist sub-contractors, and equipment have been assigned to activities based on project requirements. The critical path has been identified (36 activities with -7 days total float), a baseline schedule established, and all standard Primavera P6 reports generated.Results demonstrate that the use of Primavera P6 significantly improves project visibility, enables accurate forecasting of project duration and cost, and supports proactive identification of scheduling conflicts and resource overloads. The study concludes that the adoption of structured scheduling tools such as Primavera P6 is essential for the timely and cost-effective delivery of commercial building projects.*
***Keywords:** Primavera P6, Project Scheduling, Resource Allocation, Critical Path Method, Work Breakdown Structure, Commercial Building, Construction Management.*

## 1. Introduction

The construction industry is one of the oldest and most vital sectors of the global economy. It encompasses a wide range of activities from site preparation and structural erection to mechanical, electrical, and plumbing installations each involving numerous interdependent tasks, resources, and stakeholders. Managing this complexity effectively requires systematic planning, detailed scheduling, and disciplined resource management.

Historically, construction projects were planned using simple bar charts (Gantt charts) or manually drawn network diagrams. While these tools provided a basic visual representation of project activities, they were inadequate for managing the complexity of modern construction projects, particularly those involving multiple contractors, tight deadlines, and limited budgets. The limitations of manual planning methods led to widespread adoption of computer-based project management software during the latter half of the twentieth century.

In the present scenario, Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM) has emerged as the industry standard for construction project planning and control. Primavera P6 supports the entire project lifecycle from initial planning and scheduling through execution, monitoring, and closeout and is used by contractors, owners, consultants, and government agencies worldwide. Its ability to handle thousands of activities, multiple resources, and complex logical relationships makes it indispensable for large and medium-scale construction projects.

The present study applies Primavera P6 to a small commercial building project (CM-4) to demonstrate how structured scheduling and resource allocation can be achieved systematically using professional software. The study is relevant both academically as a demonstration of theoretical project management

principles and practically, as it produces an actual schedule that can be used for real project control.

**1.2 Problem Statement**

The construction industry in India and across the developing world faces a persistent crisis of project delays and cost overruns. According to various industry surveys, more than 70% of construction projects are completed behind schedule, and a significant proportion exceed their original budgets. The root causes of these failures are well documented: poor initial planning, lack of detailed activity scheduling, absence of a systematic resource allocation framework, and failure to identify and manage the critical path of the project.

Small commercial building projects, despite their relatively modest scale, are particularly vulnerable to these failures. Project owners, typically private developers or small businesses often rely on informal planning methods, verbal instructions, and experience-based estimates rather than structured scheduling tools. The result is poor coordination between contractors and sub-contractors, resource conflicts, idle time, rework, and ultimately, delayed handover.

The specific problem addressed in this project is the need to develop a complete, data-driven project schedule for a small commercial building using Primavera P6, incorporating all major work packages from initial mobilisation through final inspections, with clearly defined activity durations, logical relationships, resource assignments, and a baseline against which actual progress can be measured.

**1.3 Objectives of the Project**

The primary objectives of this project are as follows:

- To develop a comprehensive Work Breakdown Structure (WBS) for the commercial building project covering all eighteen major work packages.
- To define, sequence, and schedule all 126 construction activities within Primavera P6, with appropriate durations and logical predecessor-successor relationships.
- To identify the Critical Path of the project and determine the Total Float available for non-critical activities.
- To allocate resources including labour crews and specialist sub-contractors to project activities and assess resource loading across the project duration.
- To establish a Baseline Schedule and demonstrate how it can be used for project monitoring and control.
- To generate standard Primavera P6 reports including the Gantt Chart, Network Diagram, Resource Histogram, and Activity Report.
- To demonstrate the practical benefits of using Primavera P6 over traditional manual planning methods in commercial building construction.

**1.4 Scope of Work**

The scope of this project is defined as follows:

- The project covers the planning and scheduling of a small commercial building identified as Project CM-4 within Primavera P6, with a project start date of 02 April 2026 and a planned completion date of 27 July 2027.
- The schedule encompasses eighteen Work Breakdown Structure (WBS) elements covering the full construction lifecycle from mobilisation to final inspections.
- Resource allocation is limited to the resource types defined in the project, including general contractor crews and specialist sub-contractor resources.
- The study does not include structural design, architectural design, quantity surveying, or detailed cost estimation. The focus is exclusively on project scheduling and resource management within Primavera P6.
- The project schedule is developed using a five-day working week, eight working hours per day, consistent with the Standard calendar in Primavera P6.

**1.5 Project Overview Commercial Building (CM-4)**

The project under study is a small commercial building, designated as Project CM-4 in the Primavera P6 database. Key project parameters are summarised in Table 1.1.

| Project Parameter | Details |
|---|---|
| Project Name | Commercial Building |
| Project ID | CM-4 |
| Software Used | Oracle Primavera P6 v8.3 |
| Project Start Date | 02 April 2026 |
| Planned Completion Date | 27 July 2027 |
| Total Project Duration | Approximately 16 Months (340 working days) |
| Working Calendar | 5 Days/Week, 8 Hours/Day (Mon–Fri) |

| Project Parameter | Details |
|---|---|
| Currency | Indian Rupee (INR) |
| Number of WBS Elements | 18 Major Work Packages |
| Total Activities | 126 |
| Total Relationships | 176 |
| Critical Path Float | −7 working days |

*Table 1.1: Key Project Parameters Commercial Building CM-4*

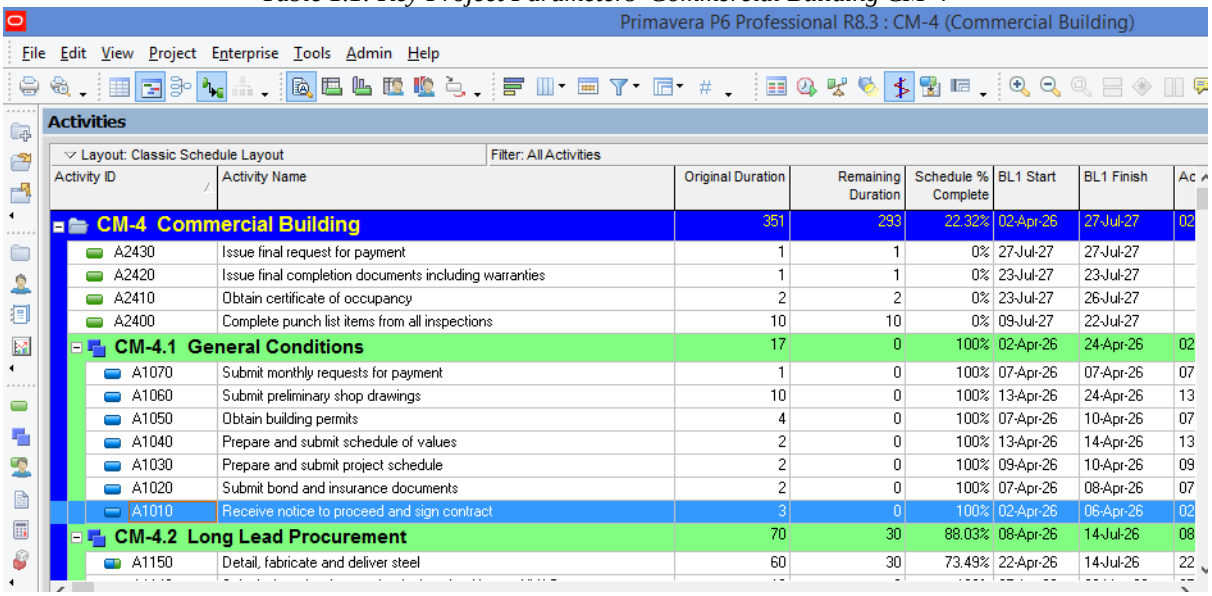


*Figure 1.1: Project CM-4 record as displayed in Primavera P6 Projects window*

### 1.6 About Primavera P6 Software

Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM) is the industry-standard software for construction project scheduling. Originally developed by Primavera Systems and acquired by Oracle Corporation in 2008, P6 operates on a hierarchical structure Enterprise Project Structure (EPS) → Projects → Work Breakdown Structure (WBS) → Activities and uses the Critical Path Method (CPM) to compute Early Start, Early Finish, Late Start, Late Finish, and Total Float for every activity. Key features used in this project include the WBS module, Activity module, Resource module, Schedule Calculation engine, Baseline module, and Reports module.

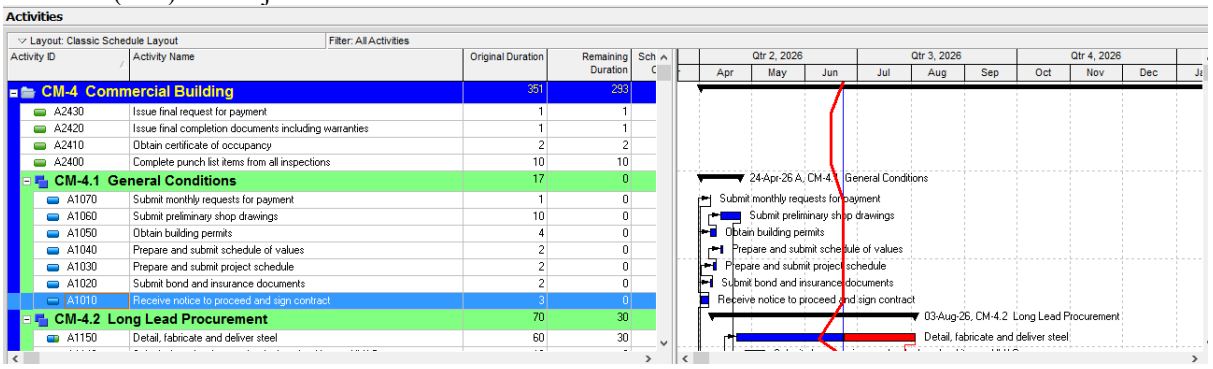


*Figure 1.2: Overview of the Primavera P6 working environment*

## 2. Literature Review

### 2.1 Importance of Planning and Scheduling in Construction

Planning and scheduling are universally recognised as the cornerstones of successful construction project management. Clough and Sears (1994) were among the earliest scholars to formalise the relationship between project planning and project success, arguing that a well-developed project plan is the single most important factor in determining whether a project will be completed on time and within budget.

Mubarak (2010) further elaborated that construction scheduling serves multiple purposes simultaneously: it provides a roadmap for the contractor, a basis for progress monitoring, a

framework for communication between the project team and the owner, and a legal document usable in the event of disputes. The quality of the schedule in terms of logic, level of detail, and realism of durations is as important as the existence of the schedule itself.

In the Indian context, Doloi et al. (2012) identified inadequate planning as the primary cause of construction delays in both the public and private sectors. Their survey of over 100 construction professionals revealed that poorly defined activity sequences, unrealistic duration estimates, and failure to account for resource constraints were the most frequently cited reasons for project overruns. Assaf and Al-Hejji (2006) reached similar conclusions in their landmark study of 76 Saudi Arabian projects, where 70% experienced delays, recommending mandatory use of formal scheduling software for all projects above a defined value threshold.

### 2.2 Resource Allocation Techniques in Construction Projects

Resource allocation, the process of assigning available resources to project activities in a manner that minimises cost and duration while respecting constraints is one of the most complex functions in project management. Hegazy (1999) provided a comprehensive treatment of construction resource management, distinguishing between resource levelling (smoothing demand peaks while maintaining project duration) and resource-constrained scheduling (finding the shortest duration given fixed resource limits). Primavera P6's levelling algorithm was evaluated by Senouci and Eldin (2004), who found that P6 consistently produced near-optimal solutions for medium-sized construction projects.

Lucko and Rojas (2010) highlighted the importance of integrated resource planning, where labour, material, and equipment are planned simultaneously. Projects adopting this approach experienced 15–20% lower total resource costs than those planning each resource type independently. Alavipour and Arditi (2018) further demonstrated that small changes in resource assignment for non-critical activities can yield significant savings in project financing costs over a multi-month construction period.

### 2.3 Critical Path Method (CPM) and its Applications

The Critical Path Method was developed in the late 1950s concurrently at DuPont (Walker and Kelley) and by the US Navy for the Polaris missile programme. CPM calculates four key dates for each activity Early Start, Early Finish, Late Start, and Late Finish with Total Float defined as Late Start minus Early Start. Kelley (1961) extended CPM to incorporate cost-time trade-offs through crashing, while Fondahl (1961) developed the Precedence Diagramming Method (PDM), extending CPM to support four relationship types: Finish-to-Start (FS), Start-to-Start (SS), Finish-to-Finish (FF), and Start-to-Finish (SF).

Thangam (2016) applied CPM using Primavera P6 to a road construction project and demonstrated how P6's critical path calculations identify scheduling bottlenecks and support recovery planning. Subramanian (2015) confirmed that P6 produces accurate CPM results and highlighted its multi-calendar capability directly applicable to CM-4, where activities are assigned to multiple specialist contractors with independent working calendars.

Andrew Tom (2013) studied the monitoring and control of a G+3 factory building in Cochin using Primavera P6, a project broadly comparable in scale to CM-4. His study demonstrated the application of Earned Value Management (EVM) within P6, showing how early identification of critical path delays enabled the project team to implement corrective action before delays became unrecoverable.

### 2.4 Use of Primavera P6 and Review of Previous Studies

Primavera P6 has been adopted by construction organisations worldwide. El-Sayegh (2008) found that 78% of UAE construction contractors used Primavera as their primary scheduling tool, attributing its dominance to superior multi-project handling, robust resource management, and widespread industry recognition. Kim et al. (2003) observed that while P6 was effective as a scheduling tool, many contractors failed to realise its full potential because they did not regularly update the schedule with actual progress, underscoring that scheduling software is only as valuable as the discipline with which it is maintained.

In the Indian context, Chandramouli and Radhakrishnan (2017) found that P6 implementation in a Tamil Nadu infrastructure project reduced scheduling errors by approximately 40% and improved on-time activity completion from 52% to 71% over a six-month monitoring period. Rao and Sivasubramanian (2014) demonstrated that P6's resource levelling function could reduce peak labour demand by up to 25% without extending overall project duration directly relevant to CM-4's concurrent MEP and finishing trade phases. Ibrahim et al. (2019) confirmed a statistically significant positive relationship between schedule quality and project performance across 45 Malaysian commercial building projects, reinforcing the value of the detailed schedule developed in this study.

The literature collectively demonstrates that structured scheduling tools are the most effective means of mitigating construction delays and cost overruns; that CPM as implemented in Primavera P6 is the most widely validated scheduling method; and that P6 has been successfully applied to building construction projects of scale comparable to CM-4 in both the Indian and international context.

## 3. MTHODOLOGY

### 3.1 Overview of Methodology Adopted

The methodology adopted follows the standard project planning and scheduling process prescribed by the Project Management Institute (PMI) and consistent with industry practice for construction scheduling using Oracle Primavera P6. The overall process was executed in seven sequential phases:

1. Phase 1 – Project Setup and Configuration: Establishing the EPS, creating the project record (CM-4), defining the OBS, and configuring the project calendar and scheduling options.
2. Phase 2 – Scope Definition: Developing the Work Breakdown Structure (WBS) with eighteen major work packages covering all phases of the commercial building construction.
3. Phase 3 – Activity Development: Defining 126 individual activities under the WBS, assigning unique activity codes (A1010 through A2430), and estimating durations.
4. Phase 4 – Schedule Logic: Establishing 176 logical predecessor-successor relationships using Finish-to-Start (FS), Finish-to-Finish (FF), and Start-to-Start (SS) dependency types.
5. Phase 5 – Schedule Calculation: Running the CPM scheduling algorithm in Primavera P6 to compute Early Start, Early Finish, Late Start, Late Finish, and Total Float for all 126 activities.
6. Phase 6 – Resource Assignment: Defining the resource library with 41 resource types and assigning resources to activities based on trade requirements.
7. Phase 7 – Baseline and Reporting: Establishing the original baseline schedule and generating standard Primavera P6 reports.

## 4. Reports Generated from Primavera P6

| Report Name | Description | Primary Use |
|---|---|---|
| Activity Report | Lists all 126 activities with ID, Name, Duration, ES, EF, LS, LF, TF and Resources | Project monitoring, Contractor review |
| Gantt Chart / Bar Chart | Horizontal bar representation of activity schedule with critical path in red | Site instruction, Owner reporting |
| Network Diagram | Precedence diagram showing all 126 nodes and 176 arrows | Logic review, Delay analysis |
| Resource Histogram | Bar chart showing resource loading per period for each resource type | Resource levelling, Crew sizing |
| Resource Loading Tabular Report | Spreadsheet showing hours/cost per resource per time period | Invoice verification, Cost control |
| Baseline Comparison Report | Side-by-side comparison of planned vs. actual/current dates | Schedule variance monitoring |
| Two-Week Look-Ahead Schedule | Rolling 2-week detailed schedule with daily activities and resources | Daily site management |
| Critical Path Report | Filtered view of critical activities with negative float values | Management escalation, Acceleration planning |
| Earned Value Report | BCWS, BCWP, ACWP, SV, CV, SPI, CPI metrics at WBS and project level | Cost performance reporting to client |
| S-Curve (Cost/Schedule) | Cumulative planned and actual cost/progress curves against project timeline | Visualisation for client presentations |

*Table 5.6: Primavera P6 Reports Generated for Project CM-4*

## 5. Results and Discussion

**Resource Cost Summary**

| Resource Type | Total Assigned Hours | Total Direct Cost (INR) | % of Total |
|---|---|---|---|
| Labour (GC + Sub-Contractors) | 7,552 hrs | INR 72,26,388 | 63.2% |
| Material (Concrete, Steel, etc.) | 1,301 units | INR 37,25,470 | 32.6% |

| Resource Type | Total Assigned Hours | Total Direct Cost (INR) | % of Total |
|---|---|---|---|
| Equipment (Excavator, Pump) | 232 hrs | INR 4,84,000 | 4.2% |
| Grand Total | — | INR 1,14,35,858 | 100.0% |

*Table 5.7: Resource Cost Summary by Type – Project CM-4*

Labour costs at 63.2% reflect the labour-intensive nature of commercial building construction. Material costs dominated by structural steel (INR 26,64,000, representing 71.5% of all material costs) and concrete (INR 7,56,000) represent 32.6%. Equipment costs are modest at 4.2%, concentrated in a short excavation and concrete pumping period.

**Benefits of Resource Loading in Primavera P6**

- Accurate Cash Flow Forecasting: Time-phased resource costs enable month-by-month expenditure forecasts, allowing the project manager and owner to plan financing requirements with precision.
- Proactive Resource Conflict Identification: The resource histogram identifies potential over-allocation before it occurs on site, enabling schedule adjustments within available float.
- Sub-Contractor Mobilisation Planning: The staffing strategy provides clear guidance on when each sub-contractor must mobilise, enabling optimal timing of sub-contract agreements and purchase orders.
- Earned Value Management: Resource-loaded schedules enable Primavera P6 to calculate EVM metrics automatically, providing quantitative schedule and cost performance indicators beyond simple on-time / over-budget assessments.

## 6. CONCLUSION

### 6.1 Summary of Work Done

This project has undertaken a comprehensive study of planning, scheduling, and resource allocation for a small commercial building (Project CM-4) using Oracle Primavera P6, executed in a systematic, step-by-step manner consistent with Project Management Institute (PMI) principles and industry scheduling practice.

The literature review (Chapter 2) established the theoretical and academic foundation, confirming that structured scheduling tools such as Primavera P6 are proven and widely recommended for construction project management in both the Indian and international contexts.

The methodology (Chapter 3) described the seven-phase process: Project Setup; Scope Definition (18-element WBS); Activity Development (126 activities, A1010–A2430); Schedule Logic (176 relationships); CPM scheduling and float calculation; Resource assignment (41 resource types, 186 assignments); and Baseline establishment and reporting. The project calendar (5 days/week, 8 hours/day), key milestone dates, planning assumptions, and project-level constraints were fully documented.

The schedule development (Chapter 4) produced the complete project schedule for CM-4, including the full 18-element WBS hierarchy with budgeted costs totalling approximately INR 1.15 Crores; all 126 activities with durations from 1 to 60 working days; 176 logical relationships; critical path identification (36 activities with TF = −7 days); total float distribution analysis; baseline schedule setup; and Gantt chart and network diagram outputs. The project runs from 02 April 2026 to 05 August 2027, a total planned duration of 340 working days.

The resource allocation analysis (Chapter 5) documented the complete resource management framework: 41 resources (32 labour, 7 material, 2 equipment); rates from INR 200/hr (GC Labor Crew) to INR 72,000/tonne (Steel TMT Fe500); 186 resource assignments; phase-by-phase loading profiles; resource levelling analysis; staffing strategy covering four critical mobilisation decisions; schedule update procedure; two-week look-ahead schedule; and a full suite of Primavera P6 reports. Total direct resource cost was approximately INR 1.14 Crores.

### 6.2 Key Outcomes

| Outcome | Value / Finding |
|---|---|
| Project Start Date | 02 April 2026 |
| Planned Completion Date (CPM) | 05 August 2027 |
| Contractual Must-Finish-By Date | 27 July 2027 |
| Total Planned Duration | 340 working days (~16 calendar months) |
| Total Number of Activities | 126 |
| Total Number of Relationships | 176 |
| Number of Critical Path Activities | 36 |

| Outcome | Value / Finding |
|---|---|
| Total Float – Critical Path | −7 working days (schedule overrun vs. contractual date) |
| Number of WBS Work Packages | 18 |
| Total Budgeted Project Cost (WBS) | Approx. INR 1.15 Crores |
| Total Direct Resource Cost (Assigned) | Approx. INR 1.14 Crores |
| Dominant Critical Activity | A1150 – Detail, Fabricate and Deliver Steel (60 days) |
| Maximum Total Float | A1380/A1390/A1430/A1440 – Elevator Pit Works (+214 days) |
| Number of Resource Types | 41 (32 Labour, 7 Material, 2 Equipment) |
| Number of Resource Assignments | 186 |
| CPM Float Calculation Method | Finish Float (Late Finish – Early Finish) |

*Table 6.1: Key Schedule Outcomes Summary – Project CM-4*

**6.3 Benefits of Using Primavera P6**

- Accuracy and Reliability of CPM Calculations: P6 performs exact forward and backward pass calculations for all 126 activities and 176 relationships simultaneously, producing precise float values. Manual CPM for a network this size would be extremely time-consuming and error-prone.
- Integrated Schedule and Resource Management: Any change to the schedule automatically updates resource loading, and resource availability constraints can be reflected in revised activity dates providing a complete picture of schedule-cost trade-offs in one tool.
- Baseline and Earned Value Performance Measurement: The ability to establish a baseline and automatically calculate EVM metrics (BCWS, BCWP, ACWP, SV, CV, SPI, CPI) provides a level of performance measurement not achievable with simple bar chart software.
- Standardised Reporting and Communication: Professional-quality reports in consistent formats combined with the portable XER file format improve communication across all project stakeholders and provide a legally defensible schedule record.
- Enterprise Scalability: The EPS structure allows CM-4 to be managed within a larger project portfolio, meaning the scheduling approach developed here can be directly replicated for larger, more complex commercial building projects.

**6.4 Conclusion**

This project has successfully demonstrated the application of Oracle Primavera P6 to the complete planning, scheduling, and resource allocation cycle for a small commercial building project (CM-4). Starting from a raw XER data file, a comprehensive and fully documented project schedule has been developed, analysed, and presented.

The study confirms that structured scheduling tools provide quantifiable benefits over manual methods in terms of scheduling accuracy, resource integration, performance measurement capability, and standardised reporting. The identification of the 7-day negative total float directly attributable to the 60-day steel fabrication activity exemplifies the core value of CPM-based scheduling: it translates a complex, 126-activity construction programme into a clear, actionable management signal, enabling the project manager to focus attention on the highest-impact scheduling risk.

The findings are consistent with the published research reviewed in Chapter 2, which consistently identifies structured planning tools as the most effective means of mitigating construction delays. In the Indian construction context, where the industry continues to experience high rates of project delay, the adoption of Primavera P6 for commercial building projects of the scale of CM-4 represents a practical and cost-effective investment in project management capability.

In conclusion, this project has achieved all its stated objectives: a detailed WBS and activity network has been developed; the critical path has been identified; resources have been allocated; a baseline has been established; and all standard Primavera P6 deliverables have been generated. The project schedule for CM-4 is ready to serve as the basis for site execution, progress monitoring, and project reporting throughout the 16-month construction period.

**References**

1) Assaf, S. A. and Al-Hejji, S. (2006). 'Causes of delay in large construction projects.'

International Journal of Project Management, 24(4), 349–357.
2) Alavipour, S. M. R. and Arditi, D. (2018). 'Impact of contractor's optimised financing cost on project bid price.' Journal of Construction Engineering and Management, 144(4).
3) Andrew Tom, A. (2013). 'Monitoring and Controlling of Factory Building (G+3) using Primavera P6.' Proceedings of the National Conference on Advances in Civil Engineering and Infrastructure Development.
4) Clough, R. H. and Sears, G. A. (1994). Construction Project Management, 4th edition. Wiley, New York.
5) Doloi, H., Sawhney, A., Iyer, K.C. and Rentala, S. (2012). 'Analysing factors affecting delays in Indian construction projects.' International Journal of Project Management, 30(4), 479–489.
6) Fondahl, J. W. (1961). A Non-Computer Approach to the Critical Path Method for the Construction Industry. Technical Report, Stanford University.
7) Hegazy, T. (1999). 'Optimization of resource allocation and leveling using genetic algorithms.' Journal of Construction Engineering and Management, ASCE, 125(3), 167–175.
8) Ibrahim, et al. (2019). 'Schedule quality and project performance: evidence from Malaysian commercial building projects.'
9) Kelley, J. E. (1961). 'Critical-path planning and scheduling: Mathematical basis.' Operations Research, 9(3), 296–320.
10) Lucko, G. and Rojas, E. M. (2010). 'Research challenges and opportunities in construction engineering and management.' Journal of Construction Engineering and Management, 136(10), 1030–1039.
11) Mubarak, S. A. (2010). Construction Project Scheduling and Control, 2nd edition. Wiley, New Jersey.
12) Oracle Corporation (2014). Primavera P6 Enterprise Project Portfolio Management Administrator's Guide, Release 8.3. Oracle, Redwood Shores, California.
13) Project Management Institute (2017). A Guide to the Project Management Body of Knowledge (PMBOK Guide), 6th edition. PMI, Newtown Square, Pennsylvania.
14) Rao, T. and Sivasubramanian, R. (2014). 'Resource allocation in multi-storey building construction using Primavera P6.' Indian construction management study.
15) Senouci, A. B. and Eldin, N. N. (2004). 'Use of genetic algorithms in resource scheduling of construction projects.' Journal of Construction Engineering and Management, ASCE, 130(6), 869–877.
16) Subramanian, T. (2015). 'Planning and Scheduling of a Residential Building Using Primavera P6.' International Journal of Innovative Research in Science, Engineering and Technology, 4(7), 6112–6120.
17) Thangam, P. (2016). 'Construction Project Planning and Scheduling using Primavera P6.' International Journal of Engineering Research and Technology, 5(6), 231–23