

Effective Scheduling And Time Management Of Itarsi-Nagpur Iiird Lane Railway Project Using Primavera P6

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Abstract- *The construction sector creates a significant amount of jobs and is essential to the nation's socioeconomic development. The aim of this research is to determine and examine the key elements that impact construction project performance by causing time and expense overruns. Numerous aspects are covered in this study, including inadequate project planning and scheduling, issues with subcontractors, poor site management and supervision, material management issues, a lack of collaboration among stakeholders, etc. According to the study's conclusions, the Ishikawa diagram is a valuable tool for determining and analysing the causes and effects of labour, material, and equipment-related delays. Thus, it can assist project managers in ensuring that the project is completed smoothly and within the budget and time frame that have been set. Implementing efficient material management is essential for timely procurement and inventory issuance to minimise delays caused by material shortages, as materials account for roughly 70% of the total cost of construction. Its utilisation can be maximised with no waste by implementing resource levelling and smoothing. According to this study, building projects may be made to be completed on time and within budget by using contemporary project management tools like Microsoft Project, Primavera, Newton software, and others to effectively monitor the project schedule.*

Keywords: Construction, Cost overrun, Project Management, Time overruns.

I. INTRODUCTION

It is crucial to research, examine, and assess the common causes of time and expense overruns in order to provide the most effective and appropriate mitigation strategies for overcoming these limitations. In the construction industry, time and money are the primary determinants of any project. Project managers and other project professionals strive to control these variables in order to guarantee that the projects are completed on schedule, within budget, without any time overruns, with perfect management principles, and

without deviations. Managing a project without going above budget or schedule is a very difficult and risky undertaking for project managers and assistant project managers. The construction industry has focused a lot of attention on time and effective cost overruns. Project managers must constantly measure progress, evaluate plans, and take appropriate action when necessary. The life cycle of construction projects consists of several phases, such as planning, initiation, procurement, and so on. Not only are every single minute and every single rupee (paisa) crucial in building projects, but in all projects that are related to economy, the loss of potential profit is the result of cost and time delays.

Currency fluctuations, stock market losses, improper quantity estimates, bank loan delays, and other special works are some of the quantitatively examined factors that influence delays of building projects (residential, commercial, etc.). Other factors that influence delays include client characteristics, a lack of knowledge and experience in the construction field, and the production process. Project characteristics include size, type, complexity, and duration; project organisation factors include duration, percentage of design completed before tender, material procurement, contract type, clarity of information provided, and number of subcontractor issues.

OBJECTIVES OF THE RESEARCH

The salient objectives of the research will be identified as follows

- To manage the risk occurring in a running project considering a case study of IIRd Lane railway project from Itarsi to Nagpur.
- 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 develop scheduling using primavera project planner's software.
- 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 methods of the case study.
- To obtain schedule delay analysis of project at any time.

LITERATURE REVIEW

This section summarises the research papers from different authors and researchers who have worked on planning and scheduling of different construction projects using management tools such as Primavera P6, MS Project and BIM products.

II. REVIEW OF LITERATURE REVIEW

Abuzar Aftab Shaikh et al. (2025) the study shows Primavera P6 gives a cautionary when analysed the Schedule Variance (SV), it gave a non-positive value, so software warned that the project lags planned Schedule by 17.80%. The Schedule Performance Index (SPI) of 0.822 specifies that the efficiency of project as of now is 82.2% compared to what originally planned. The positive values of Cost Variance (CV) and Cost Variance % (CV%) found are ₹11,33,836.8 and 3.656% respectively thus indicating the project is under budget, also it can be said that the project is within budget as the Cost Performance Index (CPI) obtained is 1.03 (>1). After 11 months updating was done and the project was delayed by next 3 months and this rose the project duration to 20 months, for the project finished within the planned time it should be levelled and smoothed by deploying more labours, timely material delivery and managing the resources with utmost care further, the study clarifies notion that Primavera software is an useful tool for monitoring the project progress, cost accompanying with progress and managing to evade delays.

Ahmed Mohammed Abdelalim et.al (2025) objective of the research was to examine the multifaceted factors causing construction project cost escalations by using scientometrics analysis and SNA to map the interconnectedness of 66 factors and identify those with the highest degree of centrality, improving the understanding of cost dynamics and providing actionable insights for construction managers and policymakers to address these challenges holistically.

The results revealed seven factors with significant centrality, such as planning and scheduling issues, project estimation inaccuracies, and design inefficiencies, that emerged as the most influential contributors to cost overruns.

By focusing on the seven most influential factors identified through the network analysis, this study not only contributes to the academic discourse on cost management but also provides actionable insights for construction project managers and policymakers who aim to reduce cost overruns. This alignment between the identified factors and the ongoing practical challenges encountered daily—most of which are key sources of construction conflicts, alongside fundamental causes of cost challenges such as planning and scheduling issues and project estimation problems —underscores the robustness of the result.

Diana M. Franco-Duran et al. (2024) stated Primavera P6 and Microsoft Project are both renowned scheduling software in the construction industry. Even though these programs assist planners to construct the project plan and to report the project status, they lack support in the decision process when it comes to resource project allocations and constraints. As a mitigation, the resource supply-demand problem, Resource-Constrained Scheduling (RCS) practices have been inculcated in Primavera P6 and MS Project. After testing Primavera P6 versions and MS Project v 2016, both software packages generate phantom float in resourceconstrained schedules as to remove phantom float no any algorithm is applied. The actual float values may be lesser than calculated during RCS, which results in incorrect identification of the critical path and causing an impact by delaying event in the project completion time.

III. METHODOLOGY

- Collection of literature : - Collection of literature is very important to provide foundation of knowledge on topic. Literature review is done from various sources which include scholarly journal articles, books, government reports, Web sites, etc. and points relevant to our research are sorted and are added in our project study.
- Selection of Project : - Project is selected which has good futuristic scope and will also help us to get good command on software and learn a lot more things about project management. Such a project is selected that is completed within our research time so as to analyse it completely and provide any recommendations if needed.
- Collection of data : - Data collection is very important and tough part because they have to links up with project staff to collect related data. Data is collected through various resources like site survey , previous technical reports. The collected data included information about the project which was helpful in scheduling and costing.
- Detailed Planning and scheduling using primavera p6 : - This software enables functions like planning, scheduling, budget and resource management software that help

V. CONCLUSION

Planning, monitoring and controlling, as well as the need and effectiveness of project management software like Primavera P6 in a construction project of IIIrd Lane from Itarsi Nagpur railway track of this study was to understand the role of monitoring and control in the progress and timely completion of a construction project. This objective was achieved through revision of literatures and methodologies involved in monitoring and control. The study proved to be a guideline in understanding the progress of construction work and also to identify the specific problems arising during the process.

- The resource graph is obtained from materials which can assist contractors to manage material requirements for the project.
- As per WPS, after the crashing exercise was accomplished, in general an observation could be made stating that an increment of 21 percentage of labour resources would offer in return, a reduction of 17 percentage of the activity completion time. However, this trend does not imply that surging the resource will directly reduce the duration, it will reduce the duration but up to the min. fundamental duration required only not beyond it.
- The tender schedule plans 420 days with ₹85.58 lakhs in labour costs. Resource smoothing shortens the duration to 370 days and reduces costs to ₹81.32 lakhs (1.02% savings) without delays. Resource levelling extends the duration to 437 days but lowers costs significantly to ₹75.21 lakhs (2.49% savings). Thus, smoothing prioritizes time efficiency, while levelling maximizes cost savings.

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