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Monitoring and Sceduling of a Bridge Using Primavera: A Review

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Abstract: *The primary objective behind the research is to identify the job role of monitoring and controlling the project progress of construction and procure recourse allocation using management tools such as primavera P6. This was accomplished through revising the literature and procedures used in monitoring and control. The study served as a roadmap for analysing construction progress and identifying specific issues that arose during the process. The findings of the study revealed the shortcomings of the current project management system in project execution. A new project management plan is completed that is both efficient and cost-effective. By allocating more resources to project activities, the time cost trade of the project duration can be lowered. However, doing so raises the project's cost. For scheduling a set of project tasks, the critical route method is employed. Primavera software was also used for resource analysis.*
In this paper presents review of literature related to planning, scheduling of construction project

KeyWord: *Resource allocation, Resource Levelling, Time cost trade off, primavera, planning and scheduling.*

I.INTRODUCTION

The construction industry is an important part of a country's infrastructure and economic development. Despite the fact that the construction industry is India's second largest, its growth has been uneven throughout the country. To cope with the state of development in metropolitan areas, rural areas require tools for economic development, land use planning, and environmental planning. The amount of time you have to accomplish this goal is dwindling. As a result, good project management is required. The building business is dealing with a number of difficulties that must be addressed. They include time and expense overruns as a result of poor project formulation, poor implementation planning, poor contract planning and management, and poor execution management. Analysts believe that the average cost of a project increases by 30% when compared to the anticipated cost. Observations reveal that competent skilled management is critical to completing the project on time, within budget, and with the resources allotted. Projects with solid planning, suitable organizational machinery, and adequate resource flow cannot accomplish the target result automatically. There must be some kind of off-and-on warning system that may alert the company about its potential success and failures. The process of gathering, documenting, and reporting information on project performance that the project manager and others want to know is known as project monitoring. During project execution, monitoring involves tracking project progress against time, resources, and performance schedules and identifying lagging areas that require immediate attention and action, whereas project controlling uses data from monitor activity to bring actual performance to planned performance.

II. LITERATURE REVIEW

BalakrishnaCh et.al (2021) The research examined timetable delays in the development of a multistory residential complex and identified the elements and people responsible for the delays. The schedule delay analysis was undertaken using various features and capabilities of Primavera software, and an alternate schedule was established with more resources and time to lessen the effect of delays, which would be beneficial to the contractor and all other parties engaged in the project.

According to the results, the project's updated length after completion was 705 days. Because constraints were not properly applied to key operations, some activities were delayed. The contractor was found to be the source of delays due to a variety of causes. Four of the 15 factors were found to be excusable, while the others caused key processes to be delayed. The project's duration was split after the proposed timeline was implemented. The process took 705 days to complete, whereas the intended schedule was just 660 days long.

GunjalKartikeyan et.al (2021) The goal of the study was to save time and cost by balancing resources, which was accomplished by comparing the optimal results in three scenarios. In Case 1, the entire project was assumed to be completed in the same WBS sequence without being broken down into pieces, and the cost incurred by resource consumption was estimated. In Case 2, the entire project was split into two sections, and the cost of resource consumption was estimated. In Case 3, the entire project was split into three halves, and the cost of resource consumption was estimated.

Determine project team roles and procedures for resolving project conflicts. For scheduling and budget management, plan and estimate % completion. Determine how to compress or recover time in your timetable. Develop risk

management plans and procedures for budget and scheduling estimates, as well as a resource histogram and resource balance to perform earned value analysis on a project plan that is being actively tracked.

NidhiRaghuwanshi and M. C. Paliwal (2021) The research report compared the two different blocks, Block A and Block B, in the AwasYojna project presentation in New Market Bhopal. The project articulated the advantages and added benefits of web-based Primavera P6 for planning and scheduling of structures under development under the government programme "AwasYojna," framing the challenges and complications encountered in the construction time frame and resource availability.

Results stated the drawbacks which ultimately became the reasons for delay of the project and compared the schedule of the two blocks of PMAY Urban. The process of preconstruction was managed equally by linking all such activities namely preparing site office, Labour room, and laboratory setup. By linking the activities, the time lapse reduces simultaneously.

Sudarshan. S and Geena George (2021) The purpose of this study paper was to compare the efficiency of two different software programmes, Primavera P6 and MSP, in building projects. Primavera P6 software was used to manage the project's planning, scheduling, and tracking. The Primavera P6 software can efficiently distribute several organisational initiatives. P6 software was shown to be useful in resource flattening and resource levelling procedures in research. Primavera P6 software was more effective, took less time, and required less administration than the traditional way.

Earned value analysis revealed that the project cost was increased due to unanticipated increases in labour and material costs. By using project management techniques such as rapid tracking and activity duration crashing, the extra cost invested can be recovered in subsequent activities. Using project management approaches and rescheduling the project, the remaining activities were cut in length.

A.A.Lakade et.al (2020) the primary objective of the research paper was to investigate ERP which is SAP- Systematic Application Product and its implementation in different phases and understand their benefits in civil industry. Integration of ERP and PRIMAVERA was done for project management due to their infinite benefits as a project management tool.

While considering ERP, it was found to be a single unified database which helps to access data from any department and by using material management module of ERP, the problem related to material management on site can be tackled and In case of PRIMAVERA, it was found that its features helps for doing resource levelling, scheduling and even reports can be generated . An integration was done of both the softwares then there was flow of data which will help to increase efficiency and cost effective project management can be done.

Divya V S and C Gayathri (2020) The study's main goal was to use the approaches "Resource allocation, Resource levelling, and time cost trade off" to maximise resources. Resource allocation was utilised to efficiently distribute available resources. The scheduling of activities and the resources required by those activities, while taking into account both resource availability and project time, was known as resource allocation. The goal of resource levelling was to reduce resource loading fluctuation over time. Redistribution and imbalance of assigned tasks are part of resource levelling. The goal of resource levelling strategies was to improve the form of the resource histogram by eliminating variation. The critical path technique was utilised to schedule a series of project activities, and Primavera software was used to analyse resources.

The entire estimated building cost was Rs. 5609600.87, and the twin home construction timetable was 167 days, according to the conclusion. The project was estimated to be completed in 140 days, thus the critical path technique and primavera were accomplished in that time.

Selva Kumar M and Manishankar S (2020) The Primavera Software makes it simple to make judgments while executing any project. Individual work costs can be estimated rather accurately based on length. According to our estimate, it is possible that the construction, which began in September 2018, will be completed. According to the typical schedule, the project will take 730 days to complete. Following up until April 2020, the assignment's overall fulfilment is 20.00 percent, with 9.96 percent of road works completed, 34.18 percent structure work completed, and 0.78 percent of varied positions completed.

The straight visit identifies the reasons for deferring my work and predicts an unpleasant date for the task's completion. Granting Permission for Isolating Soil from Cart Location, Physical Responsibility for Undertaking Site/Land Obtaining, Issuance of NOC by PWD/WRO, Govt. of Tamil Nadu, Shifting of Utilities, Cyclone "GAJA"/Rain, and Corona Pandemic COVID-19 are the monumental reasons for deferrals in our road adventure. The temporary labourer has announced a revised progression plan based on the arrangement's terms and a 364-day increase in soliciting time. The new development strategy has nothing to do with the previously approved base schedule.

K.Priya et.al (2019) The goal of the study was to use STAAD.Pro and Primavera P6 software to analyse and schedule the construction of an apartment complex (G+13). The planning was carried out using AutoCAD in accordance with the IS 456-2000 regulation. The first and most important benefit of effectively planning in Primavera is a project start date of 11 March 2019 and a completion date of 16 June 2022. By assigning two relationships to each activity at a time, Primavera P6 aids in the appropriate scheduling of the project and significantly decreases float. This report clearly shows all of the crucial procedures, such as developing an EPS, creating a WBS, linking activities based on their interdependence and resource availability, and determining the critical route. Resource allocation was used to determine the project's budgeted cost, time, and materials.

The conclusion indicated that project schedule control reduces project time due to the application of limits, amount

of effort, and resource dependency. The project review was carried out to provide a full picture of the project case study and to determine the discrepancy between the scheduled control and the planned control schedule. Primavera P6 software is used for scheduling control studies on restrictions and activity kinds. Due to the application of constraints, amount of effort, and resource dependency, project schedule control reduces the duration of the project.

Kottamasu L. N et.al (2019) The goal of this study work was to use Primavera software to achieve optimal resource use and resource levelling, as well as to comprehend the value of resource management techniques. In the construction field, the principle of project resource allocation was to optimise, condense, or stay away from wastages of all materials in the project. Project management software similar to Primavera P-6 was used to accomplish resource allocation and optimization.

According to the conclusion, resource allocation can be performed without modifying the project term. Resource allocation as optimization can be applied to all other resources employed in a building project, lowering project costs and removing over-allocated resources from operations.

Md. ZishanMallick and MohdZeeshan khan (2019) The planning and scheduling of a G+2 office complex was described in this research article utilising the highly traditional project scheduling software Primavera P6. Several activities and tasks were completed during the planning phase of the project, with durations given, baselines indicated, activity details, and activity start and finish dates. Primavera aids in the timely completion of projects and cost reduction. As a result, it is mostly used in the building industry. A full job sequence was completed in order to analyse the implications of the acquired data in terms of project scope and duration. Primavera assists in the planning, monitoring, scheduling, resource allocation, and time management of the project.

The software will be less time consuming and does not require any paper work; it provides detailed knowledge of project costs, time, working hours, and updates; it aids in better project tracking by identifying critical activities that should be given special attention to avoid project delays; and it reduces labour costs by up to 5%. This analysis served as a guideline for estimating building progress. The analysis found that the current project management system had significant disadvantages over the newly designed project management system.

Shubhashree P. Deshmukh and A. B. Ranit (2019) The research paper presented a comparison of scheduling in MS Project and Primavera, as well as defects in the organization's planning and scheduling procedure, and suggested appropriate improvements in their methods, as well as the utility of PRIMAVERA and MS Project in the project's construction and execution.

According to the results, project studies aid in understanding the present status of project scheduling theory, project processes, and commercial scheduling software usage. MS Project and Primavera features and functions are recognised, and the practical durations necessary to complete activities are determined. Scheduling has been built using Microsoft Project and Primavera, and flaws in the organization's planning and scheduling procedures have been investigated.

V.S. Divya (2019) The goal of the study was to use the approaches "Resource allocation, Resource levelling, and time cost trade off" to optimise the resources. Resource allocation was utilised to efficiently distribute available resources. The scheduling of activities and the resources required by those activities, while taking into account both resource availability and project time, was known as resource allocation. Resource levelling tries to reduce resource loading fluctuation over time. Redistribution and imbalance of assigned tasks are part of resource levelling. Techniques for improving the form of the resource histogram by decreasing fluctuations were being developed. By allocating more resources to project activities, the time cost trade of project duration can be lowered.

Flexible scheduling improves the outcomes from CPM and the existing strategies utilised to improve its schedules, according to the findings. Different objectives, such as resource levelling, resource allocation, and cost optimization with resource limits, were effectively solved using the approach.

AnuragMahure and AmitkumarRanit (2018) The study paper offered reports on the project scheduling work. The provided work was divided into two sections, the first of which dealt with data gathering and the second with analysis using Primavera P6. The initial step in data gathering was to choose a building and establish a work breakdown structure based on the construction process. Actual input offered in the software, such as wbs, activity, start date, finished date, resources, and daily updates, were explored in the second phase. A Gantt chart was created, and the outcomes were compared to the time required according to the programme.

To better understand the role of monitoring and control in the progress and timely completion of a construction project, researchers looked into planning, monitoring, and controlling, as well as the need for and effectiveness of project management software like Primavera P6 in a construction project. The research served as a guide for understanding construction progress and identifying specific issues that arose during the project. The findings of the study revealed the shortcomings of the current project management system in managing projects.

FathimaZerin T and Angela C. Joy (2018) The goal of the study was to understand the role of monitoring and control in the progress and timely completion of a construction project, as well as the necessity for and effectiveness of project management software like Primavera P6 in a construction project. This was accomplished through revising the literature and procedures used in monitoring and control. The study served as a roadmap for analysing construction progress and identifying specific issues that arose during the process. The findings of the study revealed the shortcomings of the current project management system in project execution. A new project management plan is completed that is both efficient and

cost-effective.

KeshavPhophalia and RiddhaBasu (2018) primary objective of the research was to present comparative analysis of two different project management softwares on the parameters of its efficiency and effectiveness. Microsoft Project 2016 and Primavera P6 V16.1 were compared for the investigation through survey analysis and Questionnaire survey methodology.

Results stated that the microsoft project proved to be the most efficient application when compared to primavera p6 due to its ease of use and graphical representation as it holds advanced graphic tools.

Hitanshu Saini et.al (2017) A four-story building of an Ayurveda research facility in Pandoh, Mandi (H.P) was investigated in the research report. A scheduled project on Primavera P6 was watched, and the sorts of delays that occurred were studied, resulting in an increase in the project's overall duration. Primavera P6 is a project management software that allows you to collect, record, monitor, control, and report on project performance.

Water proofing and pile head treatment may be delayed as a result of the excavation delay. As a result of these delays, the project may be completed four months late. The delays can be dealt with if the Owner allots enough time and money to the design stage of the project. Contractors and consulting firms should both contribute to the schedule. To strengthen managerial and technical skills, the contractor should hire qualified work teams and give worker training. In addition, the contractor should have a project manager on his team to monitor work progress and assure timely delivery of goods.

NagarajBelsur et.al (2017) The goal of this study was to look at the level of mindfulness on EVM among those working on a Metro Project in Phase 2 Reach2A with a length of 3.954 kilometres (approximately) at Bangalore Rail Corporation Limited (BMRCL). The overall goal of the planning was to improve the link between the foundation of a compelling efficiency estimation framework and the human task of improving hierarchical execution through methods for changes in all or a few components of the organisation, including the general population, structure, culture, and innovation. A Primavera programming P6 variation was used to plan and monitor this project. A project's WBS was created, and a few exercises were identified. On the basis of a review report, the term of a few exercises was reviewed, and the relationships were examined and linked to exercises that are involved in booking and checking a venture.

The limitations of the current project management system in SDF projects were discussed, as well as the need of efficient planning, monitoring, and controlling, as well as the requirement for and effectiveness of project management software such as Primavera P6 in a construction project. It was suggested that significant efforts be made to raise awareness and boost the level of EVM application among key participants in the construction industry.

III.CONCLUSIONS AND FUTURE SCOPE OF THE STUDY

1. The construction industry is rapidly expanding. Projects are becoming larger and more complicated, necessitating an ever-better execution plan. To achieve smooth construction work, challenges such as a proper project plan, abilities, expertise, and experience of the organization must be known.
2. Another issue that should be explored is control and monitoring. Many real estate developers, contractors, and project planners feel that for effective and efficient project planning, planning approaches and project management software should be chosen after a thorough need analysis. Primavera P6 and Microsoft Project are the two most widely utilized project management softwares in the Indian construction industry.
3. There has been no comprehensive study of the selection parameters and application of the two softwares in the Indian construction industry. The goal of this study is to compare project management software Microsoft Project 2016 and Primavera P6 R16.1 Professional Project Management.

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