

Planning, Scheduling and Resource Allocation of a Nh-344 Using Primavera P6 A Review

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ABSTRACT

Transportation is one of biggest basic need for the society. The construction of road gives the better transportation facility around the country. For better development of the country in the construction assertive, the project management is necessary. Time and Cost are the two basic parameters to control work in the execution of the road construction. Flow of cost and its usage is very important aspect for beneficial point of view. It is necessary to develop the planning software to easy the works and risks arises in the projects. For the cost analysis of the road works, EVA technique is used to overcome the problems raised during execution. To understand the cost values in the road construction projects, Earned value analysis of any construction industry which gives the warning messages to the planning process as well as during the execution of the project whether the project is going on time and it is under budget or over budget. Primavera P6 software gives the accurate Earned value results. In this paper presenting review of literatures and publications related to scheduling of projects in construction industry.

Keywords : Earned Value Analysis, Primavera P6, Project Management, Road Work, Cost, Time, EVA Parameters, Resources, Scheduling.

I. INTRODUCTION

Transportation is one of the biggest basic need for society. The construction of roads gives the better transportation facility around the country. For better development of the country in the construction industry, project management is necessary. Time and Cost are the two basic parameters to control work in the execution of the road construction. Flow of cost and its usage is a very important aspect from a beneficial point of view. It is necessary to develop the

planning software to ease the work and risks arising in the projects. For the cost analysis of the road works, EVA technique is used to overcome the problems raised during execution.

In olden days, the project budgeted total cost is determined by the difference, between the actual cost, and planned cost. That means the project managers' focus was only for planned cost and expenditure cost as actual cost. Now in the modern days many schedule properties and cost parameters are considered. Because it is very important in every Construction project, losses are due to inadequate

construction management and cost performances done by the contracts in the road construction projects. So it is necessary to develop the planning software to ease the work and risks arising in the projects. The mainly used software is MSP, Primavera P6 and some developed software. This software gives better scheduling methods and cost performances effectively.

II. LITERATURE SURVEY

Pravin Namdev Pharne et.al (2022) research paper presented planning and scheduling of 1km length bitumen road using Primavera P6. It was observed that after planning and scheduling using Primavera the cost was reduced by 47,970 and with conventional planning the cost was 6,71,200. By using Primavera software the cost was 6,23,230. Hence cost reduced by 7-8%

Planning, monitoring and controlling, as well as the need and effectiveness of project management software like Primavera P6 in a construction project of this study was to understand the role of monitoring and control in the progress and timely completion of a construction project. Delays in construction projects was minimized by using primavera software. Effective handling of materials and resources was optimized by using Primavera. 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. Hence the study gives results about cost reduction and effective management of project. Results stated the drawbacks of the present project management system in running project. An efficient and cost effective new project management plan was brought to conclusion.

Pravinkumar Jagtap et.al (2022) in the research paper, author presented planning and scheduling of G+20 residential building and allocated the needed resources and further estimated cost of the

construction. Tracked the progress of the project at various intervals of time and explained how effective it was to plan, schedule, to estimate budget and tracked the progress of a G+20 residential building using Primavera P6 software.

The forecast of total duration of the project was expected to be 749 days. The required resources for the completion of the project were known and at which stage the particular resource was required to be known. This research proved as an interpreting the progress of Puranik's Hometown building, which helps to recognize the various problems aroused during or prior the execution process. The output results of the case study defined the usefulness of efficient planning, Scheduling, Monitoring and Controlling. Primavera helps the Project Manager to help him aware about the schedule with respect to the activities which are to be started or finished according to the schedule.

Veerabhadragouda P Patil et.al (2022) in the research paper, G+5 college Building Plan was drafted in AutoCAD and estimate the building material quantity and scheduling and controlling the project by primavera p6. The quantities of different elements like footing, beam, column etc can be estimated by using estimation methods like center line or long wall - short wall method and using excel format to tabulate estimated result efficiently. The planning, scheduling and monitoring of the start and end dates of activities can be done for the project using primavera. The duration for the completion of the project be from 5-sep-2021 to 1-mar-2023. Project management Technique helps in forecasting the project duration before starting any activity of the construction. Such that it helps to use the time efficiently and overcome any further delays in the project. Hence using modern tools like primavera over conventional method help in planning, scheduling, tracking and monitoring the constructional activities efficiently.

Nidhi Raghuwanshi and M. C. Paliwal (2021) research paper dealt with presentation of AwasYojna project in New Market Bhopal comparing the two different blocks namely Block A and Block B. The project framed stated the advantage and added benefits of web based Primavera P6 for planning and scheduling of structures under construction under the government scheme of "AwasYojna" framing the issues and complications faced in the time frame of construction and availability of resources. Construction sequence was prepared and comparative analysis was done in between two structure blocks and identification of reasons in delay and further conducted financial risk analysis using Gantt chart in Primavera P6 and assigned proper sequence and links between different activities for early finish.

Results concluded that using project management tool Primavera P6 assigning and monitoring each activity as per running conditions the project may be completed in time and cost may be saved. Besides, further water logging was analyzed in excavation activity due to the environment (rain water) which was resolved to save 5 days. Observations stated that 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.

Gunjal Kartikeyan et.al (2021) The objective of the project was to minimize time and cost by leveling the resources and this was done by taking three cases to compare the optimized results. In Case 1 the entire project was considered to be done in the same order of WBS without breaking it into parts and the cost incurred by the utilization of resources is calculated. In Case 2 the entire project was divided into two parts and the cost incurred by the utilization of resources is calculated. In Case 3 the entire project was divided into three parts and the cost incurred by the utilization of resources was calculated.

In conclusion, planning and scheduling construction projects was crucial in order to avoid project delays

and cost overruns. So, the progress and completion of the construction project during the whole period of working depend on how effective is the manager's schedule. Identify project team roles and methods of project conflict resolution Plan and estimate percent complete for schedule and budget management. Perform earned value analysis on an actively tracked project plan.

SelvaKumar M and Manishankar S (2020) in the research paper, an undertaking was made in arranging and defers assessment of vacillated practices stressed in turnpike advancement in Thanjavur area, Tamilnadu, by using Primavera programming. The length of the interstate is 47.835 Kms. frameworks, Flyover, VIPs, PUPs, etc. It wanted to 730 days. The improvement unit's primary goal is to complete the work as an express on time with the proper cash, and equipment. To achieve the above goal is to execute the endeavor most financially better, similar to money and time. This examination's guideline focuses on inspecting the the time and cost of the endeavor.

The Primavera Software offers simple to utilize decisions while playing out any endeavor. The cost of individual work separately can be known close by length. From our assessment, it might be shut the Construction started in September 2018. The size of the Project as per standard Schedule is 730 days. Following April 2020 revealed 9.96% completing road works, 34.18% structure work, and 0.78% of various positions, the assignment's overall fulfillment is 20.00%.

Lalitesh Sinha and Atul Tripathi (2019) in the research paper, time and cost were the main objectives in the research using Genetic Algorithm (GA) for highway project. For scheduling of project was used which gave the correct and accurate schedule of the project while GA optimization solver in MATLAB was used to optimize time and cost of the project. The Performance of the solvers mainly depends upon the parameters of GA which was used

according to target and actual duration of project. GA modeling was used to properly allocate the material that will result in lower computational cost and increased productivity. In this study the solution were performed under different combination of GA parameters and after the analysis of the result, best values of these parameters were identified for feasible solution.

Results stated that Genetic Algorithm (GA) guaranteed the global searching from a population of solutions. It was cleared that if the project was completed within a target duration one get the incentive cost but if it is not completed or actual duration of project is more than the target duration, project cost increases due to penalty cost. GAs show faster and efficient results in achieving time cost optimization with given population and generation.

Nivedhitha M and Saraneya L (2019) research paper focuses on study of core factors that square measure inflicting delays and analyzing the regular records to attenuate delays. The research was undertaken on Construction of Villas in KR Puram, Bengaluru, Karnataka. The project was construction of 147 villas and scheduled to complete in 406 days. The day- to-day knowledge was frequently collected from website. Starting time, Finishing time and duration was recorded in Primavera, differentiating task and critical activity. Using the input data and Gantt chart generated by Primavera the delays in projects critical activity was analyzed. Primary purpose of research was to quantify the impact of the project duration delays and damages for contractors and owners.

Results stated that there was a delay of 66 days in the completion of the project. The critical activities of the project were foundation, casting the floor slab, block work, external plastering, painting and doors. Inspire of critical activities, there were some additional activities where the project experienced difficulties in execution and delay in completion. From the delay analysis an amount of Rs. 620200/- was incurred to the project which was an additional loss to the

project and simultaneously over shoots the budget allocated to the project. The main causes of the delay in the project were both excusable and non-excusable delays, which were identified by the occurrence and experience. The main delays were recorded and the loss of productivity and cost loss was calculated.

Suvarna N. Desai and Dr. A. W. Dhawale (2019) objective of the research paper was to plan, schedule, and track industrial projects with the help of primavera software. In large scale projects, preparing an accurate plan was difficult. Computer packages like MS project and primavera project planner were used in the construction industry.

Results stated that primavera software helps to proper management and save time in all phases of construction. Critical path scheduling is done by using primavera. It helps identify the critical activity and suggests suitable majors using primavera. Problems in construction, design, planning etc. like improper co-ordination between contractor and on site working people, wastage of material etc. by using primavera improper co-ordination between contractor and working people reduce then it helped to reduce the cost of construction.

Anurag Mahure and Amit kumar Ranit (2018) research paper presented the work related to the Project scheduling which consisted of two main parts. The first part was related to the Data collection and the second part was associated with Analysis on primavera P6. For the first part of Data collection, a building was selected and then the building work breakdown structure was created according to construction process. And all the other necessary data was collected for analysis. For the second part, actual input given in the software such as wbs, activity, start date, finished date, resources etc. and daily updates was done and investigated. A Gantt chart was prepared and results were compared between actual time and the time require as per software.

Primavera allows user to give actual start, actual finish dates etc. for the respective activities

accordingly P6 provides effective schedule every time which allows planner to track the project progress also he can see which activity is getting delayed due to change in finished date of another activity. Planning, monitoring and controlling, as well as the need and effectiveness of project management software like Primavera P6 in a construction project of this study was to understand the role of monitoring and control in the progress and timely completion of a construction project. 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.

R.Santhosh Kumar and Anoop James Antony (2018)

objective of the research paper was to complete the construction project as indicated time period with specified date and proper usage of funding and number of resources. Project management software Primavera P6 is used for preplanning a road project.

Conclusion stated that the preplanning and scheduling by using Primavera P6 helps in understanding the variation of the original schedule and the pre-planned schedule. This help the project managers to identify the critical activity plan accordingly while executing the project. The current construction practice in India is still adopting the policy of as and when required in managing the resource of project. This policy of management may cause a huge impact in achieving the budgeted expenses and the actual expenses. Hence using construction management software in the vast and complex projects reduce the uncertainty and achieve a better result.

Maheshwar S Maregoudru et.al (2017) in the research paper, an industrial road work was considered as a case study to understand the cost values in the road construction projects. Primary objective of the research paper was to determine the actual project cost of the road work to estimate practical durations required to complete the activities and evaluate the difference in estimated cost and actual cost of the

project. Primavera P6 was used to estimate the cost of the project via controlling the plan and appropriate scheduling the project.

Results stated that Cost variance (CV) was Rs. 9,51,454 has the positive value, it indicated that the project was under budget. Schedule variance (SV) was Rs. 1,96,25,496 has positive value, it indicated that the project was ahead of the schedule. Cost Performance Index (CPI) was 1.18, so the value obtained was more than 1 that indicated the performance of the project was good. The Schedule Performance Index (SPI) has the value of 1.6 which was greater than one, it indicated that the project schedule performance was good. Estimate at completion (EAC) was the same as the actual cost obtained from the total project cost of the work. Variance at completion (VAT) of the project was 1,20,000, because there was only maintenance cost for the road work if the road became repaired.

Sushma.H et.al (2017) research paper stated the present scenario where there was an immensely increase in demand for the road construction projects due to the rate of development in India which is increasing day by day. In India as observed, there are many underperforming projects which is effecting on time and cost. to overcome all the facts that are effecting the construction of project with poor performance there we should include proper planning and scheduling techniques to have a good and effective performance of the construction economically. So to include the best planning and scheduling techniques, Primavera P6 was used for the minimum duration of road construction. Primavera P6 gives a proper project management solution for the planning and scheduling team of the enterprise.

The Gantt charts provides a clear picture for the site engineers for the easy execution of activity and start preparation for the upcoming activities. Line of Balance was a graphical based representation whereas CPM was a chart based representation which provides a easy representation of critical activities.

Wastage of resources can be avoided by allocation of resources as per the need of activities. The resource graph obtained for the materials helps the contractor to manage the material requirements for the activities.

P. Esakki Thangam and R. Magdalene Benila (2016) objective of the research paper was to implement how effectively primavera software can be used for planning, scheduling, monitoring and time controlling the construction project particularly for the project considered in case study. VOC port trust of Tuticorin was considered for four lanes which were not sufficient to tolerate the traffic. For this purpose an alternate arrangement of a six lanes was constructed. The work carried out was not done by proper planning, scheduling and resource allocation. So, that the resources were wasted and the time was extended. For reducing this wastage in time. In this project, the planning, scheduling, resource allocation, cost and time management were done by using primavera P6 software.

The main advantage of project was timely execution and completion of the project using primavera P6 software. The road construction project has completed prior to the contract duration.

T.Subramani and Kurian Jacob (2016) research paper dealt with the project monitoring process of "Standard Design Factory", a three storied (G+2) factory building whose construction is in progress at Salem, Tamil Nadu. A comparison between the planned progress of construction work and actual progress was performed in this study using project management software Primavera P6. The case study proved to be a guideline in understanding the progress of Standard design factory construction work and also to identify the specific problems arising during the process.

Results stated the drawbacks of the present project management system in SDF projects and the importance of efficient planning, monitoring and controlling, as well as the need and effectiveness of a project management software like Primavera P6 in a

construction project. Project progress was 51.73% of the total work after consuming 62.48% of the total estimated project duration. The project has a negative value for schedule variance (SV) which means that the project is behind schedule. Schedule variance percentage is -11.05% therefore the project was 11.05 percent behind schedule. A SPI of 0.89 stated that the project was only progressing at 89 % of the rate originally planned. Cost variance percentage is 4.84% therefore the project is 4.84 % below budget for the work performed till 31st March 2012, excluding penalties applicable due to delays.

T.Subramani and M.Sekar (2015) research paper presented brief explanation for preplanning project management, Pre planning helps to schedulize the working period in a proper manner and also purchase the goods at the right time. Advantages of using this software was centralized project repository with all projects in a centralized database, the robust security module protects project data and offers flexibility when determining who can access each project. CPM Scheduling provides Critical Path Method (CPM) Scheduling, which uses the activity durations, relationships between activities and calendars to calculate a schedule for the project. CPM identifies the critical path of activities, those activities that affect the completion date for the project or an intermediate deadline, and if delayed will delay the finish of the project.

III. OUTCOME OF REVIEW

- a. Planning, scheduling is one of the important part in the construction industry because it gives exact time and cost in the construction project.
- b. Tracking and application administration with web assess give an extra feature to these primavera tools.
- c. In the future time and money will be considered very important considerations so

that in primavera two things can be controlled day/weekly/monthly/yearly.

- d. It would help in improving the efficiency and proper step by step planning of project implementation.
- e. Proper utilization of the work force which is to be utilized without wastage of men, material and machinery.

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