

Application Of Primavera Software In Management Of Construction Project: A Review

Gaurav S. Narlawar, N. B. Chaphalkar, Sayali Sandbhor

Abstract— The construction industry which provide large-scale employment is the foundation of development for emerging countries like India. The productivity of the construction industry depends largely on resource management methods. Also, it is very difficult to prepare accurate and achievable plans in large construction projects. As the complexity of the project increases and the cost of the project surges, companies must effectively manage their budgets and schedules. For construction project monitoring and control Primavera P6 turns out to be an effective tool because the time to upgrade is significantly reduced. This paper aims to provide a review on application of Primavera software in time and resource management of construction project. The study finds how Primavera P6 software solves various complexities associated with planning, scheduling, controlling, monitoring and tracking of construction projects based on detailed literature survey..

Index Terms— Construction project Planning, Primavera, Project Management, Resource Management, Scheduling, Tracking.

1 INTRODUCTION

Project management occupies an important place, especially in the allocation of resources and smooth operation with an assigned budget. In order to successfully complete a project under the complicated situations, it is important to follow effective ways to use available tools and methods, taking into account present technology and management [1]. In the construction industry, an inappropriate planning and scheduling waste a large quantity of time, money, and resources [2]. Planning and scheduling are two important factors for successful project completion [3]. Planning and scheduling are aimed at ensuring the proper functioning of the project in accordance with the project schedule, and corrective measures can be applied in case of some deviation [4].

Finalizing the construction site on a scheduled date is the most important task for project managers [4]. The effective planning, scheduling and controlling of construction projects results in reducing construction time, reducing overhead costs and minimizing disputes [5]. Monitoring project progress in terms of time, performance, planning and resources can identify a delay area that requires timely actions through the actual project implementation. Lack of resources is a common cause of project setbacks [6]. All construction projects are aimed at achieving the objectives in terms of time and quality [4]. According to Oracle, 90% of projects exceed allocated budgets, so the failure rates of construction projects are high. Therefore, using a large amount of software can help applicants manage their applications best and reduce the

amount of time it takes to make grim arrangements [7].

Conventional Scheduling Methods

Although planning techniques are common in the construction industry, such as the Gantt chart and CPM, there are issues in scheduling linear projects with the applications of these common techniques. The LOB and its variations are beneficial to linear construction. The Gantt chart and Critical Path Method (CPM) scheduling technique are prevalent in construction projects for the user-friendly software, such as Primavera Project Planning. Following sections would throw light on the use of Primavera P6 for construction project planning, scheduling, resource planning and progress tracking.

2 APPLICATIONS OF PRIMAVERA SOFTWARE

2.1 Application of Primavera Software for Project Management

The study by Liberatore, M., et al. [8] explored project management software applications and upcoming research in the construction industry. The study discovered that construction experts having additional education with experience tend to work on a small number of projects, more active than respondents in overall research and use Microsoft Project next to Primavera. Also, construction professionals found to be active users of critical path technique for analysis of earned value for control, planning with resource scheduling and accessing overall planning and control. Sajad, M., et al. [9] examined the selection of the appropriate software project management tool out of the list of Primavera, MS Project, GanttProject, Redmine, BaseCamp, dotProject and Assembla. The study overviewed that Primavera is complete multi-project planning and control software that is the best project management module. Soundarya, R., et al. [5] presented a comparative study of MS Project and Primavera software with the help of case study of an apartment building to display how proper planning and scheduling is done. The investigation

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was made owing to their analogous technical characteristics and evaluation based on the project management function. The study investigated that Primavera has some of its working characteristics, technical features and functionality upgraded as compared to MS Project. Primavera also offers excellent security tools for retrieving baseline plans and project files. In addition to resource costs, primavera allows to plan, remaining and activity expenses to enter at the activity level whereas Microsoft project does not have this capability.

2.2 Application of Primavera Software for Resource Management

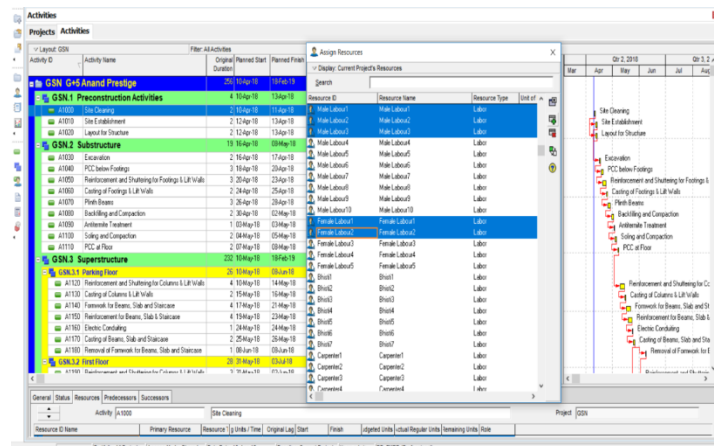


Fig. 1: Assigning Resources to the Activities in Primavera P6

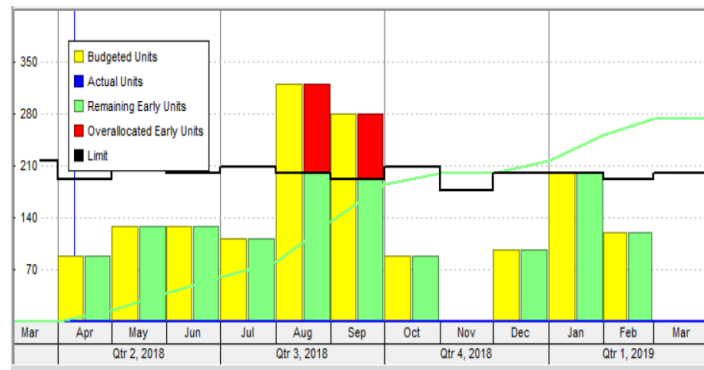


Fig 2: Indication of resource allocation in Primavera P6

Kastor, A., et al. [6] evaluated the practicality of Primavera P6.0, Microsoft Project 2007 and Open Workbench 1.1.6 which three prevalent resource levelling tools with levelling two actual construction projects. The results implied that Primavera P 6.0 is widely appreciable software since it permits users to outline an infinite criterion as rules of priority in principle. Fig 1 above depicts the typical interface for resource

allocation available in Primavera P6. Fig 2 shows the indication of over allocation of resources that can be rectified by devising useful modifications in the planning.

Nagaraju, S., et al. [2] assessed resource scheduling of speedy construction project having restricted duration. A schedule of Primavera software projects has been prepared for various works on the construction of a commercial building and the analysis of limited resources was carried out by equalizing resources for various activities by reducing resources with increasing duration to study the effects of time. The study concluded that the project schedule presented was constrained with time owing to user’s requirements. The only way to increase the time in the schedule was possible with the resource leveling, since whole schedule activities were critical with total float zero. The planned schedule increased daily expenses owing to unexpected labor requirement which consequently affecting the total cost of the project to very high extent. Reddy, B., et al. [3] illustrated the importance of resources allocation considering two construction projects in Dubai. The unintended discussion with the site supervisor & project manager with collection of the essential information meant for the resources levelling was carried out. The study detected reduction in resources demand by 5.65% in combined option with aggregated and then levelled than individually levelled. Pradhan, S., et al. [1] concluded that Primavera offers convenient options for every single task. The discrete works’ cost can be identified accompanied by the time.

2.3 Application of Primavera Software for Project Planning and Scheduling

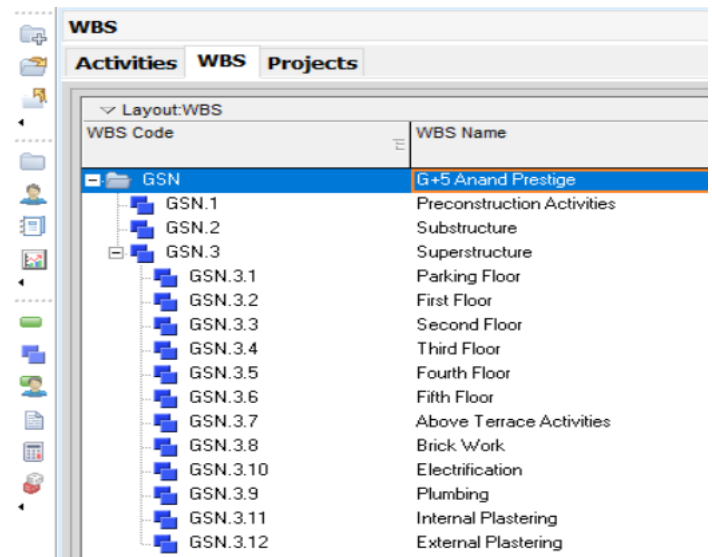


Fig. 3: Creating WBS in Project in Primavera P6

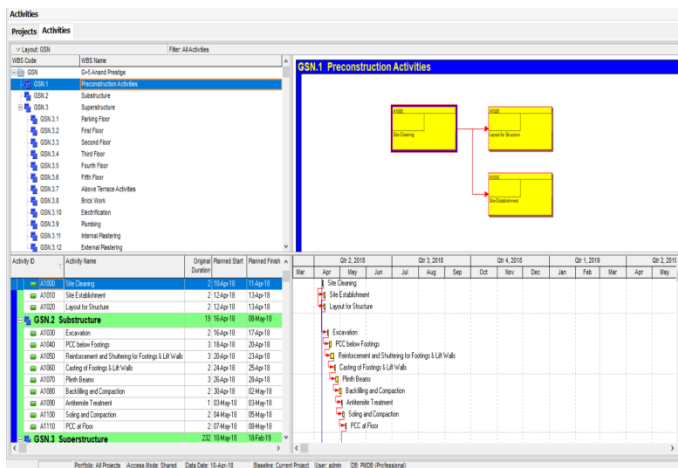


Fig. 4: Schedule Run in Primavera P6

Planning and scheduling interface of Primavera P6 is shown in Fig 3 and Fig 4 above. Polekar, U., et al. [10] examined the shortcomings in the patron organization's procedures of planning and scheduling. The establishment of the residential construction was carried out with thorough observation of the on-site activities and a proper comparison was surmised among the actual performed & planned activities. The outcomes showed that contractors along with subcontractors performed an important part completing the project on schedule. The main reasons are related to the performance of the contractor like labor scarcities, dearth of direction during implementation and management of equipment & site. Subramani, T., et al [11] studied the comparison of the temporal characteristics of the traditional construction method for high-rise residential and industrial systems through formulation of an industry-standard benchmark of total construction period by means of simulation modelling. Primavera (P3) software was considered for developing project model. It was noted that sufficient time savings can be maintained and that IBS component adoption can be improved and the construction of 18-storey apartment can be accelerated in a total of 405 days (42%) time savings from the start of the project. Dhinesh, M., et al. [12] evaluated the residential building (G + 5) with manual scheduling as well as Primavera scheduling. It showed that Primavera is effective for optimizing the duration of a building's construction and project planning. Jaswanth, S., et al. [13] investigated optimization of planning and scheduling of G+6 building construction. The study analyzed the scheduling technique followed by the organization, developed the critical path method and investigated the errors in planning and scheduling. The study observed that Primavera software is a user-friendly which provides user to perform any type of task. The cost of distinct operations that break the structure can be known together with the time span. With help of Primavera software, 6% of the schedule has been optimized compared to the originally planned schedule. After optimization of cost, there is a variance of 2.9% in the cost compared to the originally planned budget.

2.4 Application of Primavera software for Project Monitoring, Controlling and Tracking

Saini, H., et al. [14] specified that Primavera software displays project progress step by step, which helps minimize the impact of delays in a project. It can compare the planned and actual progress of construction with no trouble. Tom, A., et al. [15] examined the process of project monitoring considering four-storied factory building. Primavera P6 project management software was used to analyze planned & actual construction progress of the building. Primavera P6 tracks the completed activities which will reveal the financial aspects of the included resources and the work done. The study revealed the necessity with practicality of Primavera P6 project management software and the significance of well-organized scheduling and monitoring. Haider, M., et al. [4] evaluated the planning, scheduling and tracking of construction of hostel building with Primavera P6 web logic. Web access to a single project can be accessed by multiple users from anywhere in the world. We can maintain security by entering individual login names and passwords. Polekar, U., et al. [10] observed that Primavera has demonstrated to be additionally efficient in project monitoring. The Primavera software is beneficial for tracking contractor's work more accurately. Also, the organization had reformed planning and scheduling practices to set weekly targets for contractors as an alternative for monthly targets and trained the project managers and engineers to use software during planning, scheduling and tracking. Veena, H., et al. [16] analyzed an apartment building with Primavera P6 for the schedule management methods having constraints. It was noted that project delays occur due to inadequate resource supply. The preparation of a correct and effective plan is more problematic in major projects. The study detected decrease in the duration of the project by 13.03% which increases cost of project.

3 LIMITATIONS OF PRIMAVERA SOFTWARE

There are some limitations to the Primavera which have to be taken into consideration.

1. It sometimes produces unrealistic schedule when out of sequence progress occurs and result in inaccurate information and artificially delayed the project. This could mislead to send the wrong message to the project team that forecast project completion date is far behind the baseline if the Scheduler isn't aware the changes of critical path activities and/or due to out of sequence activities.
2. As Primavera respect CPM (Critical Path Method) rule that require the correct information and the appropriate logic to forecast a realistic completion date, it may be difficult to use in the generic activity of works. It requires lot of experiences and knowledge, the detail information of scope and time in order to design the schedule activity and logical sequences.
3. Scheduler will be busy with fixing logic to reflect the actual sequence in the field or contractor's current activity sequence,

seeking stakeholder's agreement and documenting the changes. However, this could be on the advantage side if the effort spent is worth. For example, correct the logic of the critical and high-risk activities (if they became out of sequence activities) that have been agreed in the estimated schedule assurance review and schedule risk assessment.

4 OBSERVATIONS

It is observed that lack of knowledge about resources and the details of the interaction between different resource sources lead to inadequate use of resources. The most software development is now carried out on a cloud basis, so the trend of web-based software development is growing very rapidly. The web-based management tools utilized to manage cloud basis sort of software development which includes Oracle Primavera P6 Web Logic. Haider, M., et al. [4] revealed that, comprehensive data regarding cost regulation, work time management as well as delays in reasonable actions are delivered with project planning & scheduling. It is noticed that, levelling of resources is crucial to ensure adequate allocation of resources across construction projects.

Primavera software improves facility distribution by providing detailed information on time management, cost management, updates and monitoring, etc. It is observed that organizations can increase profitability and productivity by optimizing project resources. The Oracle Primavera P6 is less efficient in project planning, scheduling and tracing than Oracle Primavera P6 Web Logic [4].

5 CONCLUSIONS

The project manager is responsible for ensuring the success of the project and can avoid project delays through Primavera software with identification of critical project activities. With Primavera P6 software, project management becomes more efficient. For construction project monitoring and control Primavera P6 turns out to be an effective tool because the time to upgrade is significantly reduced.

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