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Optimizing Planning and Scheduling while Monitoring Construction Projects: Review Paper

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Abstract: **Completing a large construction project in time and within budget is not an easy task. Project planning and scheduling plays a central role in predicting both the time and cost aspects of a project. In this review paper various studies are presented related to Project planning, important benefits of good planning and the Working Principle of Primavera P6 are presented. Project Management modules once considered a necessary commodity in the Realty & Infrastructure construction sector is now viewed as a strategic asset for organizations.**

Keywords: Production; planning; scheduling; coupling; constraints.

I. INTRODUCTION

The project consumes several resources in its life to achieve the desired goal. Delay in time increases the cost of a Construction Project. For large construction projects with a large budget; it becomes very difficult for the project team to complete tasks in scheduled time. It is therefore very important to have a tool in the hands of the project team that can be used to monitor project activities. Primavera Project Planner P6, the Oracle software, is an incredible asset owned by the Venture Group. The product helps in the efficient organization, planning, and control of activities. Construction workers in India are reluctant to use the organizational and business planning processes used around the world and currently serve as a benchmark for the timely completion of tasks. The survey includes discussions/presentations on Primavera P6, an accessible business organization, and planning device. The nature of the planning established by the product requires regular details and reasons how the product improves the business is largely overlooked by customers in India.

Without prejudice to the disclosure of information on various tenders, their interrelation, and the conditions under which it is possible to anticipate the overall duration of the company during the preparatory phase. The planning must be comprehensive enough so that the client can understand in detail the rationale for the various planning exercises. Currently, the Construction industry is one of the most widespread and rapidly growing realities in our country and in the world. It is now necessary to have specific arrangements and strategies to improve public finances, and their current situation, to cope with the degree of progress in and around metropolitan areas, and the time required to achieve this goal can be reduced.

II. LITERATURE REVIEW

Alberto Cerezo-Narváez et. al [1] The research report examined whether coordinating a cost allocation structure (CBS) can spark the era of stronger PSPs in development companies. The results showed that the PSP contains a hierarchical structure of the project scope. It is based on services and avoids both duplication and omission of activities. As project work is more clearly defined, project roles and responsibilities can be more easily assigned to subcontractors and organizational units. This, in turn, helps define more representative budgets and project plans.

Abdul Aziz and Sanjeet Kumar [2] The research aimed to understand the difference between artificial and spring software to estimate the financial and workforce management planning of a project using e.g. References and unique monitoring and control methodology using Primavera software. The estimated time for completion of the project for the G + 4 building at the University of Osmania in Hyderabad is has been set by the contractor at 560 days, or approximately 18 months. The project itself, exact planning, implementation control and monitoring of all activities with the Primavera tool on schedule. Project completion is estimated in just 486 days. The planning of various activities during the project would be optimal and thus the management of finances and manpower can be done correctly. Primavera P6 software is a perfect and efficient tool for project management and for monitoring and control of various construction projects.

Ajesh Pilaniya and Ashwin A. Mahajan [2] The aim of the research was to illustrate the importance of Primavera P6 Web in complex construction projects such as the Metro project. The research objective was achieved by using and observing the advantages of P6 Web over the client version. This software is effective and offers added value for a project. It is a proven software and it definitely improves the efficiency of the whole project. It acts as an excellent communication bridge between senior management and all other teams physically reviewing the progress of the project. The research paper focused on the additional advantages and benefits of the web-based P6 spring for planning and scheduling of the Pune Metro Rail project.

Akshay R. Kohli [4] The main goal of the research was to identify the construction sequence for the construction of the buildings and also to identify the techniques that will be used in planning and program development.

In conclusion, the research was found to provide an in-depth analysis of the management of the Primavera P6 EPPM software project and explain all related aspects. The building construction management methodology was explained in terms of planning, planning and allocation and leveling of resources. The concepts of budget optimization and updating were understood and the project was executed efficiently.

Anurag Mahure and Amitkumar Ranit [5] The research paper presented an analysis of the construction of a dormitory for 200 trainees on Dr. Panjabrao Deshmukh Prabodhini in Amravati with a contract duration of 24 months. Therefore, after careful evaluation of this product, one can control the business to the point of increasing its costs.

Command, verification and control, as well as the need and feasibility of implementing executive programs such as Primavera P6 in a development project of this studio, should grasp the observation and control function in further development. And the ideal realization of a developing society. This was achieved through correct handwriting and observation and control approaches.

III. Project planning

Project planning is a general and common term in construction management that refers to the achievement of intended goals and objectives. Planning is essential to turn planned projects into reality. Therefore, the term project management has been used on various platforms to get closer to the goals set in construction projects. In general, planning consists of dividing the current project into small, definable, identifiable and quantifiable tasks or activities, which represent the logical dependencies between them. Basically, the project planning process refers to three general questions, stated as

- What is to be done?
- Who does it?
- How to do it?

Planning refers to the determination of the duration using explicit analysis when planning each individual activity to determine the final duration of the project and the time period for the delivery of the project. In other words, check the timing of any work activities identified by the planning process before or during the execution of the project. As a rule, it defines and characterizes activities of a sequential order by executing several individual projects in a symmetrical manner as the project is completed. A calendar is a tool for any project management team that is used and practiced to predict the most likely completion time of the project, thus enabling the timely completion of budgeted resources for each job.

IV. Working Principle of Primavera P6

Engineering and construction companies have a wide variety of temporary workers, vendors and manufacturers, ranging from large numbers of representatives around the world to assemblies of a few people. The independent form of P6 is widely used in this collection. Usage ranges from fully enhancing the product's strengths to simply using the framework as a popular program. The authoritative disclosure needs of the largest and humblest associations regularly dictate that Primavera P6 be used for corporate updates. The standalone form of the product is often used to meet these needs in a business-to-business place.

Primavera P6 is supported by an SQL employee. This means that many members can simultaneously access the information base and perform certain tasks. Companies can be separated and stacked in key chains that coordinate the structure of the association. Having all data from a single source is invaluable for announcing productivity, determining costs, and executing threats. The P6 manager portfolio has also been expanded to include 100% online availability. This allows confirmed customers anywhere in the world to access and access information about the P6 plan. It is important that although the Primavera P6 innovation is fully customizable, the arrangements made by Oracle do not work immediately. The actual combination and arrangement of Primavera P6 is normally done by an external IT master.

The dynamic planning technique depends on the alternative solutions implemented by the various project management teams and their partners.

i. Work/ Budget Scope- Project Management Team/ office.

ii. Strategic Planning- Project Management Team/ office.

iii. Project Work breakdown Structure – Scheduler of the project.

iv. Focused on the geographical and the physical breakdown of the past.

Important benefits of good planning include

- the ability to forecast resource requirements and costs;
- the ability to develop more realistic schedules with clear time deadlines;
- the ability to communicate with clear and reliable information to project stakeholders;
- providing reliable information for risk and opportunity assessment;
- providing good information for monitoring and control;
- minimizing materials wastage; and
- providing a strong basis for team coordination and assisting in the negotiation of contractual claims.

These benefits cannot be achieved without strong commitment and knowledge on the part of project managers and other project stakeholders on how to manage planning and scheduling most effectively.

V. Planning and scheduling methods and tools – Overview

lanning and scheduling methods and tools are regarded as essential parts of project planning and scheduling. It could be argued, therefore, that failures in project schedule performance should call for a specific focus on the effectiveness of existing methods and tools for managing construction schedules. In current practice, various project planning, monitoring and control methods and tools, in both traditional and modern approaches, are in use. Planning and scheduling methods vary in use, ranging from traditional approaches such as line-of-balance, the critical path method (CPM) and program evaluation and review technique (PERT) to more sophisticated methods such as critical chain project management and the Last Planner System. Based on these methods and tools, project scheduling can be classified into two main groups: resource-driven scheduling and time-driven scheduling. Resource-driven scheduling can be defined as a schedule that is driven by, and limited to, available resources (i.e. technical and human resources); examples are line-of-balance and the Last Planner System. Time-driven scheduling concerns the traditional scheduling of project activities based on estimated duration and their dependency relationships, regardless of resource limits; examples are CPM and PERT.

These methods are already integrated into software to handle the complexities of large-scale construction project schedules. However, the complexity of project schedules can hamper the understanding of the application of these different methods and tools when executing and controlling the project. Consequently, the effectiveness of scheduling using different methods and tools should be properly assessed by project managers and their planners. It indicated that the construction industry has struggled to become specialized in certain types of projects that require more sophisticated methods and tools to manage schedules than is possible using a traditional approach. The authors asserted that: “[…] the most utilized scheduling tools in the construction industry are CPM/PERT. However, the limitations of these tools are also being realized and research is going on to improve these tools and increase utilization of other tools such as linear scheduling techniques, simulation techniques, genetic algorithms for construction activities”.

Despite advances in many scheduling techniques, there are still many challenges in achieving a fit-for-purpose schedule, within the allocated time and available resources, using different methods and tools. These studies suggested there might be a need to determine more appropriate mechanisms for gaining a proper understanding of the underlying concepts of different methods and tools. introduced a knowledge-based construction scheduling framework to enable a better understanding of the different scheduling problems and the different methods and tools used to handle them. Yang also identified areas that need to be covered in the knowledge domain of construction scheduling.

VI. Factors affecting planning and scheduling

A number of studies examined factors associated with the performance of planning and scheduling in construction projects; however, the main focus has been on the factors affecting schedule performance as an indicator of project success. For example, different studied critical factors affecting scheduling performance on public construction projects in Singapore. Their study indicated that poor site management and lack of effective coordination among project stakeholders, as well as inadequate competence in the project management team, were ranked as the most significant factors having a negative impact on schedule performance. significant barriers to scheduling at the Aeronautical Systems Centre (ASC), where the findings revealed a lack of team training and acquisition of knowledge about scheduling, shortage of resources, lack of disciplined project management and schedule as the factors having the most impact on scheduling. In another study, on schedule performance in Indian construction projects, found that factors such as the commitment of project stakeholders, competence of owners and a diversity of perspectives from project stakeholders in planning were considered significant factors in the success of project schedule performance. In addition, adopting proactive scheduling, motivational programs and effective communication approaches are important factors for schedule performance.

the factors (or criteria) affecting the performance of scheduling from the perspectives of a number of project stakeholders. The authors revealed that project schedules did not seem to be properly considered by both project managers and their planners/schedulers, as many criteria were ignored while developing and executing the project schedule. These criteria concerned reliability and robustness of information in the schedule, resource utilization and constraints, skill and competence of the planners/schedulers, and the level of uncertainty and complexity within the internal and external environments. The authors developed a scheduling performance measurement framework which categorized the factors (or criteria) impacting schedule performance into four main groups as shown in Figure below.

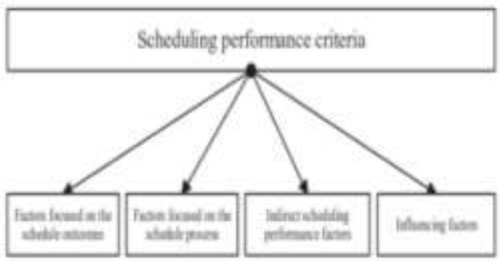

Fig. 1 scheduling performance criteria

Relatively few studies have investigated and analyzed factors affecting project planning processes. Assessed factors causing delay concerning the planning and design stages of construction projects. They found that changes in the requirements of project stakeholders, especially owners, poor scope definition and an unrealistic initial or baseline plan were the top factors causing delay to a project. Consequently, there is a need to focus on factors affecting project planning, which in turn have a negative impact on the performance of the project. Examined the relationship between project planning and project success from the perspectives of project stakeholders. They found that the effective definition of project scope at the early planning stages is significant to the success of a project. The authors further revealed that the inadequate involvement of project stakeholders will negatively affect the effectiveness of planning.

VII. Conclusion

Project Management modules once considered a necessary commodity in the Realty & Infrastructure construction sector is now viewed as a strategic asset for organizations that wants to remain competitive by quickly adapting to change and accelerating business performance. This review paper focuses on studies on Project planning, important benefits of good planning and the the Working Principle of Primavera P6.

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