

Delay Analysis of Flyover Bridge Using Primavera: A Review

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Abstract- Indian construction industry is growing quickly and huge development projects are going on. Most certainly it's justifiably or in a roundabout way connected with the Indian economy, the speed with which projects complete have appeared to influence the GDP of the country. Appropriate scheduling and planning are substantial in construction projects for decreasing and controlling postponements of the project, while an error in the same causes squandering of a significant quantity of time, capital, resources, and quality. Despite firm principles and policies, the monitoring process may be inefficient because of the practical problems prevailing or rising in the project. An attempt has been made in realizing the practical problems in project execution will contribute to proper recognition of the problem areas and implementing mitigation.

In this paper presenting literature survey and publications related to analysis of project management

Keywords- Flyover Bridge, Delay factors, Project Scheduling, Project Updating, Project Crashing.

I. INTRODUCTION

Many big construction projects are ongoing in India that helps the nation to grow economically as well as globally. Today construction industry in India is the 2nd largest employment-generating sector. It contributes to about 9- 10% of India's GDP and likely to increase to 15% by 2030. In spite of the prominence and the worthiness of the Indian construction sector, it can be distinguished that the owners, consultants, and contractors are unable to give importance to evaluate the time and cost overruns at the end of the project. Project management is the way by which guiding and managing human and material resources during the life of a project by using recent management practices to accomplish determined aims of scope, cost, time, quality and partakers satisfaction.

There are mainly six phases of project management, which in the project are as follows: definition, initiation, planning, execution, monitoring & control, closure of the

project. Usually scheduling comprises of the breaking the entire commenced project works into minor definable, distinguishable and quantifiable activities / works and then creates the logical relations between them.

II. REVIEW OF LITERATURE SURVEY

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 11months 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.

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.

Nimbal et. al. (2024) considered that owing to an expanding setting of condition, Construction industry is ever forthright for the improvement and headway in instruments and gear highlights, apparatuses of correspondence, systems of effective administration, instructing the HR about it. This exceptional specialization requires profoundly engaged whose development was intended to begin at Pune, Maharashtra, India. Undertaking Planning and Controlling devices or systems. In the present investigation PC based Project Management programming/apparatus Primavera P6 was actualized for the Planning, Scheduling and Allocation of assets for a (G+8) private condo building It knows the likeness between the arranged the arranged advance of development work and real advance of the performed work. In this way the centrality and the benefits of utilizing Primavera will be sketched out through the information comes about acquired. The acknowledgment of the product Primavera as a stage of booking is been on a blast in Multi National Construction Companies, yet because of obliviousness and absence of Project Management ideas and demoralize towards the utilization of PC based projects, little and medium scale Indian development organizations go up against different issues, for example, wasteful arranging, venture delays, wastefulness of assets and numerous different issues. In this way, it was endeavor to teach one such medium scale development organization about the upsides of Primavera in execution of any development extends proficiently.

R. Kohli (2024) reasoned that Efficient task administration is the need of great importance and it is the sole duty of the undertaking director to guarantee the working of the venture as indicated by its dispensed spending plan and due dates. For any development venture, legitimate arranging, booking, compelling asset allotment and refreshing the exercises is to a great degree basic to improve the task and build up most extreme spending augmentation. Dishonorable planning, sporadic checking and poor treatment of the continuous exercises builds the venture term and sum with a significant edge. Subsequently, it is fundamental to embrace expansive scale administration extends effectively with the assistance of PC helped programming. The well ordered strategy to embrace an undertaking has been clarified and a definitive use of Primavera P6 Enterprise Project Portfolio Management (EPPM) has been condensed.

Bandi Sri Ram Gopal et.al (2023) research served as a cicerone in analyzing the Yellareddy Tank Bund Portion Bridge construction, assisting in identifying the many difficulties that arose during or prior to the execution process.

The case study's production findings defy the importance of effective planning, scheduling, monitoring, and controlling. For the same task, the contractor estimated it would take 120 days to complete it, or about 4 months. With precise and timely planning, management, execution, and monitoring of all operations using the Primavera P6, the same project is still expected to be finished in 104 days. The project manager in charge should be well informed of the schedule's timetable, including the activities that must begin or end on time.

Results concluded that the utilization of diverse resources throughout the project's duration would be optimal. The software Primavera P6 proven to be an excellent and effective tool for monitoring and coordinating diverse building projects. The unique layout will significantly save the time required for upgrading efforts.

Ahmed Alhady et.ak (2022) aimed to provide an integrated methodology and analogical model for planning a construction project with the employment of ELS and the minimum moment method (MOM) for solving the resources problem. Furthermore, a comparison takes place between the leveled resource histogram using MOM and symbiotic organisms search (SOS).

Resource leveling is the process used to minimize the fluctuations presented in the resource histogram, which will maintain more stability in the field. As was mentioned in the Literature review that there are hundreds of methods available to apply resource leveling to any construction project. However, in this paper, the main focus was on the Minimum Moment method which is a metaheuristic technique used to solve resource leveling problems by shifting the non-critical activities among their total floats. Moreover, a comparison took place between the minimum moment method and symbiotic organisms search, which is another method of leveling which performs nine different resource histograms as a result of applying it to any construction project. The comparison result proved that SOS is a more efficient technique when it comes to resource-leveling.

Rasikh Riyaz et al. (2022) a survey discovered both Primavera and MS Projects are reputable project management tools that meet project objectives as well as organisational requirements. It is difficult to distinguish one tool from another tool since they employ different tactics and have diverse characteristics. In order to produce a high-quality CPM schedule, we should determine which software enables the specific project services to be fulfilled based on the project requirements. Although each tool has a unique set of capabilities, they all attempt to deliver professional construction management services. Both MS Project and

Primavera P6 were used to track the industrial project, and both software programmes assisted in the seamless tracking of construction work.

Simranjeet Singh and Sakshi Bhatia (2022) primary goal was to understand more about the functions of planning, scheduling, resource allocation, and project progress control. The first and most crucial thing we can say is the start and end dates of the project may be obtained through proper Primavera planning. The resource allocation for each activity can be seen, and resources may be modified and reallocated at any time. Each activity's numerous resources, whether material, machinery, or labour, can be allotted.

Akash Ashok Jagtap and Dr. Dhawale A. W (2021) objective was to investigate resources required for highway construction and increases Resource Productivity in different condition. A detailed study and analysis of the resources' productivity in highway projects was absolutely essential for the prediction of production rate of any team / group and as a whole of a project team. Identification of the factors affecting the productivity of each of the resources along with formation of graphs, formulas and charts to estimate production is also essential for the easy going of the job of planning.

The economic impacts of highway infrastructure; this suggests that recent empirical evidence can help reconcile the divergent views on the role of highways in the economy. The resolution illuminates two ideas that should be more prominent in transportation policy. First, highways are associated with both local economic gains and economic losses. In a system of centralized highway finance, this creates the possibility of a geographic mismatch between the areas that pay for highway projects and the areas that benefit from those projects. Second, efficiently using the available highway capital is potentially as effective as building additional highway stock in enhancing the local economic impacts of highways.

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.

Gunjal Kartikeyan 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.

Ishan Singh et.al (2021) objective was to prepare construction sequence for case study on Rani Kamla Vati Flyover (Cable suspension bridge at kamla park) using primavera P6. Resource allocation for individual activities was designed as per I.S. 7272-part-I.

Results stated that cost proportionate reduced due to decrease in time consumption and effective management of available resources. In order to utilize every day, the tasks were assigned proportionately without any lag so as to reduce the project completion time and this was effectively monitored using Primavera P6. 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.

Tushar Pruthviraj Sonawane and Pankaj Attarde (2021) objective of the research was to identify the crucial aspect of the expressway construction project, identifying the activities which could be start parallel so that the duration could be reduced time duration. □ Identifying the optimal use of resources and purchasing of materials and adopt the proper activity sequencing by assigning the appropriate relationship between activities.

The construction of the highway using the traditional method proves to be asymptomatic and consumes more time

with more complexity and massive error, which is the project's actual execution. The traditional planning method does not divide the main task, which hinders over-allocation of resources, improper decision making of resources for particular activities, etc. Microsoft Project is a modern tool of project management that helps to overcome the obstacles encountered. Due to the traditional method of planning and management. This allows for optimum and effective organization of activities to complete the project in the planned period and within the economy.

Dilip Kumar E and Manishankar S (2019) objective was to analyse the delays in constructing flyover bridges and control the time loss and cost manipulation of the project considering schedule and delay analysis of varied activities concerned in flyover bridge construction in Salem district, Tamilnadu, using Primavera Software. The Flyover bridge is 811m in length, and it's scheduled for 988 days. The construction unit's primary goal is to complete the work as specified on schedule with correct utilization of all the resources like man power, materials, cash, and machinery. To achieve the goal is to execute the project most economically better in terms of money and time.

Results stated that the Construction started in February 2016, and the duration of the Project as per the baseline Schedule is 988 days. Tracking till April 2019 revealed 99% completion of foundation and substructure work and 100% casting of precast segments, and 64% erection of segments, overall completion of the project is 58%. Causes of delay in our project are identified by a direct site visit and predict the project's approximate date. In our case study, the most important causes of delays in our bridge project are Traffic permission/diversion delay because this project is located at five road junction to bus stand, delay in utility shifting/diversion, delay in design works, shortage of resources, and land acquisition delay.

Shet Yash S and Ambekar Rahul S (2019) objective was to reduce the cost of project by using SCM model and investigate the feasibility of this model considering a case study from Pune city. The case study assesses the supply chain of the project in detailed, finding the problems in supply chain, highlighting the effect of these problems on supply chain. Finally a proposed supply chain is suggested to the contractor, so that he can save the cost of materials as well as lead time giving benefits and limitations of reduction of suppliers. Recommendations to use these proposed supply chain were presented including evaluation of material cost should be conducted between purchasing from supplier and purchasing directly from the material producer. These evaluations should

be carried out with respect to the time, transportation cost, credit allowance and payment method etc.

Vishal Annappa Nimbale and Balasaheb Jamadar (2017) study's major purpose and mission were to learn about the function of project planning, scheduling, monitoring, and control in the timely completion of any construction project. This conclusion was reached with the use of literature references and unique approaches intertwined in Monitoring and Control using Primavera project management software. The contractor anticipated the time of completion to perform the same job for 640 days, or roughly 21.5 months. However, the same project is scheduled to be completed in 434 days with exact and timely planning, management, implementation, and monitoring of all activities using the Primavera application.

Keval J. Shah and M. R. Apte (2015) in the case study entitled "Causes of Delay in Construction of Bridge Girders," Frequent site visits were carried out in an ongoing bridge girders construction project and collected the data from the site for each activity of construction of bridge girder and compared with its planned duration and actual duration. Identified the important causes of delay and the effect of these in the project duration. Causes of delay have a direct effect on time overrun and cost overrun for the whole project. Most of the reasons for delays are related to the contractor. Some of the causes are beyond all the project parties' control, such as differing site conditions, unforeseen weather, etc. In the overall responsibility of delay, the contractor possesses near about most responsibility.

Shaik Mohammad Masood et.al (2014) focused on understanding the impact of EVM in monitoring and controlling construction project progress and timely completion. The main message was that Earned Value Analysis allows you to recognize possible problems early in the project and take action to fix them. A case study of a "Windmills of Your Mind" Duplex Apartment in Whitefield, Bangalore was taken. For project planning and EVM calculations, Primavera P6 software was used. 'Earned Value Management is a remarkable way of project management since it incorporates cost, schedule, and scope and can be used to estimate future performance and project completion dates,' the article stated. It enables projects to be managed more efficiently and on time.

III. SUMMARY

Delays in construction projects are a pervasive issue globally and have been extensively studied in academic and professional literature. The causes of these delays are

multifaceted, encompassing managerial, technical, financial, and external factors. Numerous studies identify poor project planning, inadequate resource allocation, and inefficient supply chain management as core contributors to project delays. For instance, delays in decision-making, design approvals, and the relocation of utilities are often cited as internal administrative shortcomings that lead to schedule overruns. Additionally, external influences such as land acquisition disputes, legal complications, adverse weather conditions, and regulatory hurdles frequently exacerbate time overruns. Financial issues, including delayed payments and budget constraints, further compound the problem, causing interruptions in labor, material procurement, and subcontractor engagement. Several researchers emphasize the role of stakeholder communication and coordination, highlighting that fragmented communication between contractors, consultants, and clients often results in misaligned expectations and timeline deviations. Moreover, the literature stresses the importance of risk management frameworks and the use of modern project management tools such as Building Information Modeling (BIM) and Critical Path Method (CPM) scheduling to anticipate and mitigate delays. In summary, construction delays are complex phenomena resulting from interrelated systemic inefficiencies, and addressing them requires an integrated approach involving proactive planning, stakeholder collaboration, and technological intervention.

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