# RETHINKING CONSTRUCTION MANAGEMENT PRACTICES TO ATTAIN SUSTAINABLE DEVELOPMENT GOALS

**(VOLUME - 1)**

**Chief Editor**
**Mohd Asim**
Assistant Professor, Department of Civil Engineering, Integral University, Lucknow, Uttar Pradesh, India

Scripown Publications
New Delhi

***Chief Editor:*** *Mohd Asim*
***Edition:*** *1st*

***Publication Year:*** *2023*

***Pages:*** *201*

***ISBN:*** *978-93-94375-70-3*

***Price:*** *₹1200/-*

*Scripown Publications*
*2nd Floor, 304 and 305, Pocket - 4,*
*Sector - 22, Rohini, North West Delhi,*
*Delhi, 110086, India*

# CONTENTS

CHAPTER 1

# RETHINKING CONSTRUCTION PROJECTS WITH PRELIMINARY AND RATIONAL PLANNING: A PARADIGM SHIFT

**Lalit Mohan Srivastava**
M.Tech Research Scholar, Department of Civil Engineering, Integral University, Lucknow, Uttar Pradesh, India

**Mohd Asim**
Assistant Professor, Department of Civil Engineering, Integral University, Lucknow, Uttar Pradesh, India

**Syed Aqeel Ahmad**
Professor and Head, Department of Civil Engineering, Integral University, Lucknow, Uttar Pradesh, India

## Abstract

The goal of the study was to determine how crucial the preliminary and rational planning phase is to the success of any building construction project. Construction projects are planned efforts to erect a structure or facility. Construction projects involve the process of physically putting together a building or an infrastructure in the professions of civil engineering and architecture. The preliminary project plan outlines the strategy that will be employed to accomplish the project's goals during the Identification Stage. This will include the reasons for starting the project, the tasks that must be completed, the people involved in its creation, the deadline, and the method of completion. Any construction project should be planned rationally using a multi-step process that follows an organized path from problem identification to solution. Making logically sound conclusions requires a multi-step process called rational decision-making, which seeks to take an organized approach from problem identification through solution. Making a development plan for a building project is commonly referred to as construction project planning.

Index Terms- Construction Projects, Planning, Preliminary Planning, Rational Planning, MS Project

## Introduction

The initial step to managing construction projects effectively is thorough and strategic planning. More planning will be required the more complicated the project. A well-planned project increases productivity and offers a detailed road map for completing the work on time and under budget. Each project gets evaluated based on its use of resources, such as personnel, tools, money, office space, and time. Without adequate planning, it is almost impossible to guarantee that a business distributes and manages resources in the most sensible and economical manner. Planning involves setting goals, and managerial tasks like organising, arranging, staffing, directing, and controlling are used to achieve these established goals. Planning offers benchmarks by which to compare real performance. Planning, in particular, helps in critically evaluating the objective to figure out how feasible it is. By computing when the business will be able achieve its goal, it assists in decision-making and enables to set up constraints on time. Furthermore, it outlines who will be in charge of evaluating performance in accordance to the established objectives. To develop schedules project plans, manage resources, and keep track of time, project managers use Microsoft Project.

## Literature Review

Yash Pandit, Swaroop Kulkarni, Yash Choulwar, Soumitra Kher, S.D. Marawar (2017), "Analysis of Planning & Scheduling Using Traditional and Primavera Approach", International Journal of Innovative Research in Science, Engineering and Technology.

Construction industry is an integral component of a nation's infrastructure and industrial growth. Even though construction industry is the second largest industry in India, the growth of this industry has been differential across the nation. The rural regions need tools for economic development, land use and environment planning to cope with the status of development in urban areas. The time available to achieve this goal is shrinking. Here arises the need for effective project management. Many issues are being faced by the construction industry that must be taken care of. They Include time and cost overruns due to inadequate project formulation, poor planning for implementation, lack of proper contract planning and management and lack of proper management during execution. It has been estimated by analysts that the average cost of a project goes up by 30 percent compared to the budgeted cost. Observations show that proper skilful management is imperative for the

timely completion of the project within estimated budget and with allocated resources. Projects with good planning, adequate organizational machinery and sufficient flow of resources cannot automatically achieve the desired result. There must be some warning mechanism, which can alert the organization about its possible success and failures, off and on. Project monitoring is the process of collecting, recording, and reporting information concerning project performance that project managers and others wish to know. Monitoring involves watching the progress of the project against time, resources and performance schedule during execution of the project and identifying lagging areas requiring timely attention and action whereas project controlling uses data from monitor activity to bring actual performance to planned performance.

Nidhi Raghuvanshi, Prof. M.C. Paliwal (2021), "Planning & Scheduling Construction Projects using Primavera Software: A Case Study", Published in International Journal of Trend in Scientific Research and Development.

Planning and Scheduling are very essential in large infrastructure projects like road and bridge construction. These projects have numerous stakeholders and large amount of money, resources are invested. Improper planning and scheduling leads to loss of resources, increase in project cost and unpleasant delays. But with computer and software evolution, it is now possible to plan these projects using software like Primavera P6 and Microsoft office project. This paper deals with presentation of AwasYojna project in New Market Bhopal comparing the two different blocks namely Block A and Block B. The project stated the advantage and added benefits of web based primavera P6 for planning and scheduling of structures under construction under the government scheme of "Awas Yojana" framing the issues and complications faced in the time frame of construction and availability of resources.

PS Gahlot, B.M. Dhir (2007); "Construction Planning & Management" Book.

The main functions of construction management includes planning and scheduling, organising, staffing, directing, controlling & co-ordinating.

Planning is the starting point of all management functions. Planning leads to organising & staffing followed by directing, controlling & co-ordinating.

**RH Neale, DE Neale - 1989 in 'Construction Planning' book**

Planning is the creative and demanding mental activity of working out what has to be done, how, by when, by whom, and with what, i.e. doing the jobs in mind. Plans are not just pieces of paper. Plans represent the results of

useful thoughts, comprehensive discussions, decisions and actions, and commitments made between people and contractual parties.

Shelbourn, M, Dr.; Bouchlaghem, N.M, Professor; Anumba, C, Professor; Carrillo, P, Professor; "Planning and Implementation of Effective Collaboration in Construction Projects"; Civil & Building Engineering, Loughborough University, Loughborough.

The twenty-first century is now seen as the time for the construction industry to embrace new ways of working if it is to continue to be competitive and meet the needs of its ever demanding clients. However, it is now recognised that good collaboration does not result from the implementation of information technology solutions alone, the organisational and people issues, which are not readily solved by pure technical systems, need also to be resolved.

S. Ragavi, Dr. R.N. Uma (2016); "Review of Project Management Softwares - MS Project and Primavera"; International Research Journal of Engineering and Technology.

Planning of huge projects requires a huge amount of paperwork, which can be reduced with the help of primavera and MS project software. Microsoft Project and Primavera is the modern tool of Project Management that aid to beat the obstacles faced remaining to conventional ways of Planning and organization. It helps for the optimal and resourceful organization of activities which helps to give the dream to complete the project in planned duration and within the market.

Rhuta Joshi, Prof. V. Z. Patil (2013); "Resource Scheduling of Construction Project: Case Study"; International Journal of Science and Research.

Analysed man power resource constrained project using Microsoft Project 2013 by resource levelling and compares the time cost in residential building. It helps to resolve resource conflicts and also useful in minimizing the project duration within limited availability of resources to make the project profitable. They concluded that without proper resource scheduling the project gets delayed and they can be leveled to reduce project duration and cost.

**Methodology**

The five steps of the project's management lifespan are starting, planning, executing, monitoring and controlling, and closing. The management of the project life cycle's planning phase involves selecting a technology, identifying work tasks, evaluating the duration and resources required for every task, and

identifying relationships among the various work activities. A well-constructed construction plan acts as a basis to formulate the budget and the work schedule. The project manager works together with the team to come up with the technical design, task list, resource plan, communications strategy, budget, and initial timeline for the project during the planning phase. The project manager further establishes the functions and duties of the project team and its stakeholders. Creating planning offers us a greater grip over the course of things in the project. Making decisions regarding what to do, how to do it, when to do it, and who ought to do it in advance is known as planning. This bridges the gap among the project's current state and its desired state. The planning process involves establishing goals and arranging them logically. The process to identify the most effective and economical way to produce an acceptable final output of the construction project is termed as construction planning. A construction plan's main function is to give a project a sustained path from conception to completion. A strategic plan developed at the inception of a project enables project stakeholders to ensure that the project continues to adhere to the initially stated goals by functioning as a guidepost and reference point.

**Findings**

Two construction projects: one School project, and another, academic block of Medical College have been selected for comparative study regarding applicability of preliminary and rational planning in construction projects with similar nature. The similarity among both the projects are as following:

| S. No. | Parameters | School Project | Academic Block of Medical College | Remarks |
|---|---|---|---|---|
| 1 | Construction | Building Construction | Building Construction | Same |
| 2 | Project Type | Greenfield Project | Greenfield Project | Same |
| 3 | Type of Structure | Framed Structure | Framed Structure | Same |
| 4 | Covered Area of Academic Block | 3.50 Lacs | 3.14 Lacs | Variation of 11% only |
| 5 | Foundation Type | Raft Foundation | Raft Foundation | Same |
| 6 | Project Output | Educational / Institutional Building | Educational / Institutional Building | Same |
| 7 | Project Constraints regarding project completion | Strict Finish Date to allow the Client to start the academic session | Strict Finish Date to allow the Client to start the academic session | Same |
| 8 | Scope of Works | Structure, MEP, Interior & Facade works | Structure, MEP, Interior & Facade works | Same |

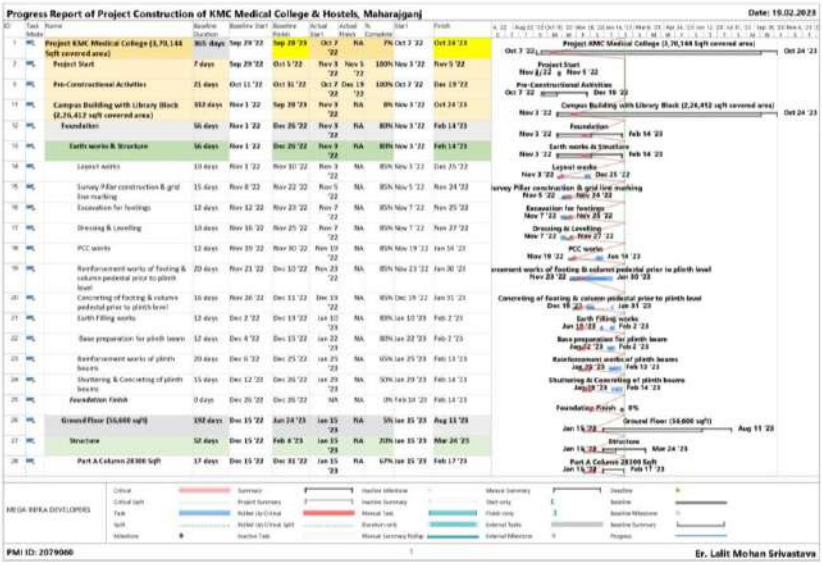
**The findings in the School project**: This project is an example of initiation of the project without proper planning. No finish date was planned during initiation of the project. The drawings have been revised several times which delayed the project.

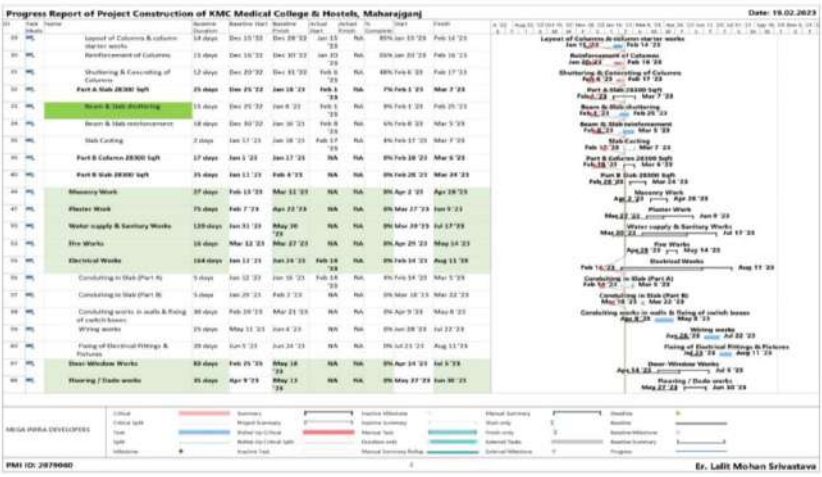
- No scope of work had been documented
- No project schedule was prepared during initiation and execution phase of the project
- No Risk Management Plan have been prepared
- No Communication Management Plan have been prepared
- No Stakeholder Management Plan have been prepared
- No Change Management Plan was defined
- Due to lack of planning in the Initiation phase of the project, these are the observations:
    - During excavation for the basements, shoring work was executed immediately as per the site conditions without planning, resulted in delay of 06 months
    - Due to un-defined scope of works, no sufficient progress was observed till January 2021.
    - Cost over-run was claimed by the clients due to no defined budget during initial stage of the project
    - No Stakeholder Management Plan was prepared, due to which progress of the project affected badly
    - Current situation of the project – project is kept on hold by the clients due to frequent encounter with the unplanned circumstances and still not completed after 03 years of unplanned execution

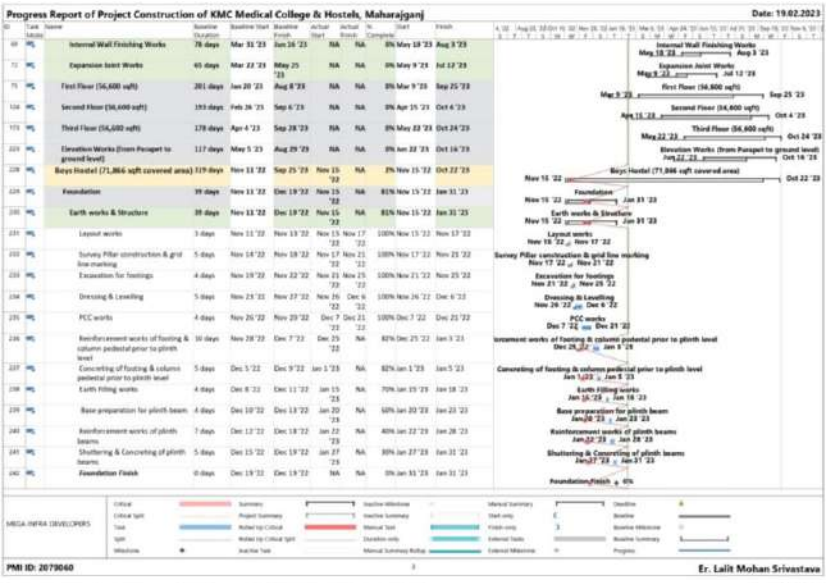
**The findings in the Academic Block of Medical College:** This project is an example of initiation of a time-constraint & budget-constraint project with proper planning prior to the execution of the project

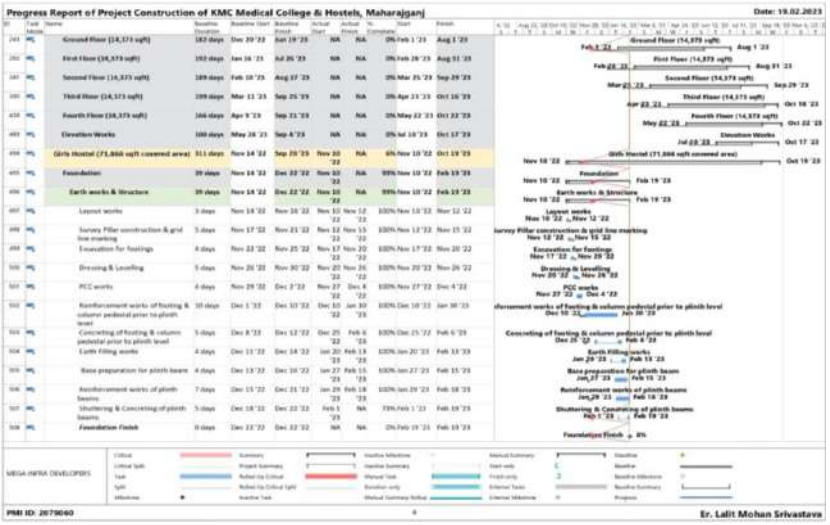
- Planning Team has been determined regarding planning for the project
- The Roles & Responsibilities have been determined prior to the execution of the project.

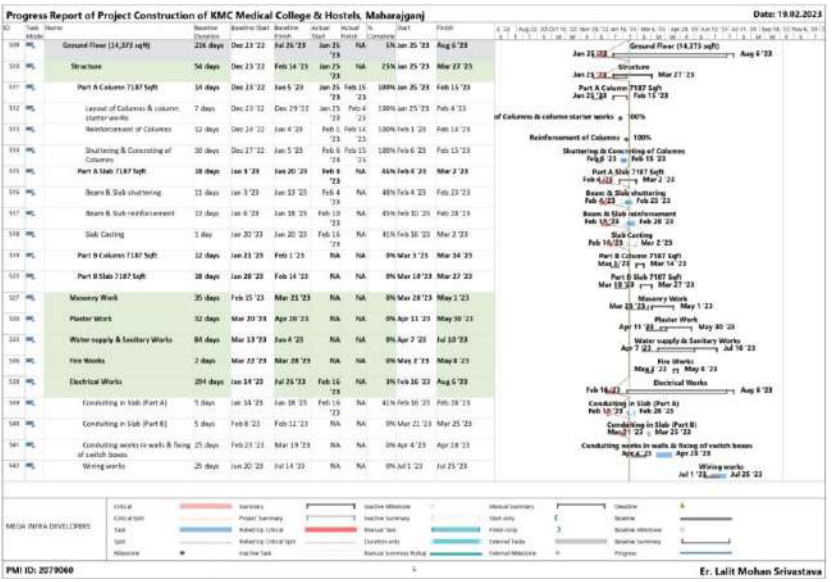
- Time Management Plan has been prepared with inclusion of all the scope of works in the Work Breakdown Structure (WBS) with activities prepared on the Microsoft Project Software, and all the activities are interlinked with each-other.

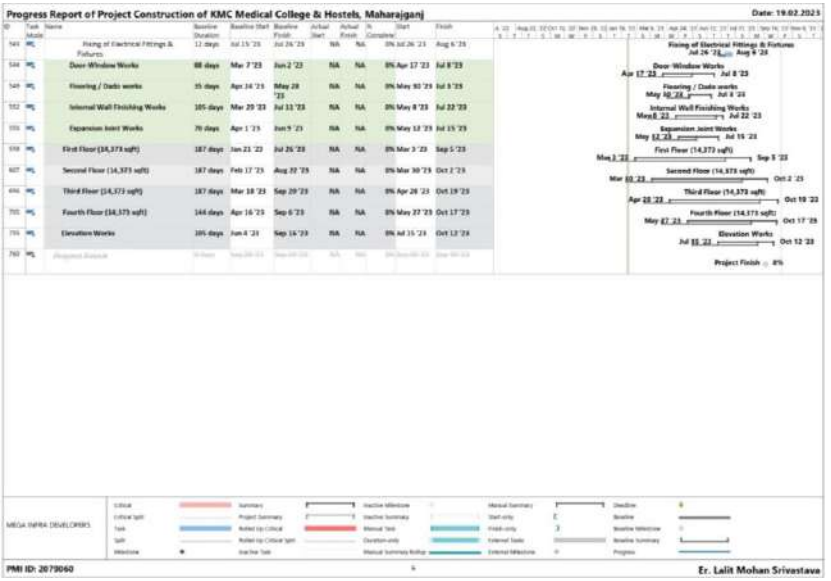



Progress Report of Project Construction of KMC Medical College & Hostels, Maharajganj
Date: 19.02.2023
MEGA INFRA DEVELOPERS
PMI ID: 2079060
Er. Lalit Mohan Srivastava


Progress Report of Project Construction of KMC Medical College & Hostels, Maharajganj
Date: 19.02.2023
MEGA INFRA DEVELOPERS
PMI ID: 2079060
Er. Lalit Mohan Srivastava




**Tracking Schedule with respect to the Baseline Schedule of Academic Block of Medical College**

- Critical Path of the Baseline Schedule has been identified
- Scope Management Plan has been prepared along with Procurement Management Plan which is also aligned with the Time Management

| Preliminary Planning | | | | |
|---|---|---|---|---|
| **S. No.** | **Parameters** | **School Project** | **Academic Block of Medical College** | **Remarks** |
| 1 | Scope Management | Neither drawings were finalized prior to initiation of the project; nor the type of materials & their specifications were decided | Drawings were finalized as 'Good for Construction' prior to the initiation of the project. The scope was further described in work breakdown structure (WBS) and activities in Microsoft Project software. The materials required for each activity along with the specifications were decided. | Scope finalization prior to the initiation of the project prevents scope creep during the execution which ensures successful completion of project. |
| 2 | Time Management | Neither project schedule was prepared prior to the initiation of project, nor finish date of the project was decided | Project Baseline Schedule was finalized in Microsoft Project software which was also an integrated part of the contract signed by the contractor | Schedule finalization is a necessary step prior to initiation of any construction project to ensure its successful completion |
| 3 | Cost Management | Lump-sum cost of work was calculated for incomplete scope which represented wrong budget; a lot of works were not taken into consideration to calculate budget | Cost associated with each & every activity was calculated and was entered in the Project Baseline Schedule in Microsoft Project software. As the scope of project & rate for each activity was finalized prior to the initiation of the project, the project budget was finalized. | Project Budget should be finalized prior to the initiation of the project which ensures successful completion of the project. |
| 4 | Human Resource Management | No planning was finalized for human resource management | Teams comprises with skilled, semi-skilled & unskilled staff & members were decided with the help of RACI chart, and the teams have been assigned with the activities of the baseline schedule | Planning of required human resources for each activity in different time-span of the project should be finalized prior to the initiation of the |

| | | | | |
|---|---|---|---|---|
| | | | prepared on Microsoft Project software | project. |
| 5 | Communication Management | No communication channels were finalized among stakeholders for different domain (technical, financial etc.) prior to the initiation of the project | Communication channels with the help of RACI chart & Stakeholder Management Chart was finalized prior to the initiation of the project. | Smooth & unambiguous communication with the key stakeholder ensures timely solution of any issues in the project. |
| 6 | Procurement Management | No procurement plan was created for the project prior to the initiation of the project | Procurement Management Plan was finalized prior to the initiation of the project which was linked with each activity of the project baseline schedule along with the details of materials & probable lag time to unload the materials from the date of order to vendors | Timely & sufficient availability of materials in any construction project is a basic requirement. Procurement Planning prior to initiation of any project ensures smooth execution of that project |
| 7 | Quality Management | As there was no scope finalized, hence the required parameters for quality assurance were also not finalized | As scope was finalized prior to the initiation of the project along with materials & their specifications, the required parameters for quality assurance along with frequency of field & laboratory tests were finalized. | Quality Management Plan should finalized prior to the initiation of the project |
| 8 | Risk Management | Neither any probable risks were noted down, nor any preventive actions were prepared | A Risk Register was prepared prior to the initiation of the project along with the preventive actions to mitigate the probable adverse effects of those risks. In project baseline schedule, probable risks in | Risk Register should be prepared prior to the initiation of the construction project to ensure timely preventive actions can be |

| | | | | |
|---|---|---|---|---|
| | | | critical activities were marked along with the probable level of severity so that preventive actions can be taken accordingly during execution | planned (or corrective action in case of occurrence) accordingly. This ensures smooth execution of any construction project |
| 9 | Stakeholder Management | No stakeholder management plan was prepared prior to the initiation of the project | A detailed stakeholder management plan associated with the communication management plan was prepared prior to the initiation of the project along with the description of the extent of involvement of each stakeholder & their effect on the progress of the project was analyzed | Stakeholder Management is a key to smooth execution & successful completion of any construction project which should be prepared prior to the initiation of the project |
| 10 | Integration Management | As there was no planning of scope, cost, quality, human resource etc. were done prior to the initiation of the project; hence there was no integration among them | The Integration Management Plan was prepared to maintain synergy among the scope, cost, quality, human resource, communication plan & stakeholder management plan. A proper change management plan was prepared to ensure smooth & unambiguous change in all inputs in case of change in any one input of the project. | A comprehensive Integration Management Plan along with Change Management Plan should be prepared prior to the initiation of the project to ensure smooth execution of any construction project |
| **Planning during execution of the projects** | | | | |
| **S. No.** | **Parameters** | **School Project** | **Academic Block of Medical College** | **Remarks** |
| 1 | Scope Management | Scope was changed abruptly during execution which badly | Scope was pre-planned. Change in scope which could not be avoided was | Proper planning for change in scope during execution |

| | | | | |
|---|---|---|---|---|
| | | affected the progress of the project | proceeded with a proper change management plan. Effect of change in one input was preceded in all the other inputs accordingly. | resulted in smooth execution of the project |
| 2 | Time Management | As there was no baseline schedule prepared, hence no tracking of progress of the project could be possible. | As the baseline schedule on Microsoft Project software was finalized prior to the initiation of project, tracking of each & every activities were done during the execution of the project along with deciding corrective actions in case of intermediate delay of activities. | Tracking of the progress of a construction project is required to analyze the progress, as well as, the effect of progress on the whole project in case of delay in any activity / activities. |
| 3 | Cost Management | As the scope changed abruptly, budget of the project changed accordingly due to which the payment cycle, and hence, the progress badly affected | Scope rarely changed; that too via Change Management Plan; and incorporating the scope & its affect in the project baseline schedule including cost so that budget & schedule can be updated | Project budget should always be controlled and the expenses should be tracked in comparison with the planned expenditure |
| 4 | Human Resource Management | As there was no manpower planning prior to the initiation of the project, the assessment of the required manpower could not be possible with respect to the probable finish date of project | As per the progress update in the tracking gantt chart in Microsoft Project software, the critical path analysis was always done & manpower allotment is being done accordingly | Adequate availability of the manpower with the required skill-set is necessary to complete the activity in time along with as per the quality assurance plan. |
| 5 | Communication Management | No communication channel was followed during execution due to | Communication channels were followed during execution; issue escalation followed to | Right communication at right time to the right person is the key of |

| | | | | |
|---|---|---|---|---|
| | | which several decision-making processes could not be taken in time. | already decided hierarchy as per the communication channels. This ensured issue resolution within scheduled time. | successful project completion |
| 6 | Procurement Management | Execution suffered a lot as there were sudden requirements raised to unload the materials. | As the schedule was being updated during tracking in Microsoft Project software, the materials were unloaded as per the scheduled (or updated) start date of any activity. | Procurement Planning linked with the updated project schedule is necessary for smooth execution of any construction project |
| 7 | Quality Management | As the scope was changed abruptly, the quality assurance was not been prioritized | Frequency of field & laboratory tests were being planned in the project baseline schedule to ensure quality of materials & workmanships | Quality Management Plan is necessary for quality assurance of the processes & output of the construction projects |
| 8 | Risk Management | Progress of the project suffered badly due to unavailability of planning to mitigate risks during execution | The preventive actions of the risks were linked with the activities of the schedule which was always been considered during execution; along with the update of risk register | To ensure completion of project within predetermined budget & within pre-approved time duration, risk management is necessary in construction project |
| 9 | Stakeholder Management | Unplanned and unregulated involvement of stakeholders affected the project badly due to lack of stakeholder management planning | Involvement of each & every stakeholder was predetermined along with analyzing their effect on the project & linking this with the communication management plan which enhanced coordination | Stakeholder Management Planning is necessary to ensure smooth execution and completion of the project |

| | | | | |
|---|---|---|---|---|
| 10 | Integration Management | Change in one aspect of project affects the other inputs & outputs of the project which could not be assessed prior to the occurrence | All the aspects of project were linked with each-other which facilitates accurate tracking of progress of project along with change in all aspects of project in case of change in one aspect of project | All the aspects of project should be in control to ensure completion of project within predetermined budget, time and quality parameters |

- Plan
- Cost management Plan has also been finalized of each & every activity of the work breakdown structure of the baseline schedule
- Human Resource Management has been prepared with the RACI (Responsible, Accountable, Consulted & Informed) chart
- Communication Management Plan has been prepared with clearly defining channels in all possible vertical & horizontal channels
- A Risk Management Plan has been prepared. One online risk register has been prepared on Google Doc in which relevant stakeholders have access to identify the risks & to write the preventive actions of those risks. One online Issue Register has also been prepared among the team members including consultants & clients so that all the relevant stakeholders may enter issue of the project, along with the corrective action taken to mitigate those issues

**Comparative Analysis of both the construction projects for parameters of preliminary & rational planning:**

**Conclusion**

Throughout the construction phase, planning includes figuring out the resources required to complete the project. The planning phase should not just concentrate on financial matters, but also on time, goods, suppliers, and workers. At the same time, the project's equipment requirements have also been determined.

In context with the project, a project plan should consists the following areas, whether it has been written down or not: The project's scope, comprising time and cost: exactly when do you want finish the building and on what extent of a budget? The project's objectives will determine what type of structure you design and those requirements that need to be adhered to the project to be

successful towards achieving its objectives. Which stage or activity of the project will represent considerable progress? A work schedule and breakdown structure need to be established as there are numerous different tasks that constitute the construction process. It is essential to define when each activity will be completed along with the logical sequence that each task will proceed in. Project progress should be monitored with regard to the schedule in order to determine whether the project is on track or lagging through comparing actual output to planned output. Deliverables go along together with planning, and poor planning results to, among other things, delays project completion, cost overruns, and poor execution. Therefore, it is essential that the team prior to executing activities, the project leader develops detailed and appropriate plans to ensure a smooth processes, good value for money, and completion on schedule.

**References**


1. Yash Pandit, Swaroop Kulkarni, Yash Choulwar, Soumitra Kher, S.D. Marawar (2017), "Analysis of Planning & Scheduling Using Traditional and Primavera Approach", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 06, Issue 04, DOI:10.15680/IJIRSET.2017.0604246
2. Nidhi Raghuvanshi, Prof. M.C. Paliwal (2021), "Planning & Scheduling Construction Projects using Primavera Software : A Case Study", Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-2, February 2021, pp.1110-1120
3. Shelbourn, M, Dr.; Bouchlaghem, N.M, Professor; Anumba, C, Professor; Carrillo, P, Professor; "Planning and Implementation of Effective Collaboration in Construction Projects"; Civil & Building Engineering, Loughborough University, Loughborough, LE11 3TU.
4. S. Ragavi, Dr. R.N. Uma (2016); "Review of Project Management Softwares - MS Project and Primavera"; International Research Journal of Engineering and Technology; Vol. 03, Issue 11, e-ISSN: 2395 -0056
5. Rhuta Joshi, Prof. V. Z. Patil (2013); "Resource Scheduling of Construction Project: Case Study"; International Journal of Science and Research, Vol. 04, Issue 05; ISSN (Online): 2319-7064
6. PS Gahlot, B.M. Dhir (2007) ; "Construction Planning & Management" Book, ISBN: 81-224-0411-1
7. Richard H. Neale, David E. Neale (1989) : 'Construction Planning' Book

8. ‘Project Management Body of Knowledge (PMBOK) and The Standard of Project Management’ Book, Seventh Edition, ANSI/PMI 99-001-2021, ISBN : 978-1-62825-664-2