

Planning and Scheduling of G+12 Building using Primavera P6

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ABSTRACT

Utilization of Project management in construction industry is now a days considered as a big skill to remote the allocation of resources and scheduling of the entire project. For such management activities various tools like primavera and MSP are in trend. People utilizes these tools to carry out an estimate scheduling for the entire project before starting. This helps out in making project run smooth and without any delay.

In this study we are utilizing primavera P6 software in a G+12 building project to justify the positive remarks of such scheduling. In this project we are considering data from site work.

Keywords: Scheduling, Allocation, Management, Construction, Resources.

I. INTRODUCTION

The project consumes several resources in its life to achieve the desired goal. An increase of cost due to a delay in time is associated with resources. For large construction projects with a large budget; it becomes very difficult for the project team to complete tasks on 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 why 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 development 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 can be reduced.

II. Literature Survey

P. N. Pharne et.al (2022) in the research paper, author investigated a road project of 1 Km length by conventional method of planning and using primavera P6 software planning. Comparative study of both conventional and primary software was given and the primavera gives better results. 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 project is minimized by using primavera software. Effective handling of materials and resources is optimized by using Primavera.

Results showed the drawbacks of the present project management system in running project. An efficient and cost effective new project management plan was brought to conclusion.

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 project site that was taken for project was Bangalore. 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.

Conclusion stated that 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.

Practical Utility

No detailed study on suitability of Scheduling a building project and related technique has been done in past researches were conducted on different parameters related to management of projects like activities, risk, resources allocation. however information on techno economic feasibility of materials to be used in tall structures is lacking.

- This study will provide a suitability criterion for Scheduling a live project (building).
- This study will provide a reference to project managers for management of a building project and to minimize the risks.

Objectives Behind the Research

- To develop scheduling and planning using Primavera P6 V8.3 for Structure prepared under government program "AwasYojna".
- To prepare construction sequence and comparative analysis in between two structure blocks and identification of reasons in delay.

- To conduct Financial Risk analysis using Gantt chart in Primavera P6.
- To assign proper sequence and links between different activities for early finish.

Case Study

Pradhan Mantri Awas Yojana (Urban) The mission was sent on June 25, 2015 and expects everyone in the metropolitan areas to be accommodated at all times. 2022. Under the PMAY (U) rules, the size of an economically weak zone (EWS) house can be up to 30 m². Regardless of the area of coverage, States / UT have the ability to increase the size of the homes in question and department approval.

The two blocks, block G and block H of Pradhan Mantri Awas Yojna Madhya Pradesh in RE-2, near Maurya Hills Bhicholi Hapsi Road, Indore were studied. The state government bears all the costs of purchasing, restoring and redeveloping the land. Government banks and private banks are in charge of financing the project.

The following sub work breakdown Structure (W.B.S) were taken.

WBS is a grouping of different elements of the project with concerned to specific project and it organizes or impinges to determine the overall intent of the project.

- Survey and Site Investigation.
- Substructure.
- Super Structure.
- Finishing Work

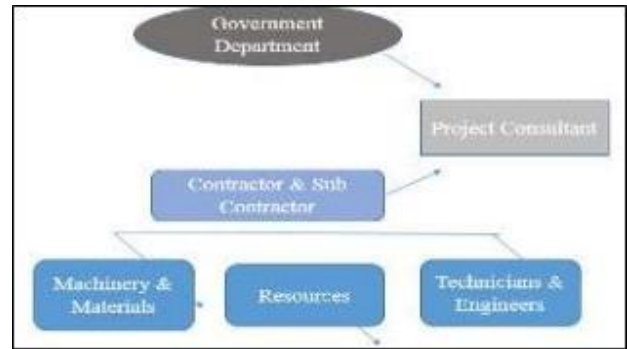


Fig 1 Hierarchical Structure of Construction Project Team

Table 1 Project Details

Project Details	
Name of Work	Pradhan Mantri Awas Yojna Indore, RE-2, near Maurya Hills Bhicholi Hapsi Road
Name of Agency	Shrivastava Consultants & Engineers
Amount of Contract	441 Cr.
Date of Start	2016
Tentative Date of Competition	2023

Background

The Pradhan Mantri Awas Yojna (Urban) situated in Aravali Parisar (Situated on RE-2, near Maurya Hills Bhicholi Hapsi Road) Indore Madhya Pradesh is considered in this research. In this project, preparation of scheduling and planning of the two different blocks in the defined project destination are considered in Indore and comparing it with present scheduling which is working on the site.

Project Planning and Scheduling

As soon as we create organization, the activity subtle elements are acquired in the bar graph. The equivalent is further visible in PERT view. The perspective demonstrates the action subtle elements which incorporates activity name, term, managing start and completion date and detailing information segment territory. After recording the initial activities with their start and end dates, one can monitor them throughout the project in the data portion of primavera screen.

Step 1: Selection of Ongoing task, for the undertaken project, considering running venture named "Pradhan Mantri Awas Yojna". Monitoring of the project is running by Nirvana Consultants & Engineers.

Step 2: Obtain point by point illustrations and rates which is fundamental for further analysis.

Step 3: With the assistance of task supervisor and site build set up the venture planning utilizing administration device Primavera P6 V 8.3.

Step 4: Detailed examination is done on asset task and levelling utilizing Primavera P6.

Step 5: Assigning Supervisor to every activity, to provide and update the running status of the work on day to day basis according to business sector rates.

In this step, creation of the company profile with division in which company operates was prepared. These divisions were further subdivided into streams such as Structure Urban and Structure Rural.

Step 6: Preparing Gantt chart graph and system models.

Step 7: Prepare planning according to current side conditions.

Step 8: Comparing both planning and scheduling to counteract flaws.

Project Scheduling

For task Planning, separated the undertaking in various Work Breakdown Structure (WBS) to appoint labor and length of every activity. The work breakdown structure is depicted beneath:

Survey and Preconstruction work which contains every one of the activities and questions be assembled or taken to the site territory. Like temporary structures namely site office, testing laboratory, Store room, Inventory Room and others are to be provided to begin working at the site. Such exercises are important to begin another task to oversee the working on site easily.

Step 1- To create enterprise project of a company to execute company profile.

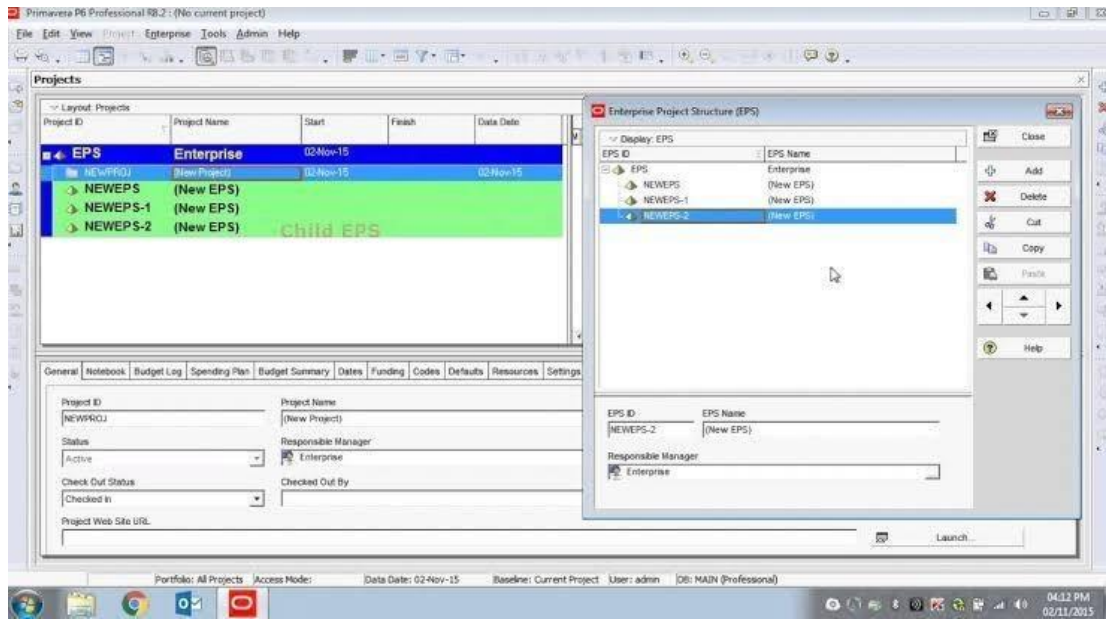


Fig 2 Project Structure

Step 2- Assigning roles and organization structure constituting of company management and responsible managers profile.

their qualifications and their experience in the similar tasks as efficient resources are responsible for completion of any project in right intervals and are important for development ventures.

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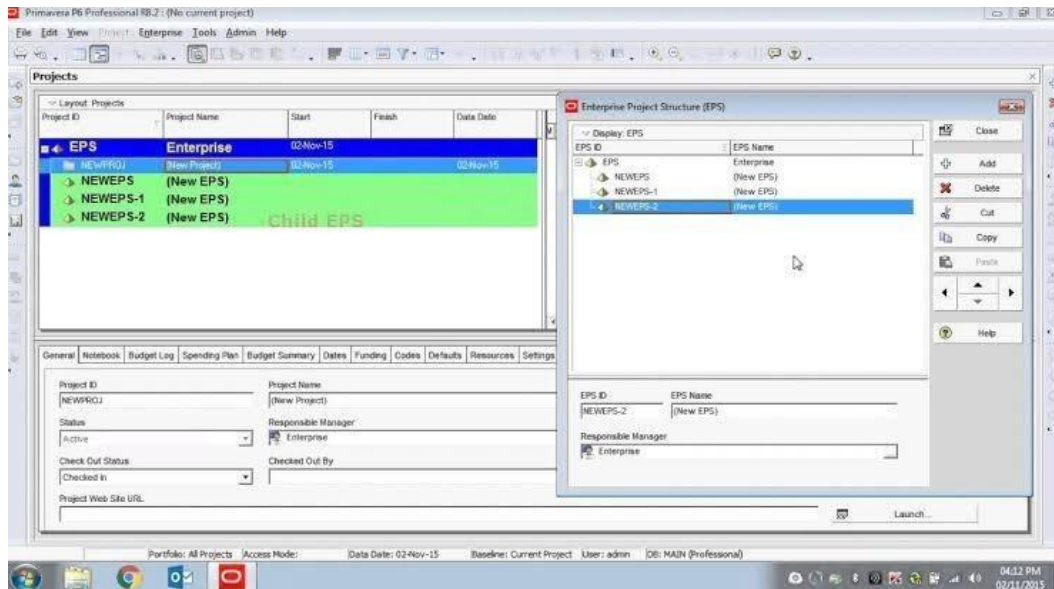


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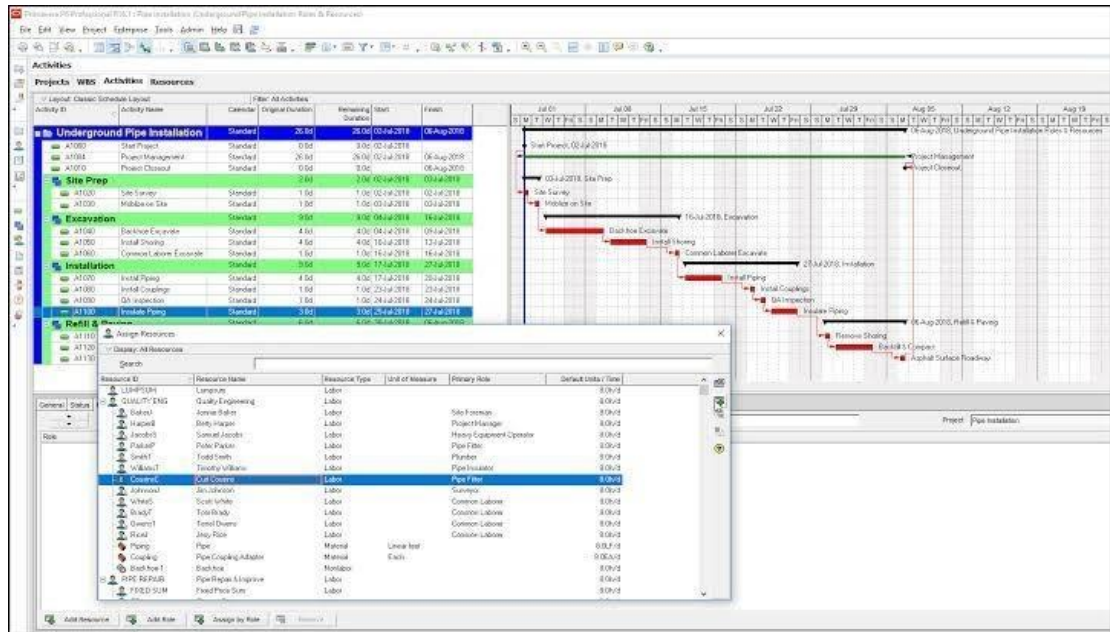


Fig 3 Assigning Job Roles

Step 3- Creating working calendar as per working hours and shifts to be assigned in project:

Before the start of project, the activity list is entered and the calendar are characterized and utilized to display the working time for every action in the task. Calendars are additionally used to characterize the working and occurrence design over the length of the task. These are three unique kinds of schedules namely Global, Venture and customized. The working shift is considered as 8 hours and six days working. The point to point working hours are from 08:00 AM to 05:00 PM. Meal break is of an hour from 12:00 PM to 01:00 PM.

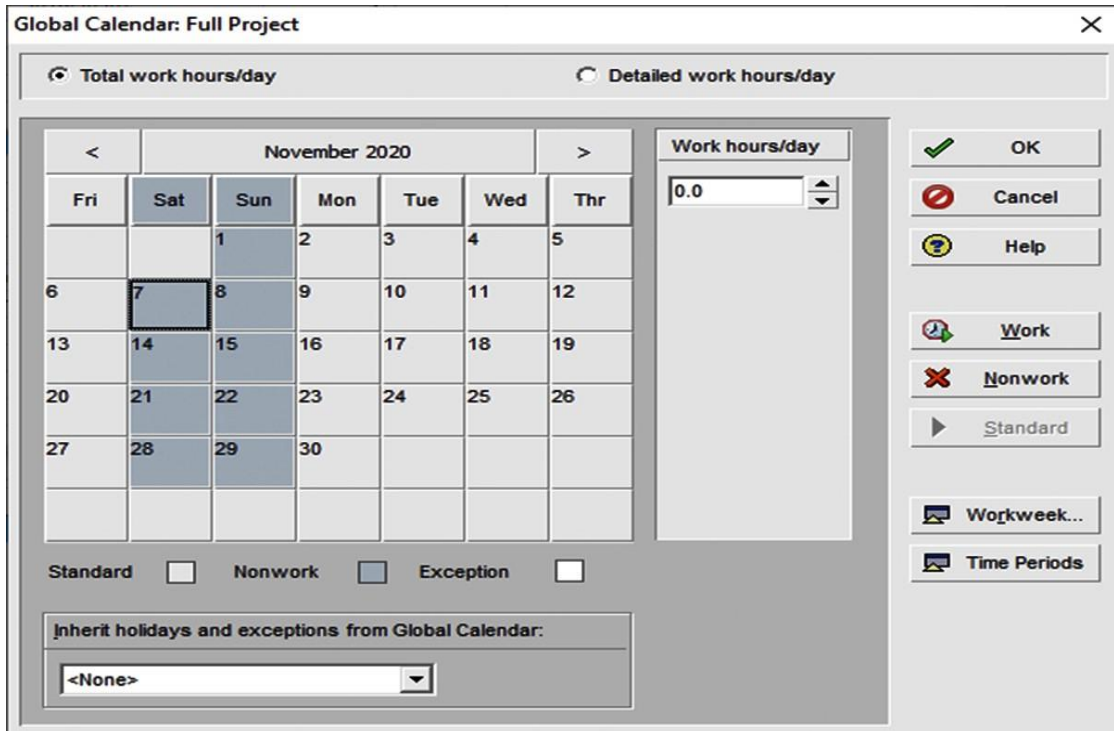
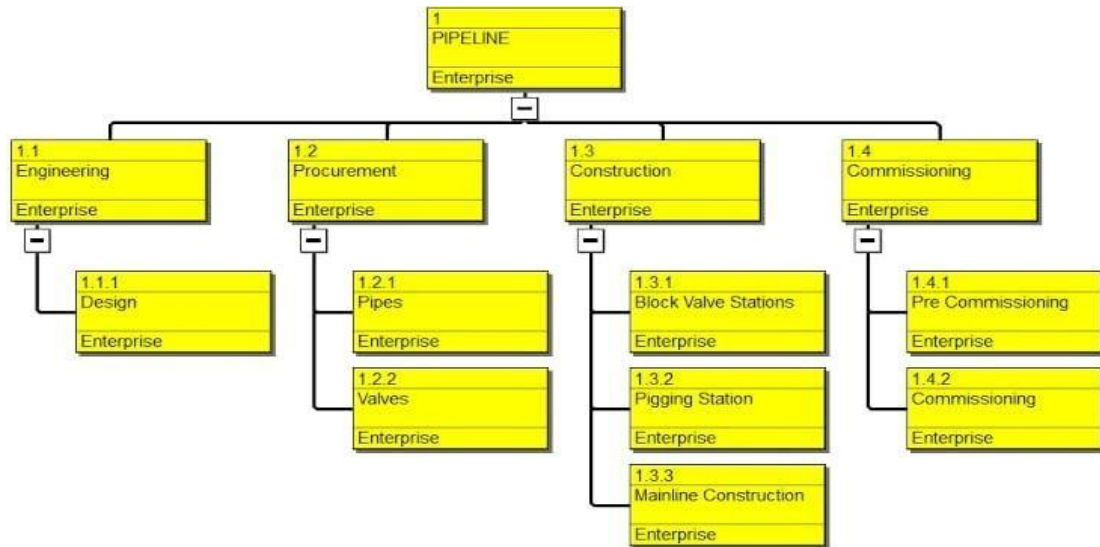


Fig 4 GLobal Calender

Step 4- Preparing WorkBreakdown Structure

A WBS is the progression of work used to achieve the project to finish a task. WBS is organized in levels work point by point starting with final task and latter formation of different forms into identifiable work components. WBS is based on the individual sub venture and the undertaken WBS is figured beneath:



99Fig 5 WBS Structure

Step 5- Assigning activities of each WBS as per scheduling data with links in between activities using Gantt chart.

Critical advance in the undertaking arranging is to distinguish the activities to finish the task and furthermore anticipate or valuate the number of days required in completion of the project. The term of exercises is evaluated based on meetings, research, estimation and strategies of costing. These lengths are relegated in every activity. As the undertaking is of tedious kind, in order to identify the approach connected by utilizing CPM as PP apparatus.

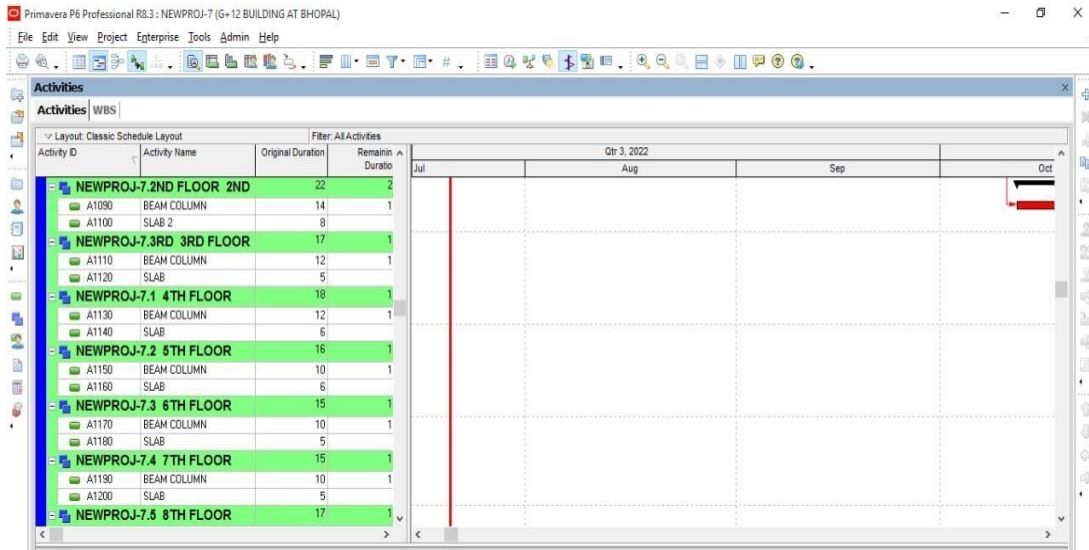


Fig 6 Activity List of Block G

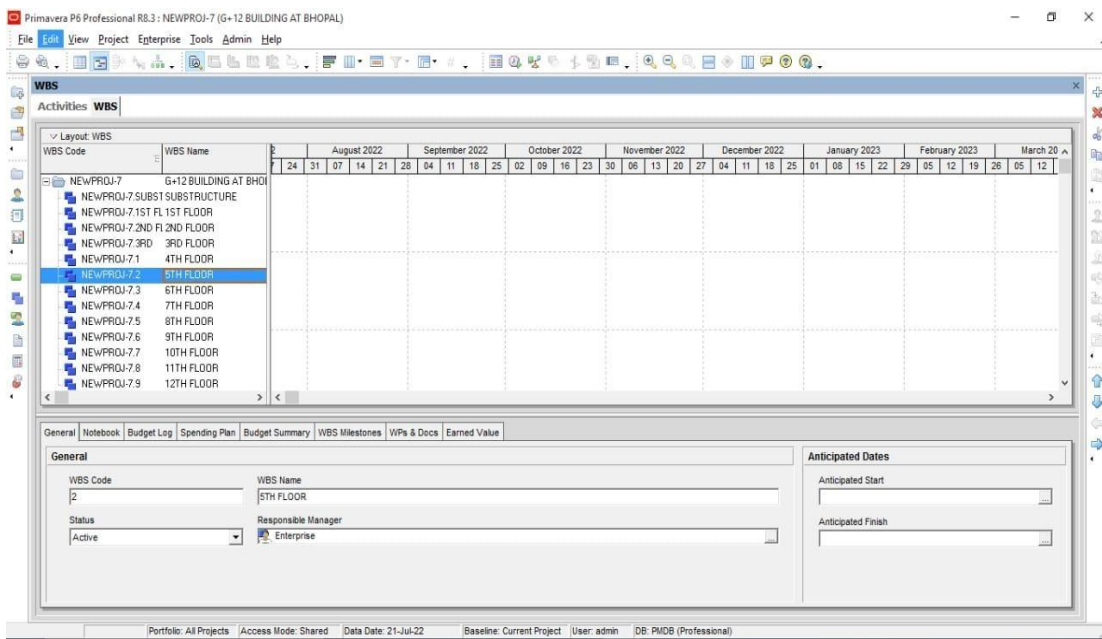


Fig 7 Activity List for Block B

Step 6- Creating Resources (Manpower, Machinery and Material) The assets are prepared using big business asset, where an option is received to get the choice of including new assets. Cost of assets relies on its unit as cost of work is on daily wages, material relies on their weight and machinery relies on its working hours along with its maintenance.

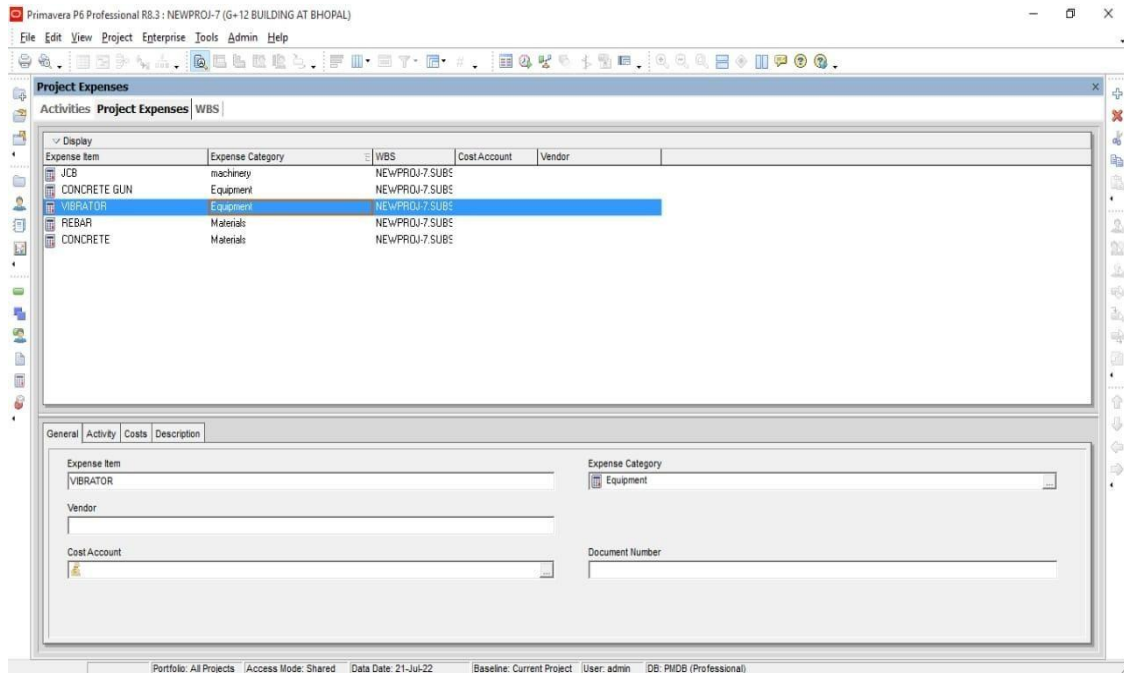


Fig 8 Analysis of Resources

Step 7- Assigning Resources in each activity as per IS. 7272

IS 7272 provide inexact necessity of labour according to the assigned activity. It provides consistent working labour according to sort of work, this code depends on the prerequisite of work for exercises relying on the jobs required for usage.

Step 8- Comparison of scheduling proposed as per site scheduling using Primavera P6.

Primavera provides another instrument to correlation of standard versus current advancement of the task known as Project Scheduling. It furnishes legitimate booking and checking of every last exercises managing and investigating different parameters.

Step 9- Network Diagram

A network diagram represents a project plan in detail graphically; it displays the job logic and basic activity succession. In broad the network diagram displays the 'big picture' like what next and what is the order of occurrence. This feature makes the network diagram

accurate, efficient and dependable review method to prevent any bad logic from getting lost in the scheduling software tool and therefore it is important that the parties involved know to read the network diagram and evaluate them. The precedence diagramming method PDM is most powerful, popular, flexible and effective programming method used in the construction industry. Due to the ease of generation and use and also due to its incorporation of four major activity relationships the network diagram is used in most of the scheduling software.

Projects are introduced to network diagrams. These diagrams provide powerful visualization of the status of position and relationship among numerous project activities. These are the basic resource of communicating among planners and observers in the project.

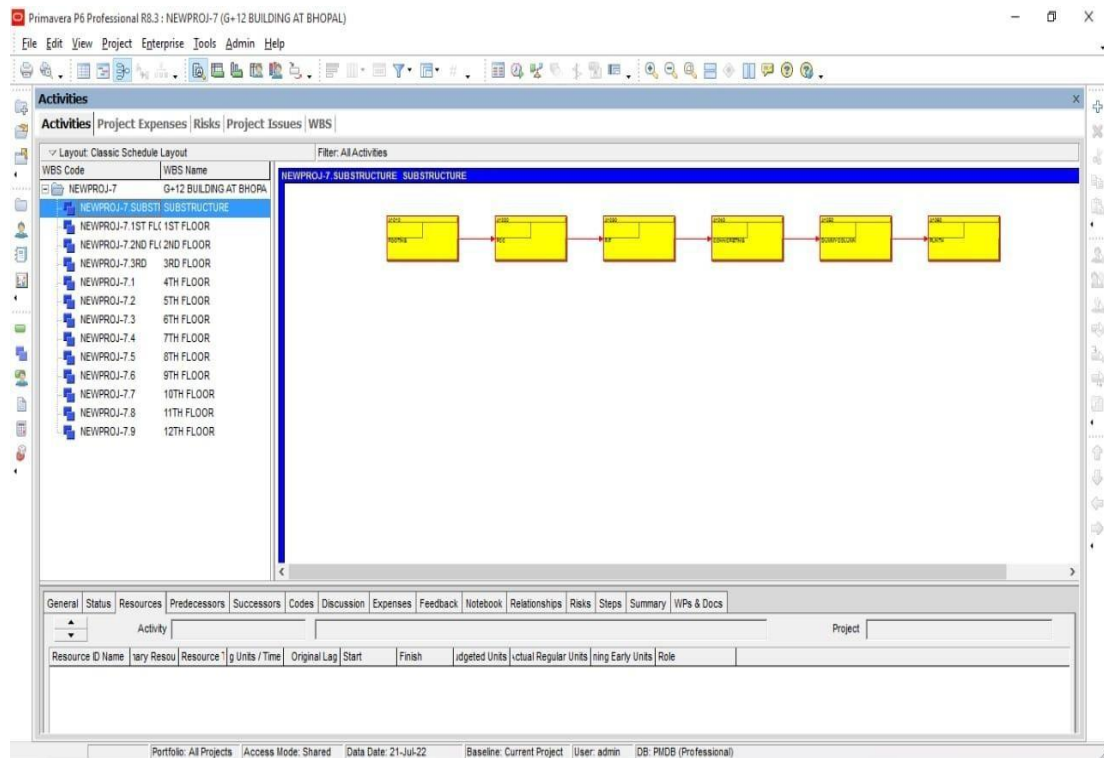


Fig 9 Network diagram of the project Activities

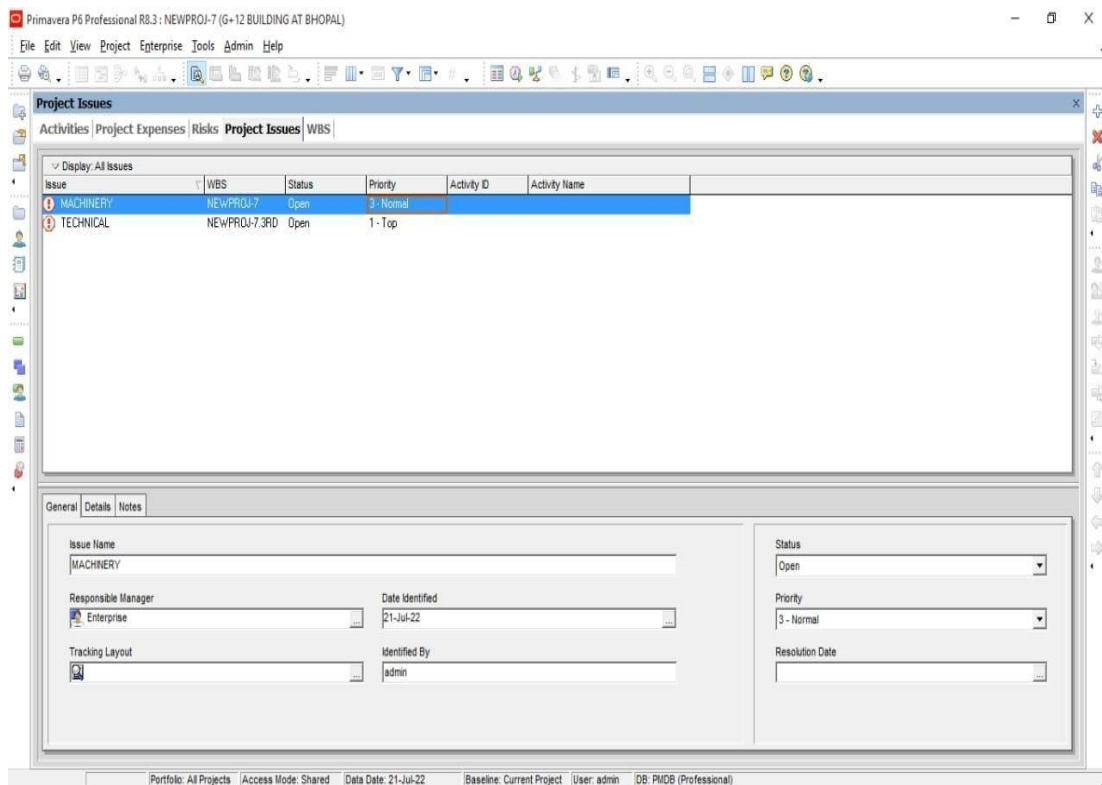


Fig 10 Defining Project Issues

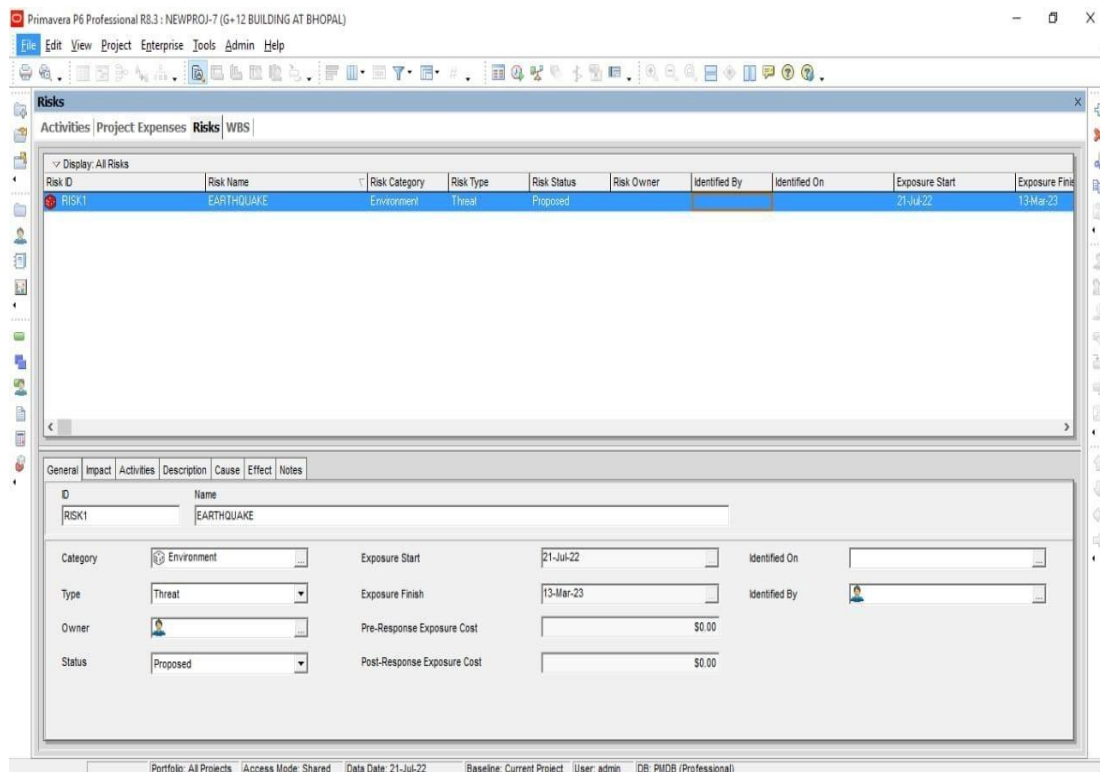


Fig 11 Defining Project Risk

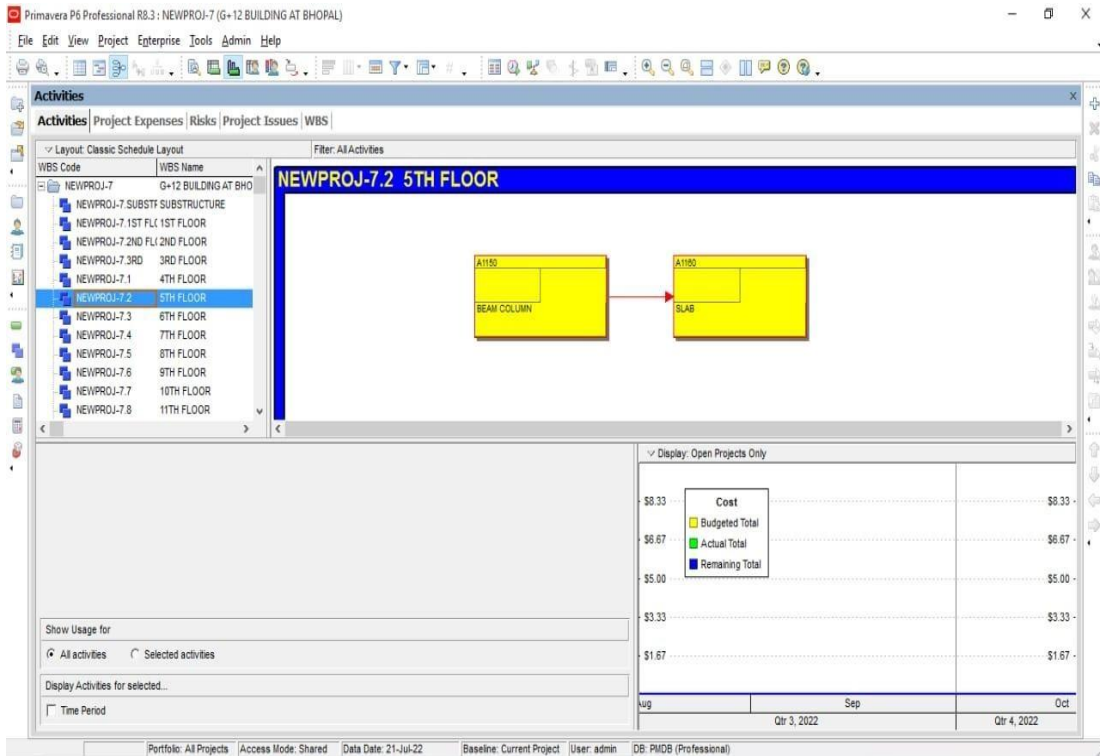


Fig 12 Cost Analysis

RESULTS and DISCUSSION

Overview of Resources

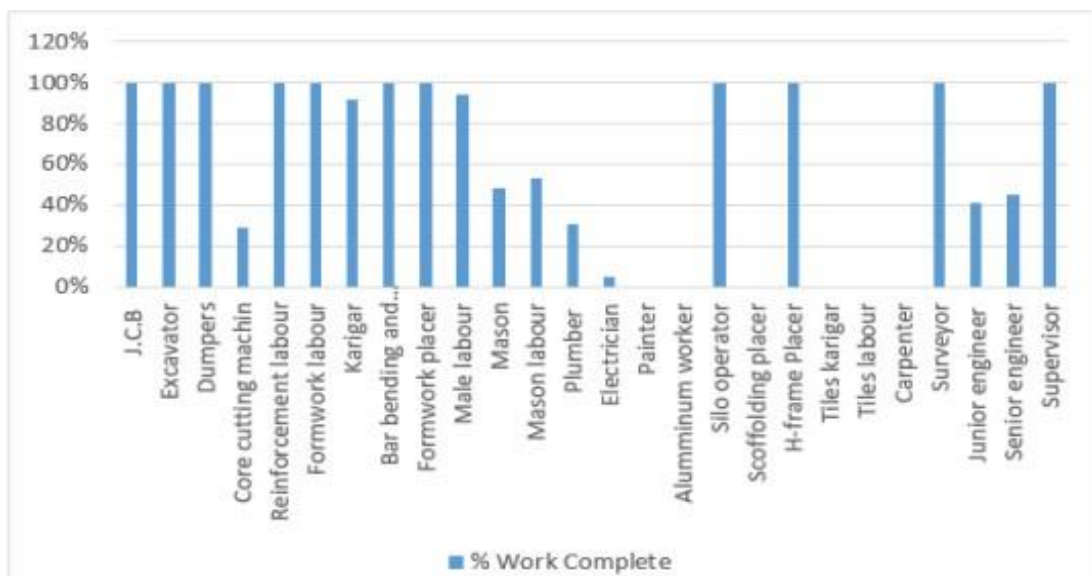


Fig 13 Work Completion Bar Graph

Name	Start	Finish	Remaining Work
J.C.B	Fri 7/3/20	Sat 7/4/20	0 hrs
Excavator	Sat 7/4/20	Wed 7/8/20	0 hrs
Dumpers	Sat 7/4/20	Wed 7/8/20	0 hrs
Core cutting machin	Sun 3/14/21	Sat 5/1/21	80 hrs
Reinforcement labour	Thu 7/9/20	Thu 2/25/21	0 hrs
Formwork labour	Sun 7/12/20	Wed 2/24/21	0 hrs
Karigar	Wed 7/8/20	Thu 7/8/21	32 hrs
Bar bending and tying karigar	Thu 7/9/20	Thu 2/25/21	0 hrs
Formwork placer	Sun 7/12/20	Wed 2/24/21	0 hrs
Male labour	Wed 7/8/20	Thu 7/8/21	120 hrs
Mason	Sat 12/5/20	Tue 7/6/21	6,336 hrs
Mason labour	Sat 7/25/20	Tue 7/6/21	7,928 hrs
Plumber	Mon 3/8/21	Thu 12/23/21	1,440 hrs
Electrician	Thu 7/23/20	Sun 12/26/21	3,000 hrs
Painter	Sat 4/10/21	Sat 12/18/21	2,864 hrs
Alumminium worker	Sun 12/12/21	Sun 12/19/21	288 hrs
Silo operator	Tue 7/14/20	Fri 2/26/21	0 hrs
Scaffolding placer	Thu 4/8/21	Mon 5/3/21	256 hrs
H-frame Placer	Mon 3/1/21	Wed 4/7/21	0 hrs
Tiles karigar	Thu 7/8/21	Thu 11/18/21	3,096 hrs
Tiles labour	Thu 7/8/21	Thu 11/18/21	4,200 hrs
Carpenter	Sun 12/12/21	Wed 1/12/22	1,200 hrs
Surveyor	Sat 7/4/20	Sat 7/4/20	0 hrs
Junior engineer	Fri 7/3/20	Wed 1/12/22	4,960 hrs
Senior engineer	Fri 7/3/20	Sun 12/26/21	1,504 hrs

Fig 14 Work Hour Remaining Table

Inference- the resources were identified and listed in WBS for both schedules. Here the availability of resources even suffered due to the pandemic COVID-19 due to the migration of labours in their home town at the time of lockdown, still, the local resources were hired to stay connected to the schedule of the project.

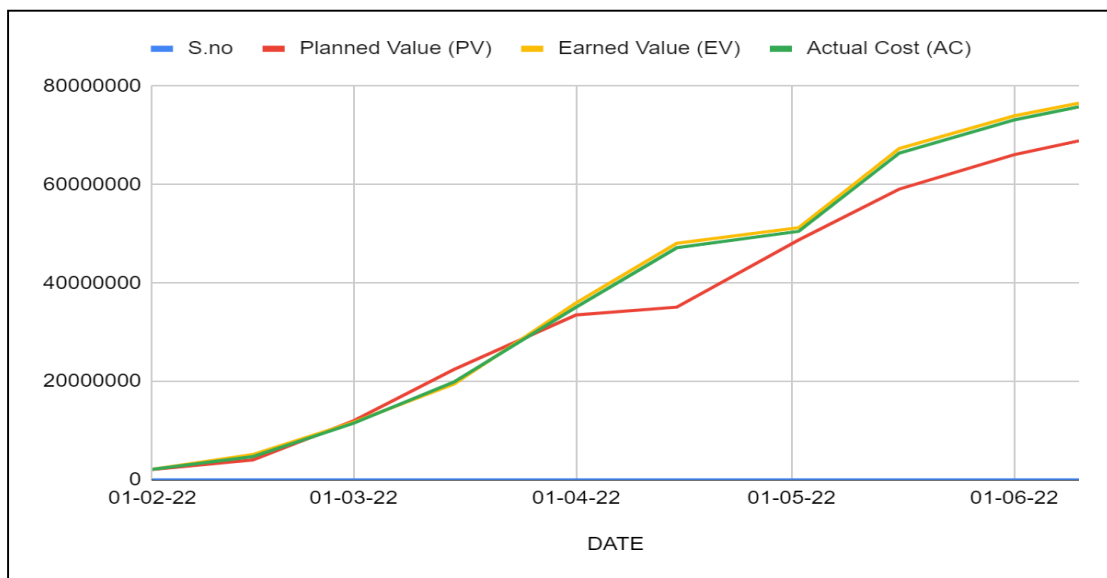


Fig 15 Planned Value, Earned Value & Actual Cost

Inference- The results of planned value, earned value, actual cost of the project which was tracked for every 15 days intervals. The baseline has been set and the results of every 15 days updation. The analysis of earned Value over time depicts that the Project is fluctuating behind and ahead of schedule in the weeks 3rd to 11th, but it was observed that after 11th week the project was on schedule till the last update of the project as when compared to EV from Block H but the Block G work did not started.

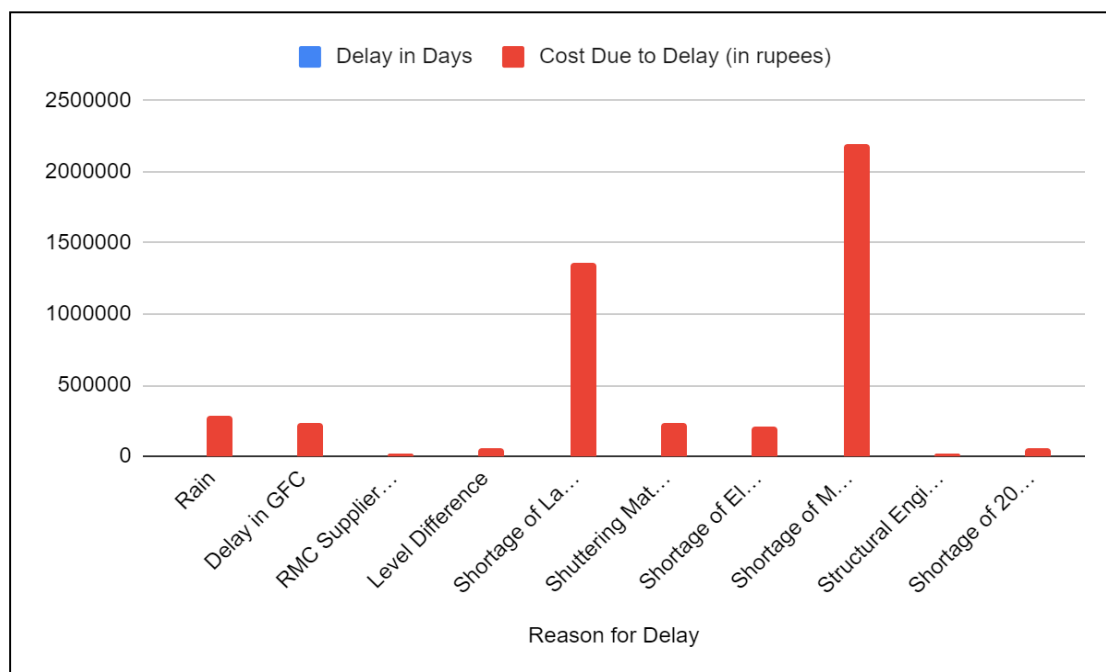


Fig 16 Cost Incurred due to delay in Activities

Inference- Delay analysis identifies why delays occur on a construction project and the impact they are expected to have on the overall programme. The outcome of the analysis may lead to legal action brought by one party to the contract. Here in this project the 86 days were lost due to different reasons in case of Block G. The major reasons with the cost of loss are listed above.

Conclusion

The research presented to develop scheduling and planning using Primavera P6 V8.3 for Pradhan Mantri Awas Project and prepare construction sequence and comparative analysis in between two blocks and identification of reasons in delay. Conducting Financial Risk analysis using Primavera P6. Financial Risk analysis using Gantt chart in Primavera P6 and assign proper sequence and links between different activities for early finish.

The observation stated the drawbacks which ultimately becomes the reasons for delay of the project and compared the scheduled of the two blocks of PMAY Urban.

In this study, minimization of delay was done by allocating resources as per demand of activity based on availability of resources and uncertainties like lockdown due to COVID 19. The study elaborated work breakdown structure to activity level to provide proper lagging of project management as per scheduling.

Here 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 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.

Overall it is observed in the running project that management of all the activities and observations on their previous and next activity is necessary to run simultaneously, so as to optimize the time and cost.

Delay analysis identifies why delays occur on a construction project and the impact they are expected to have on the overall programme. The outcome of the analysis may lead to legal action brought by one party to the contract. Here in this project the 86 days were lost due to different reasons in case of Block H.

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