Planning and Scheduling of Cuffe Parade Metro Station.

[1]Anuj Pawar, [2]Keyush Shah, [3]Siddhant Mehta, , [4]Amit Mishra, [5]Sahil Mehta, [6]Shubham Rathod.

[1]Assistant Professor, [2]Undergraduate Student, [3]Undergraduate Student, [4]Undergraduate Student, [5]Undergraduate Student, [6]Undergraduate Student.

[1]Department of Civil Engineering,
[1]Thakur College of Engineering and Technology, Mumbai, India.

Abstract : The biggest challenge that the modern-day civil engineer faces, is that of an efficient project management. Integration of the progressions and processes become essential in the fast-paced nature of construction businesses. Project managers strive to solve the problems like cost overrun, poor planning, poor scheduling and to name a few using conventional methodologies and techniques. However, due to lack of foresight and usage of conventional methodologies, they are bound to make some errors. This is why the field of Construction Management has come to the forefront, which through its specialized management techniques helps in planning, scheduling, designing and evaluation of any construction project end-to-end. Various construction management tools like Microsoft Project, Primavera have proved to be very efficient in construction industry. The planning and scheduling of activities for Cuffe Parade Metro Station was done using Primavera (P6) software. Efforts were made to study the differences and it was found that Primavera proved to be advantageous at various stages which is compared in this paper.

IndexTerms – **Primavera, Project Management, Scheduling, Planning, Metro.**

I. INTRODUCTION

A Project Management Information System (PMIS) is typically one or more software applications and methodical process for collecting and using project information. A PMIS provides information so that the team has a common understanding of the facts : a pre-requisite for collaboration. It is the cheapest way to gather information because it is only done once. And it is the most reliable way to host information because many eyes scrutinize centralized data and mistakes are more likely to be found and corrected. It is the first line of defense against political or legal attack. It is a clear window into the project that leaders can use instead of relying on delayed or biased reports filtered through layers of management. It improves performance because it measures it; it is a report card for both, team members and management. And most important, it educates the team and makes better managers because it tells true stories.

II. PROJECT MANAGEMENT INTEGRATED SOFTWARE (PMIS)

A. Functions of PMIS The PMIS defines the program and the projects: cost, time, scope, and quality. It defines the team: people, organizations and their roles. It helps manage agreements: contracts, permits, approvals and commitments. It manages documents. It produces standard and custom reports. It presents vital signs on dashboards. It guides collaboration and communicates best practices with policies, work flow diagrams and document management. The PMIS will have a file structure that is the complete project central filing system. It will provide storage, retrieval and distribution of project documentation.

B. Typical PMIS software system. It consists of the following:

1) Work breakdown structure (WBS) creation tools 2) Calendering features 3) Scheduling 4) Earned Value Management (EVM) controls 5) Gantt Charts and other charting features 6) Traxking and levelling 7) Reporting functionality.
.

III. LITERATURE REVIEW

1. Project management using Primavera P6 – Anurag Mahure: Project management software like primavera P6 helps in planning monitoring & controlling of construction project. The basic objective of this study was to understand the role of monitoring and control in progress and timely completion of construction project.

2. Project management in construction – Hitanshu Saini: Construction Schedule delay in a project can create problems for contractors and owners, which results costly disputes, controversial issues and

adverse relationships between or the project participants. This study, major causes like: organizational scarcity of owner in handing over construction site, Delay due to initial mobilization of people, Very large rocks available in excavation of foundation, delay in waterproofing and pile head treatment were studied.

3. Developing and efficient schedule in primavera P6- Satinder Saini: Concluded that the activity ID and Description of the activity that may be the most unused part greatly improves the calendar quality when used right. It is the duty of the planning team to determine the structure of the activity ID in advance. The preparation of the calendar runs smoothly without Conflicts. Further research on how other areas, such as Initial duration, remaining time, taskbars in the start and end dates can be displayed in the Gantt chart gives the user the utmost understanding of the effectiveness Calendar development.

4. High cost Infrastructure report monitoring by P6 software - V. dhanalakshmi: Study deals with the project monitoring process of the economic method of the transport of a construction pipeline has been completed Ennore-Trichy-Madurai. Construction and real work. Progress is a comparison of the planned progress conducted in this study with project management using Primavera P6 software.

5. P. Esaki Thaana – Planning, Scheduling and Time Management of Six Lanes Road Construction Work at V.O.C Port Trust using Primavera P6 software: The time management system considers a key role in the organization that is responsible for completing the project within a specified time. The main objective of this research is preparing the correct plan of construction of 6 lane roads. The P6 software controls TRUST OF PUERTO VOC, Tuticorin, time control and Time management schedule. The main benefit of the project was the timely Completion of the project with the P6 software. The road construction project was completed before this Contract period.

IV. METHODOLOGY

STEPS FOR SCHEDULING OF CUFFE PARADE METRO STATION.

1) CREATING EPS
To create an ideal project, we need an Enterprise Project Structure (EPS node), Organizational Breakdown Structure (OBS node) to assign a responsible manager, Project ID, Project name and Project start date. This is the first step to be done while starting the scheduling of any project.

2) CREATING NEW PROJECT
A project constitutes set of different activities and its associated information. The project can be created by selecting the respective EPS node, which is created in the web. Likewise, we can enter the Project ID, Project name, anticipated start and finish date, as well as the responsible manager. We can also assign global, resource, or project calendar to the project.


3) WORK BREAKDOWN STRUCTURE
Every task in a project has an identification that reflects its location with project hierarchy. WBS is a hierarchical structure that is used to organize tasks for reporting scheduling and tracking costs. A WBS chart displays and defines the product to be developed and/or produced. Activities are to be placed under respective WBS. To create a WBS, open the project and then simply click add give it a name and choose the level.
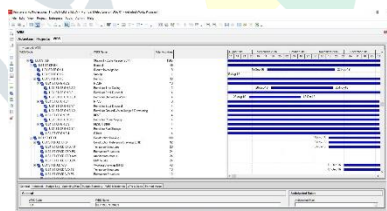

4) DEFINING ACTIVITY
Activities are the fundamental work elements of a project. They are the lowest level of a WBS. Activities must have certain duration, cost, and resource and role requirement. There are two ways of creating an activity namely, Adding activity using Wizard OR Adding activities using Activity details. The characteristics activity like ID, Activity name, start and finish dates, Activity calendar, Activity codes, constraints, predecessor and successor relationships etc. can be defined.
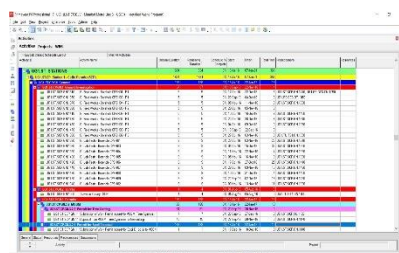

5) RELATIONSHIP BETWEEN ACTIVITY
After defining the calendars and assigning them to the required activities, the next step is to assign relationships to the activities, to arrive at the schedule of the project. It involves two types of logic, to understand how to define relationships. The first type is related to the relationships between activities and the second type works by imposing constraints on the activities. There are four types of relationships available; they are – Finish to Start (FS), Start to Start (SS), Finish to Finish (FF), Start to Finish (SF).
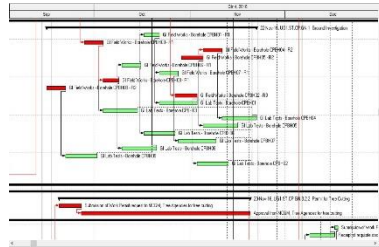
6) CALENDAR

A project should follow specific working days and time. According to the timing, project duration can be scheduled and analyzed. Calendars are used to set in a project and its resources working time to accurately reflect resource availability information. The application uses your calendar assignments for levelling resources, scheduling, and tracking activities. There are three types of calendars – Global, Project, Resource calendars.
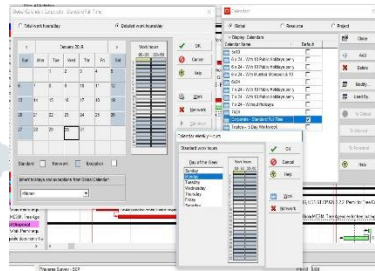
7) SCHEDULING

When the list of activities, duration and the relationships assigned for each and every activity has been completed, the activity dates and full schedule of the project can be calculated. Primavera Project Management starts scheduling at the beginning of the project and continues till the end to calculate the early start and finish dates for each activity. During scheduling, Primavera Project Management also calculates total float and free float for each activity to get the critical path for the activity.

8) BASELINES

A baseline is a copy or a snapshot of project data at a given time. Since baseline is a static representation of a project plan it can be used to compare against major performance as the project progresses. By default, baseline types are classified as – Customer sign-off, Initial Plan, Last Performance Update, Management sign-off, Midproject status, What-if project plan. To create a baseline, select a project and go to maintain baselines. Further define the baselines by giving it a name selecting the type, entering the data date, and then assigning to the project.

V. PROJECT DETAILS

Mumbai Metro is a fast & rapid transport system serving the city of Mumbai, Maharashtra. The system is designed to reduce the traffic congestion in the city, and supplement the overcrowded Mumbai Suburban Railway network. It is being built in three phases over the period of 15 years, with total completion expected in 2025. The population, which is increasing day by day, requires faster transportation to avoid delay in work and to avoid decongestions in the region. The existing transport system of city is not considered capable of bearing the upcoming transportation needs It is planned in three phases of development, phase-I to be completed during 2005-2011; phase II to be completed in 2011-2016; and phase III in 2016-2021. Line 1 – Versova - Andheri-Ghatkopar, section of metro rail is currently operational. Line II, Charkop - Bandra - Mankhurd section is not yet started. Line III Colaba – Bandra - SPEEZ, under present study, is 33.5 km in length.

Station	Station Dimensions (Metres)			
	Length	Width	Height	Excavation Depth
Cuffe Parade	403	21.2	14.4	22
Vidhan Bhavan	255	21.2	14.4	26
Church Gate	255	21.2	14.4	29.5
Hutatma Chowk	250	16.15	19.5	25

- Name of the Project : Construction of Cuffe Parade Metro Station
- Name of Contractor : L&T-STEC JV Mumbai
- Contract Value : INR 4,22,39,23,270
- Commencement Date : 18th July 2016
- Finish Date : 10th January 2021
- Client : Mumbai Metro Rail Corporation Ltd.

VI. OBSERVATION

It was observed that after project planning and control using Primavera the schedule duration was reduced significantly by 56 days and the use of software also helped in cost optimization by reducing cost by nearly INR 76,34,29,873. This time and cost optimization plays a very vital role in case of large infrastructure projects such as metros as the they help to deliver the project faster to the end consumer and saving a lot of public funds.

VII. CONCLUSION

The ultimate purpose of this research is to build a model that allows you to predict the activities and resources that are critical for timely completion of the project. Planning allows strategies to be implemented to ensure that these activities and resources are managed and the project is delivered both 'on time' and 'within budget'. The three components that may be measured and controlled using this model are Time, Scope and Cost. Any change in one of the three normally results in a change in one or both of the other two. The successful completion using this model helps in excellent performance of the project. Construction schedule delays in a project can create problems for contractors and owners, which results in costly disputes, controversial issues and adverse relationships between all the project stakeholders using this model can help to avoid this issues. This study helped to show the drawbacks of the current project management system in large infrastructure projects. Thus a cost effective and efficient new project management model is brought to conclusion.

VIII. REFERENCES

[1] Sandip Pawar, P. M. Attarde(2015), "Time and Cost Planning in Construction Project," International Journal of Science and Research (IJSR), Volume 4,pp(422-425).

[2] Shaik Mohammad Masood, Devanand.R, HarshaH.N(2014), "An Analysis on Resource Planning, Cost Estimation and Tracking of Project by Earned Value Management," International Journal of Engineering and Innovative Technology (IJEIT), Volume 4,pp(42-48).

[3] Shanmuganathan N, G.Baskar(2016), "Effective Cost And Time Management Technique In Construction Industry", International Journal of Advanced Engineering Technology,vol.7,pp(743-747).

[4] Shweta Rai(2013), "Scheduling of FRP composite bridges using 'Primavera' Software," International Journal of Scientific & Engineering Research, Volume 4, pp(15471552).

[5] Study on Optimisation of Resources for Multiple Projects by Using Primavera" Journal of Engineering Science and Technology, Vol. 10.

[6] Chidambarakumar.M.G & Gomathi Sankar.G, Construction Scheduling Using Project Management Software,SSRGInternational journal of pf civil Engineering (ICRTCETM-2017)- Special issue-April 2017

[7] Hitanshu Saini, Khushpreet Singh, Uma Malik, Project Management Using Primavera International Journal of Civil Engineering and Technology (IJCIET)Volume 8, Issue 8, August 2017

[8] Andrew Fernans Tom, Sachin Paul, Project Monitoring and Control using Primavera, International Journal of Innovative Research in Science, Engineering and TechnologyVol. 2, Issue 3, March 2013

[9] hamed ziaidoostan, hamidreza ghaneh, matin amanin, mohamadmahi gholipoor, using primavera software in resource allocation and project evaluation of construction projects, interdisciplinary journal of contemporary research in business, april 2013 vol 4, no 12

[10] T.Siva NAGARAJU, Sri Lakshmana Kumar, Schedule and Resources Optimization Using Primavera in Metro Rail Project, International Journal of Mechanical And Production Engineering, ISSN: 2320-2092, Volume- 4, Issue-7, Jul.2016.