

A Review of Planning & Scheduling of a Pune Metro Rail Project using Primavera P6 Web

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Abstract— Planning and Scheduling are the very essential in the big infrastructure project like road and bridge construction, Metro rail projects as these are intended for public welfare. These projects are 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 thanks to the computer and software evolution, it now possible to plan these projects using software's like Primavera P6 and Microsoft office project. This paper deals with advantage and added benefits of Web based primavera P6 for planning and scheduling of Pune Metro Rail Project.

Key words: Primavera P6 Web, Pune Metro, Planning, Scheduling

I. INTRODUCTION

Pune is the most industrialized district in western Maharashtra and a famous IT hub in the country. Besides, it is famous for its religious and historical places. Pune city is known in the world map because of its educational, research and development institutions. Due to this Pune has seen the large population influx coming from every corner of India. This has created the expansion of city making it difficult to commute from one end to the other. Thus, metro rail as a public transport is much needed in this city. Pune Metro Rail Corporation has already started the works of metro rail. This is the huge project and needs accurate planning so that it can be completed in optimum time frame.

Pune Metro Rail is divided into corridor-1 and corridor-2. Corridor 1 has 15 station out of which 6 are underground. Corridor 2 has 16 stations. Construction activities are mainly classified as Construction of piers and Alignment (Over the ground and underground), construction of stations and laying of tracks and installation of rolling stock.

This paper deals with the civil work for corridor-2. The civil work for this corridor has been awarded to NCC Ltd. The work order includes construction of piers and viaduct and their installation. The viaducts are precast member and are manufactured at the casting yard in Hinjewadi Area. The pier foundation varies according to location and hence isolated footing and pile foundation are used. The pre-cast viaducts are constructed in yard and are transported at the site for erection. Viaduct installation is done at night shift since traffic congestion and safety reasons. While the pier construction work is done two shifts. Thus, it makes the work complex and hence the proper planning is necessary to keep the work in progress and in continuous flow. Hence, web based primavera P6 serves the purpose as it allows multiple user access from remote locations.

II. METHODOLOGY

Primavera P6 uses a Gantt charts and Network Scheduling Method (CPM) or critical path method as base.

A. Gantt Chart

The technique was developed by Henry Gantt and Fredric Taylor and can be identified as the scientific method of project planning. The method uses horizontal rods representing time length of a task accomplishment for planning and tasks' names are written vertically in separate columns. Every rod is place in front of every task and the chart shows the starting date, accomplishment time length and finishing date of tasks.

B. Critical Path Method

This method involves the use of a geometric representation of flow chart which depicts the precedence between activities. The critical path method (CPM) is a duration-driven technique in which the basic inputs are project activities, their durations, and dependence relationships. Activity durations are functions of the resources required to complete each activity.

C. Primavera P6

Primavera is an enterprise project portfolio management software. It includes project management, product management, collaboration and control capabilities, and integrates with other enterprise software such as Oracle and SAP's ERP systems.

D. Application of Primavera P6 Web in the metro rail project

1) Enterprise Project Structure (EPS)

NCC will create this project tree where they will make a project tree according to the project type and category. Example- Residential, Commercial, Infrastructure.

2) Organizational Breakdown Structure (OBS)

It defines the hierarchy of professionals, staffs and other employees and their roles and responsibility related to this particular project.

3) Calendar

The work is carried out per 6 days in week in two shifts. The exception to these standard working hours are added if there are public holidays are other reasons.

4) Creating a New Project

A new Project is created under the EPS. In these case two projects are created, one for casting yard for manufacturing of Viaducts. And other for civil work of alignment in corridor 2

5) Work Breakdown Structure (WBS)

It is a hierarchy of work which must be accomplished to complete the project. Ex. Substructure- Superstructure- MEP- Finishing etc.

6) Defining Activities

Activities are the main work elements created under the suitable WBS and are arranged in sequence of executions and further linked by the relationships. Example- under the WBS Substructure the Activity will be named as Foundation which will be further classified in sub activities like excavation, PCC, Shuttering-RCC-DE shuttering etc.

7) Relationships between Activities

Activities are linked together by the set of relationships to form a network of activities which will give the total project duration.

- Finish to start (FS) relationship.
- Finish to finish (FF) relationship.
- Start to start (SS) relationship.
- Start to finish (SF) relationship

8) Dates & Duration

Duration for each activity are feed manually for each activity which will then when linked will give the start date and finish dates and the whole duration of the project.

9) Cost

Cost of activity are assigned by allocating the resources demanded by the activity along with their quantity and unit rates.

10) Baseline

Baseline is the original path of project which will be used as benchmark to track the actual progress in comparison with original path to see whether it is on schedule or delayed or early.

11) Schedule and Updates

- If the project is progressing exactly as planned, then only needed to estimate progress.
- If the project is not progressing as planned many activities are starting out-of-sequence, actual resource use is exceeding planned use, and then update should be done for activities and resources individually.
- Most projects contain some activities that progress as planned and some which do not. In this case, the best method is to combine the two updating methods.

12) Tracking

It is a monitoring tool for monitoring the progress of project in terms of the cost, resource allocation.

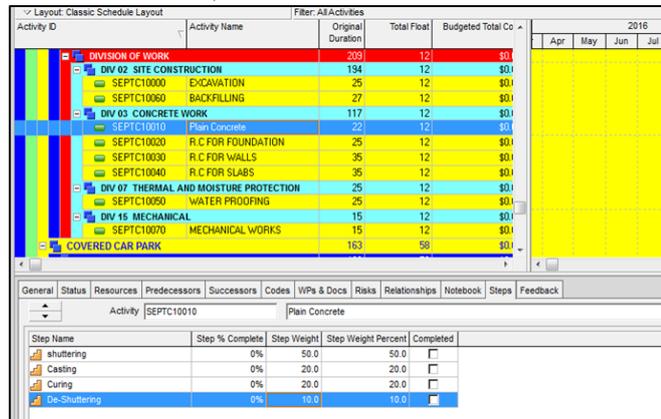


Fig. 1: Activities

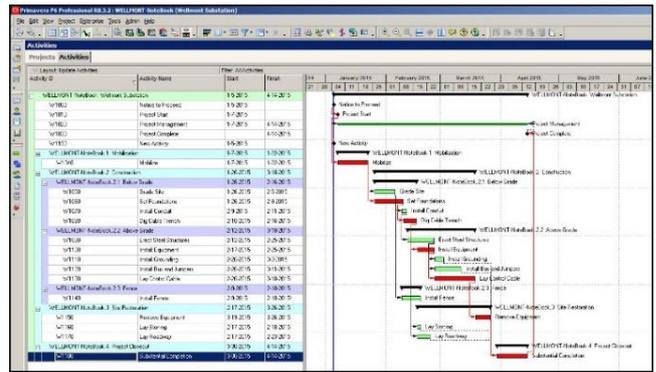


Fig. 2: Gantt Chart

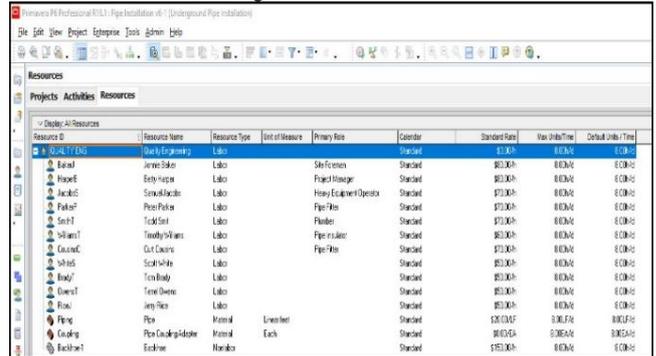


Fig. 3: Resource Allocation

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E. Added benefits of Web Based Primavera P6 in Updating and tracking of Project

- Infrastructure project are different than any other projects as they are located in remote locations and headquarters are located within a city.
- In this case, web based primavera P6 gives advantage of remotely updating and tracking of project through cloud based server.
- Primavera P6 has password and username entry makes it secure and the access is controlled.
- Team members can improve collaboration by working independently and concurrently within the system.
- It will decrease the maintenance and support cost.
- In this Pune Metro Rail Project, NCC has been awarded for civil work for corridor-2 which is almost 16km in length.
- The Pune Metro Rail Corporation has their head office located at Koregaon Park.
- NCC is one of the many contractors. NCC has their pre-cast viaduct casting yard located in Hinjewadi Area. Therefore the job site- Headquarters- casting yard is about 32km route.
- Web based P6 created one common point where it allows to monitor the project remotely.
- It save valuable human resources and unnecessary efforts and time.
- It records the access log and hence the process becomes transparent.

- It gives limited access to stakeholders which are not directly involved in construction but they can track the project progress by themselves on mobile application.
- P6 Web allows all teams to communicate with the PMO, but the flow of information is multi-directional. In other words, information may flow through the system to the PMO from upper-level management and from skilled workers or team members under the supervision of your office. Moreover, a web-based interface can eliminate many of the repetitious activities in project management, like running reports and sending status updates to stakeholders.

III. CONCLUSION

The objective of this thesis was to understand the importance of Primavera P6 Web in the complex construction projects like metro rail project. Objective of this work was achieved by enlisting and observing the advantages of P6 web over the client based version. This software proves to be efficient and adds value to a project. It is tried and tested software and certainly it improves the efficiency of overall project. It acts as excellent communication bridge between upper management and all other teams who physically check on the progress of project.

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