

## GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES PROJECT MONITORING AND CONTROL USING PRIMAVERA

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### ABSTRACT

Project monitoring and control is the process of collecting, recording, and reporting information concerning project performance. Project controlling uses the site data to monitor activity to bring actual performance to planned performance. The present study deals with the project monitoring process of “Earn Value Management”, a three storeyed (G+2) factory building whose construction is in progress at Sonipat. A comparison between the planned progress of construction work and actual progress is performed in this study using project management software Primavera. Despite well-established principles and policies of project monitoring the process itself may not be efficiently accomplished in a project, because of those practical problems existing or arising in the project. Such an attempt in realizing the practical problems in implementation of project monitoring and control will contribute to proper recognition of the problem areas and putting in place the control process to rectify the deviations.

### I. INTRODUCTION

Construction industry is a basic part of a nation's foundation and modern growth. Even however construction industry is the second biggest industry in India, the development of this industry has been differential the country over. The country areas need apparatuses for monetary improvement, land use and condition intending to adapt to the status of advancement in urban zones. The time accessible to accomplish this objective is contracting. Here emerges the requirement for viable project management. Many issues are being looked by construction industry that must be dealt with. They incorporate time and cost invades because of deficient project detailing, lack of common sense for execution, absence of appropriate contract arranging and management and absence of appropriate management amid execution. It has been assessed by experts that normal expense of a project goes up by 30 rate contrasted with the planned expense. Perceptions demonstrate that legitimate skilful management is basic for the auspicious fulfillment of the project inside evaluated spending plan and with assigned assets. Projects with great arranging, satisfactory hierarchical apparatus and adequate stream of assets can't consequently accomplish the ideal result. There must be some notice system, which can caution the association about its conceivable achievement and disappointments, off what's more, on. Project checking is the way toward gathering, recording, and announcing data concerning project execution that project director and others wish to know. Observing includes watching the advancement of the project against time, assets and execution plan amid execution of the project and distinguishing slacking zones requiring convenient consideration and activity while project controlling utilizes information from screen action to bring genuine execution to arranged execution.

The fundamental goals of this research are:

- To recommend the significance and motivation behind observing the construction work.
- To recommend rules to contractual workers for refreshing the project.
- To exhibit a perfect schedule for the plant construction process.
- To recommend a format for refreshing the schedule.
- Earned value examination and following for the Standard plan production line construction work

This investigation is for the most part done utilizing Primavera P6, project management software. All exercises and their arrangement of event, term, and assets required and costs included are considered. The authoritative breakdown structure of organization and work breakdown structure of the project are noted. Attaching of the finished exercises and earned value investigation are finished. This gives a thought regarding the assets included and money related part of the finished work. "Project management is the utilization of learning, abilities, devices and methods to project exercises to meet the project prerequisites" (PMBOK, 2008). K. K. Chithkara (1998) has characterized project management as a craftsmanship and exploration of activating also, overseeing individuals, materials, hardware and cash to finish the doled out project take a shot at time inside planned costs and indicated specialized execution standards. Mainly project management process involves five procedure gatherings (PMBOK, 2008). They are

starting, planning, executing, checking and controlling, and closing. Screen and control of project work is the way toward following, assessing and directing the advancement to meet the execution destinations characterized in project management plan. Observing is a part of project management performed all through the project. It incorporates gathering, estimating, and dispersing execution data, and evaluating estimations and patterns to influence process upgrades (PMBOK, 2008)

### **Case Study: Standard Design Factory Project**

Main activities in building construction in construction phase are as follows:

1. Site Mobilization
2. Foundation
3. Column & beam concreting
4. Slab & stair concreting
5. Post concreting works
6. Masonry work
7. Plastering
8. Flooring
9. External wall plastering
10. Finishing

## **II. METHODOLOGY OF MONITORING THE PROJECT WITH PRIMAVERA**

The construction projects have become so vast and complex that the application of information technology has become inevitable. Companies started developing softwares for project management such as Primavera P6, P3, Suretrack, Microsoft project, etc. This study involves monitoring and controlling the project using Primavera P6. The progress at site must be incorporated in the Primavera schedule and updated. These updates need to be thoroughly monitored using Primavera. Tools and techniques involved in this process are: →

**Earned value management (EVM):** Earned value management is a commonly used method of performance measurement. It integrates scope, cost, and schedule measures to help the project management team assess and measure project performance and progress. This technique requires the formation of an integrated baseline against which performance is measured for the duration of the project. This can be effectively done in Primavera. **Cost**

**performance baseline:** The project performance baseline is used to measure, monitor, and control overall cost performance on the project.

**Work performance measurements:** The calculated cost variance, schedule variance, CPI, values for WBS components, in particular the work packages and control accounts, need to be documented and communicated to stakeholders.

Steps engaged with checking and control of SDF project are

- 1) Creating a perfect schedule

To make a schedule for any project, initial step is to gather information accessible for the project. In this way the accompanying advances can be followed in Primavera.

- 2) Enterprise project structure (EPS) Make the structure of the organization with its branches, which is executing the project. This is known as Enterprise project structure (EPS).

- 3) Organizational breakdown structure (OBS) After the EPS, OBS is made which is a chain of command that mirrors the people in charge of the projects in the venture.

- 4) Creating new projects A project is a lot of exercises and related data that establishes an arrangement for making an item or administration. The project is made under the separate divisions in EPS and relegated the individual in control from OBS to it. The project can be given arranged begin and should complete dates. The project is doled out a logbook which can be worldwide, asset or project schedule.

- 5) Work breakdown structure (WBS) WBS is a chain of importance of work that must be cultivated to finish a project. Each project has its very own WBS chain of importance with top dimension WBS component being

equivalent to that of each EPS hub or project. Every WBS component may contain increasingly itemized WBS levels, exercises, or both.

6) Defining exercises Exercises are the basic work components of a project and structure the most reduced dimension of a WBS and, are the littlest subdivision of a project. An action has the accompanying qualities like movement ID, name, begin and completion dates, action date-book, movement type, action codes, requirements, costs, antecedent and successor connections, assets, jobs and so forth.

7) Relationship between exercises To form a network, the exercises ought to be associated with one another, which is finished by relegating going before and succeeding exercises with noteworthy relationship to the exercises.

Finish to begin (FS) relationship.

Finish to complete (FF) relationship.

Start to begin (SS) relationship.

Start to complete (SF) relationship.

8) Determining action span When planning the work, the term is entered in the first length field. The genuine term must be entered for the exercises, which are finished.

9) Activity dates Coming up next are the sorts of movement dates accessible in the primavera; actual begin, genuine completion, arranged begin, arranged wrap up.

10) Activity cost The action cost is the whole of all the expense brought about to finish the movement.

11) Creating baselines A basic pattern plan is a finished copy of the first schedule which gives an objective against which a project's execution is followed.

12) Updating schedule - If the project is advancing precisely as arranged, at that point just expected to assess advance.

If the project isn't advancing as arranged numerous exercises are beginning of-grouping, real asset use is surpassing arranged use, and afterward refresh ought to be improved the situation exercises and assets independently.

Most projects contain a few exercises that advancement as arranged and some which don't. For this situation, the best technique is to consolidate the two refreshing strategies.

13) Tracking: Following window is utilized for checking a project's advance utilizing diverse sorts of layouts such as work costs, project cost, asset estimating, asset designation unit astute and cost savvy.

14) Earned value: Earned value is a strategy for estimating project execution as per both project cost and schedule. The strategy analyzes the planned expense of the work to the real expense.

15) Claim digger: The case digger is a schedule investigation device that empowers an organization to produce a report that thinks about chosen information fields in a reexamined project and a comparing standard.

16) Project limits: Project limits comprise of parameters doled out to WBS components; they are utilized to screen projects and create issues

17) Project issues: Project issues are the issues inside a schedule that must be tended to before the project can be finished. They can either be made by limits or physically.

Schedule investigation and forecasting

Schedule variance (SV)

It decides if a project is behind or in front of the schedule. It is determined by subtracting arranged value from the earned value.

Schedule variance = Earned value (EV) - Planned value (PV)

The Schedule Variance can be communicated as a rate by isolating the schedule variance (SV) by the arranged value (PV):

$SV\% = SV/PV$

Schedule execution file (SPI)

It shows proficiency with which the project group is utilizing now is the ideal time.

Schedule execution file = Earned value/Planned value

Time gauge at finish {EAC(t)}  
We can create a harsh gauge of when project will be finished  
Gauge at complete {EAC(t)} = (BAC/SPI)/(BAC/months)  
BAC = Budget at culmination  
Cost examination and guaging  
Cost variance (CV)

It indicates whether a project is under or over spending plan.  
Cost variance (CV) = Earned value (EV) - Actual cost (AC)

This number can be communicated as a rate by partitioning the cost variance (CV) by the earned value (EV).  
CV% = CV/EV  
Cost execution list (CPI)

It is one of the clearest markers of the aggregate cost effectiveness of the project.  
Cost execution file (CPI) = Earned value (EV)/Actual cost (AC)

### III. IDEAL BASELINE FOR STANDARD DESIGN OF PROJECT

An ideal baseline B1 was created in Primavera for the SDF case study. The work breakdown structure, activities and stepsfor activities are being discussed here. The structure for the baseline is presented from the WBS levels. In WBS a level maybe again sub divided. Activities come under the WBS.

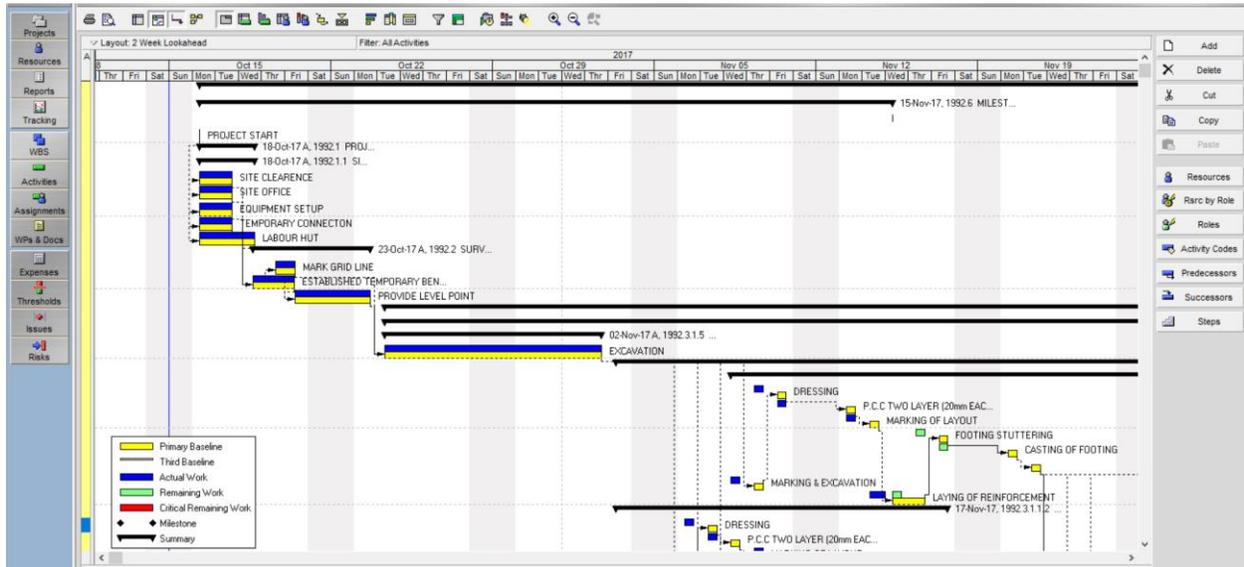


Fig. Various activities of project

### Work Breakdown Structure

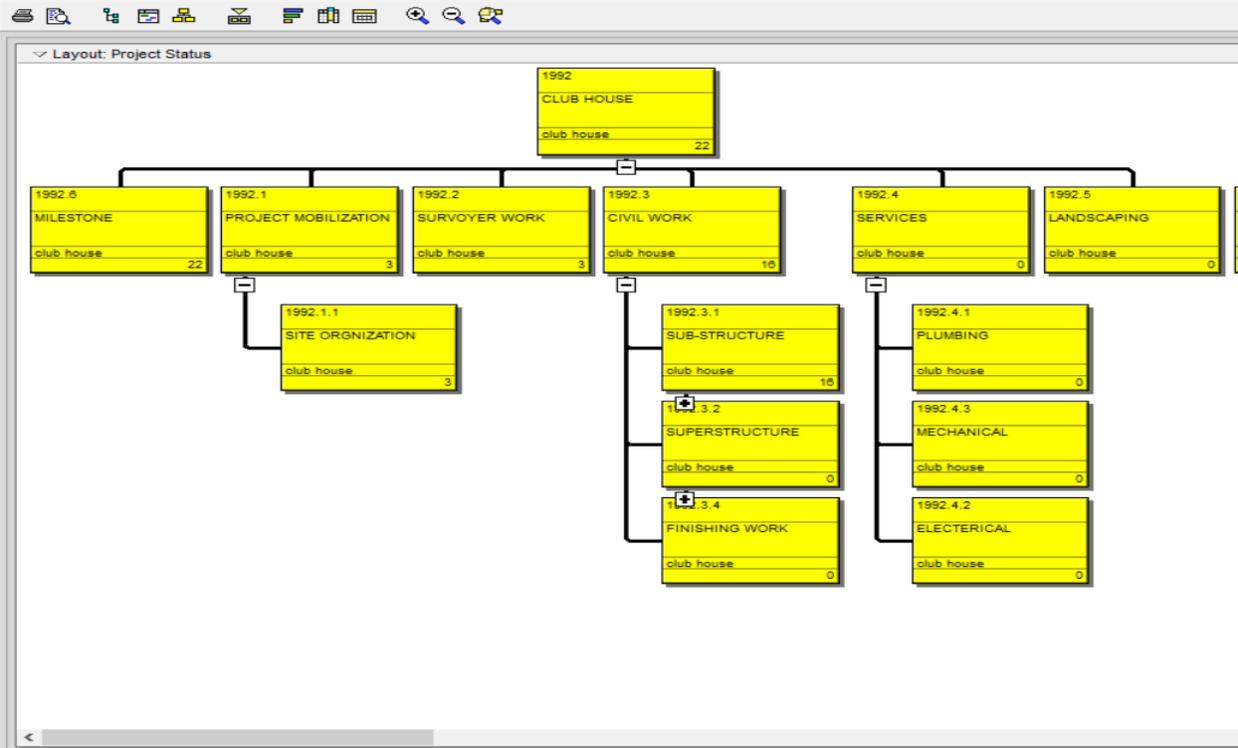


Fig. WBS of project

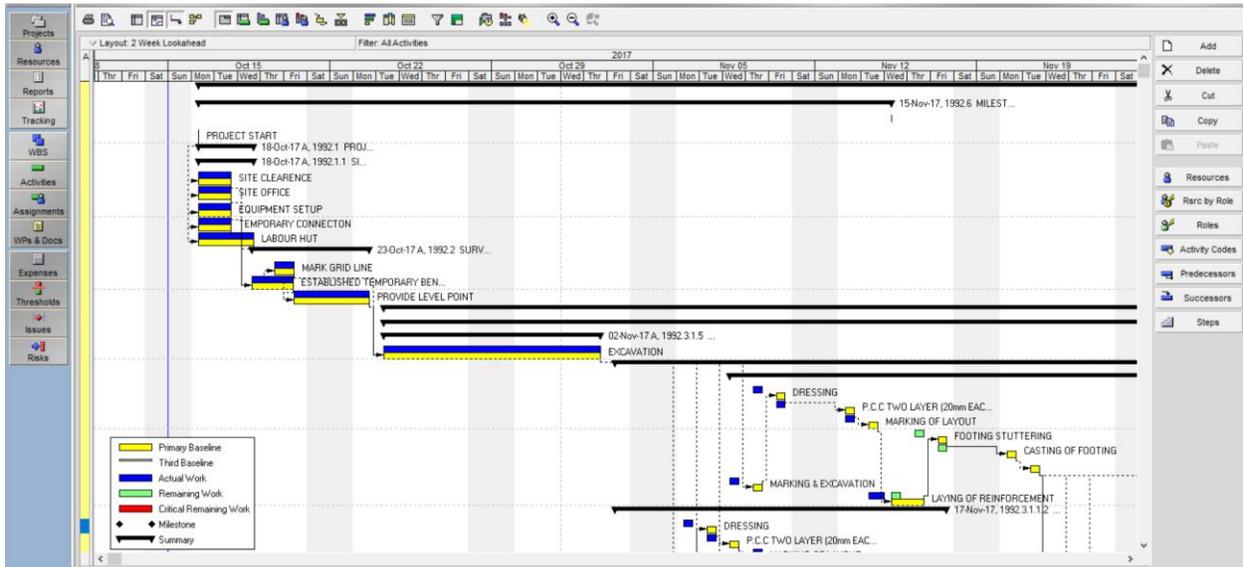
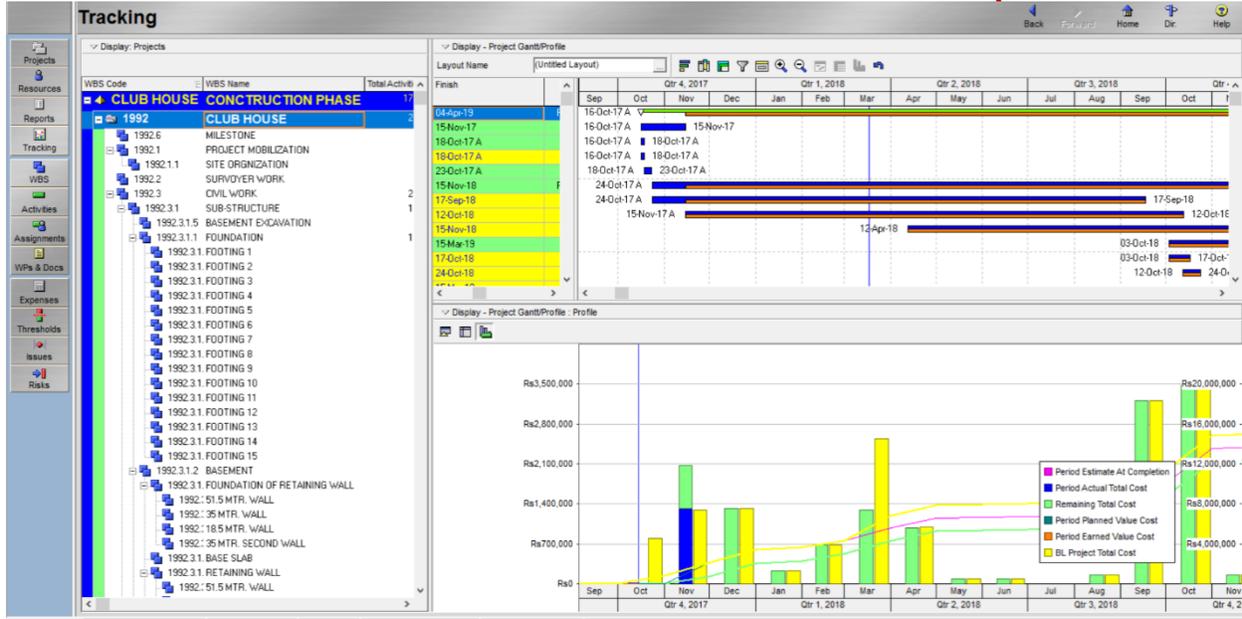


Fig. Bar chart of project



Tracking of project

Project budget	Rs. 5,17,81,595
Planned value	Rs. 4,49,16,764
Earned value	Rs. 4,16,11,087
Actual cost (AC)	Rs. 4,11,63,038
Schedule variance (SV) = EV-PV	Rs. 52,93,669
SV % = SV/ PV	- 11.05 %
Schedule performance index (SPI) = EV/ PV	0.89
Total duration	21 months
Estimate at Complete {EAC(t)}= (BAC/SPI)/(BAC/months)	23.6 months
Cost variance (CV) = EV- AC	20,61,048
CV % = CV/ EV	4.84 %
Cost performance index (CPI) = EV/AC	1.05
Estimate to complete	Rs.1.82 crores

#### IV. CONCLUSION

The primary goal of this examination was to comprehend the job of observing and control in the advancement and opportune culmination of a construction project. This goal was accomplished through correction of literary works and philosophies associated with checking and control. The contextual analysis turned out to be a rule in understanding the advancement of Standard plan production line construction work and furthermore to recognize the particular issues emerging amid the procedure. Consequences of this examination demonstrate the disadvantages of the present project management framework in SDF project and the significance productive planning, observing and controlling, just as the need and adequacy of a project management programming like Primavera P6 in a construction project.

Synopsis of the outcomes acquired from the contextual investigation lead to following ends.

- Project advance is 51.73% of the absolute work subsequent to devouring 62.48% of the complete assessed project term.

- The project has a negative value for schedule change (SV) which implies that the project is behind schedule.
- Schedule change rate is - 11.05% subsequently the project is 11.05 percent behind schedule.
- A SPI of 0.89 would reveal to us that the project is just advancing at 89 % of the rate initially arranged.
- The initially evaluated finish time for the project was 21 months, so the project administrator presently realizes that if work proceeds at the present rate the project will take 2.6 months longer than initially arranged as time gauge at culmination is 23.6 months.
- The project has an ideal cost difference of 2,061,048. A positive value of CV implies that the project is finished financial plan.
- Cost change rate is 4.84% in this way the project is 4.84 % underneath spending plan for the work performed till 31st Walk 2012, barring punishments material due to delays.
- A CPI of 1.05 would reveal to us that the project is at present running inside spending plan.
- Estimate to finish demonstrates that Rs.1.82 crores is the normal cost required to complete all the rest of the work.
- 88 issues in completion date changes and 88 issues in begin date fluctuations are accounted for when the completion date difference edge and begin date difference limits are observed.
- Comparison of overhauled project schedule with standard of demonstrates that 41 WBS have been included and 43 WBS have been erased. By and large it tends to be presumed that Inadequacy in usage of checking arrangements has been watched.

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