

Application of Earned Value Analysis For Residential Project

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Abstract- Earned Value Management helps to analyze the project's performance and predict the forecast. It shows the current status of the project, tracks actual progress with the planned progress, answers various performance related queries such as whether projects are over budget or under budget and whether you are behind schedule or ahead of schedule, etc. This technique is used to compare actual cost to budgeted cost of work in civil construction projects. The present study deals with the project monitoring process and rescheduling and also to discuss the main parameter's that are involved in the calculation of Earned Value Analysis in cost management of construction projects. For EVM calculations MSP 2016 software is generally used. The main objective of project to track the existing project and perform analysis for effective scheduling and cost benefit analysis. Site data sampling is done for industrial sites as well as residential sites.

Keywords- Earned Value Analysis, Rescheduling, Project Tracking

I. INTRODUCTION

1.1 General:

Earned Value analysis is a method of performance measurement. Earned Value is a program management technique that uses "work in progress" to forecast the future possibilities of work. Earned Value is an up gradation of the traditional accounting methods used by the project managers. In the traditional methods the main focus was on planned accomplishment i.e. expenditure and actual costs. Whereas Earned Value goes one step further and examines actual accomplishment of the project. This gives managers a greater understanding of upcoming potential risk. It is an "early warning" program/project management tool that enables managers to identify and control problems before they become insurmountable.

It allows projects to be managed better – on time, on budget. Earned Value Management is a set of guidelines that guide a company's management control system and it is not a system or a technique. When the project gets over budget, the project management team may implement a value engineering

program for cost reduction by either reducing the quality work of project in some parts and by reducing the scope or providing extra budget to cover overrun cost. Similarly, for time overrun case, the may plan some program such as fast tracking or time crashing for time reduction. Therefore, the role of EVM as well as correct and on time forecasting is very important to achieve project goals.

This research includes implementation and improvement on EV to achieve a forecasting EAC based on statistical and econometrics techniques and traditional EV indexes as well. The Earned Value Analysis (EVA) is a valuable technique to determine real gains and losses. EVA provides means to balance gains/losses, optimize the balance and maximize the gains. EVA is a powerful tool to control simultaneously physical and cost performance.

The solution is an appropriate WBS – Work Breakdown Structure, and a suitable account plan. The solution requires distinguishing the financial control and cost control

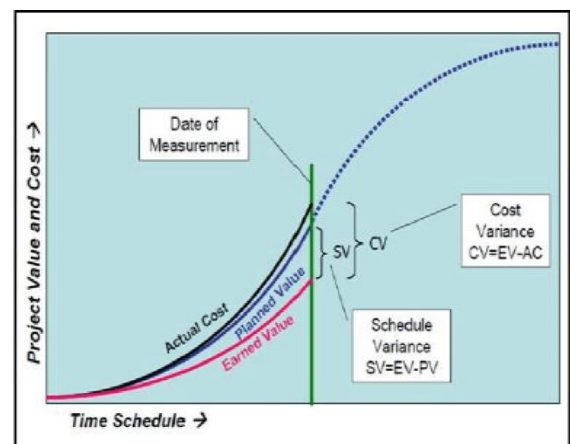


Fig 1: standard Earned Value analysis graph

1.2 Earned Value Analysis – EVA – Basics and Concepts:

The main EVA variables (indicators) are:

- BCWS (Budgeted Cost of Work Scheduled) - PV (Planned Value)

- BCWP (Budgeted Cost of Work Performed) - EV (Earned Value)
- ACWP (Actual Cost of Work Performed) - AC (Actual Cost)
- SV (Schedule Variance) : $VP = EV - PV$; CV (Cost Variance): $VC = EV - AC$
- SPI (Schedule Performed Index): $SPI = EV / PV$; $SPI = 1$ (project on time)
- $SPI < 1$ (performing less than planned); $SPI > 1$ (performing more than planned)
- CPI (Cost Performed Index): $CPI = EV / AC$; $CPI = 1$ (project on budget)
- $CPI < 1$ (spending more than planned); $CPI > 1$ (spending less than planned)

1.2 COST REDUCTION METHOD FOR CONSTRUCTION:

Time and cost are two main concerns which increase importance of cost reduction techniques. Reduction of cost of construction is a constant goal for construction industry. One way of reducing construction costs to develop innovative technologies as well as methodologies to increase productivity.

For any construction project the most difficult thing is to keep the project under the budget. Construction costs including excavation, labour and equipment hire seem to have a habit of costing more than you are quoted for. Here are 5 simple things you can do to help reduce construction costs for your residential projects.

1. Firstly applying the 80/20 rule
2. Control your variable costs
3. Be wary of excavation costs
4. Consider alternative products
5. Create a project plan

1.3 Aim Of Study

To perform earned value analysis for residential, and commercial building for better project tracking

1.3 Objective Of Study

- To study earned value analysis and its implementation in construction industry.
- To identify cases for cost overrun in all construction activities.

- To reschedule activities to lower cost performance index and schedule performance index of project to avoid cost overrun
- To perform S curve analysis in given case studies

II. LITERATURE REVIEW

Many construction projects gets delayed due to various factors resulting time and cost overrun. Earned value analysis was firstly introduce in industrial engineering, it was later adopted in the civil construction work.(1)

Construction industry has a great importance at international level, it provides employment and plays an important role in economy of country. EVM a tool use to overcome the different problem is generally used in construction work.(2)

A proper budget planning is very important in any construction work at any level. At the start of the project the cost on paper is very different that in the actual construction. EVM offers a great help in managing the budget of project.(4)

In the construction industries there are various indicators used to measure the performance of the project one of them is procurement These indicators represent financial and non-financial efficiency of project activities. EVA provides a report of the actual work performed.(3)

For any project to be successful the cost of the project is the basic and most important factor. EVA is a tool to evaluate the performance of the project, basically it compares the budgeted coast and actual cost of work and offers solutions.(5)

III. CASE STUDY

Analysis and Comparative Study

Data Collected

Following Case Study Details Collected So Far

3.1 Site Details

- Name of site : stargaze
- Location of site : Bavdhan, West Pune zone, Pune, Maharashtra 411021
- Design Team : jw consultancy
- Owner and Developer :koltepatil
- Architect :manojtatuskar and vikasacharikar

- Cost of project : 64.4 Lakhs Onwards
- Structural Engineer : jw consultant
- Builder :koltepatil
- Area : 1.91 acre
- Residential building having No. of Towers: 6, Towers No. of Floors: 14 Floors, No. of Units: 462 Units.
- This project is based on sustainable structure
- Present condition of the project : under construction
- No. of Towers: 6, Towers No. of Floors: 14 Floors, No. of Units: 462 Units.
- Total built up area =966.35 sq.m.

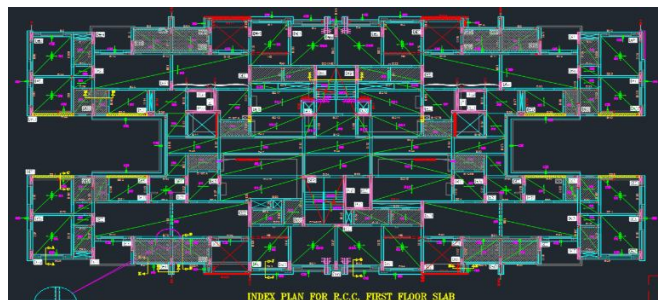


Fig 2: First floor slab

Site Details

- Name of site : 18 Latitude.
- Location of site : Punawale, Mulshi, Pune
- Site Engg: Manoj Gawade

A proposed commercial building having 7 floor and 102 shops is taken for case study location is in Punawale, Pune.

- Design Team: Sanskruti construction
- Owner and Developer :G. D. Square and Akshay Chordiya
- Architect:Rajas Designers
- Cost of project : 16 Cr
- Structural Engineer : Structural Consultants
- Builder :G. D. Square and Akshay Chordiya
- Area: 92000 sq.ft.
- Commercial building having No. of Towers: 1, No. of Floors: 7 Floors, No. of showroom:6.
- Present condition of the project : Under construction
- No. of Towers: 1, No. of Floors: 7 Floors, No. of showroom:

DATA ANALYSIS OF CASE STUDY

Rate analysis is done to workout rates used in construction

From data collected from site BBS is prepared from working drawings and MSP schedule is prepared the

important aspect of quality planning such as time, resources like machine and materials factors are added in MSP schedule for cost of quality

Table 1 Cost Concrete Work

Table 2 Steel Cost

Sr. No	Bar Size
1	8 mm
2	12 mm
3	16 mm
4	20 mm

Total Volume After Deduction of door and windows	27.1665
Size of CLC Brick	600x200x125 mm
No Of brick For One Flat	1631.327689
No Of brick For One Floor	7831
No Of Cement Bag	15 bag
Sand In Brass	8.5

Table 3 Brick Work Calculation

Fig 4 0% Brick Work in Mivan Technology take more cost but less duration

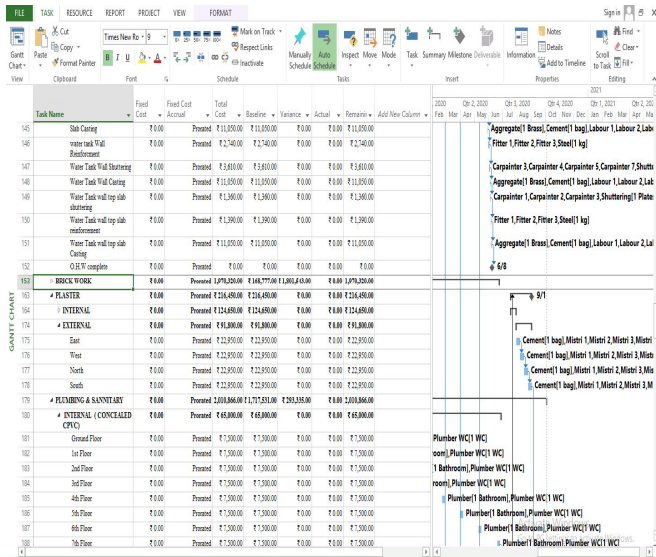


Fig 5 CLC Brick Work takes less Cost but take more Duration

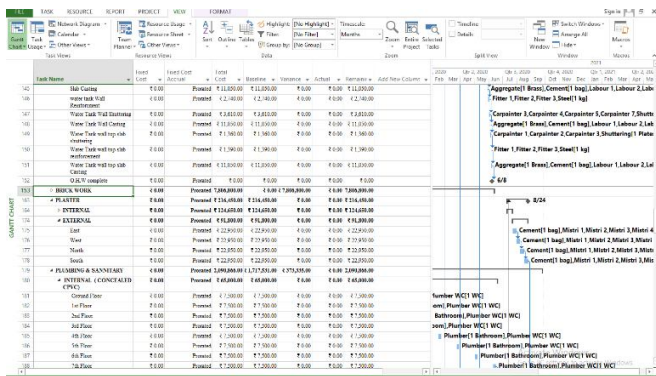


Fig 4 (Conventional) Brick Work takes less Cost but take more Duration

In Above the MSP Scheduling we have use CLC Bricks to reduce time and cost of the project as compare to Mivan Technology in Mivan we can reduce brick work time but it take more cost than brickwork

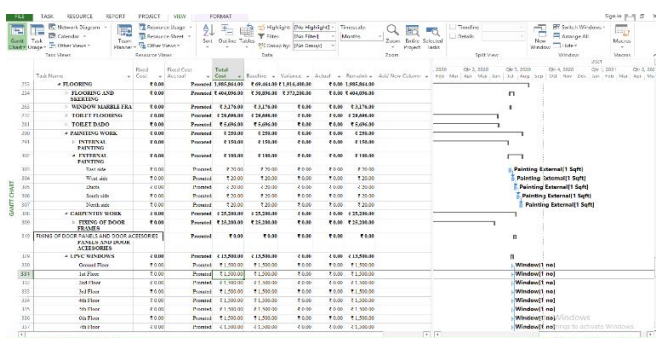


Fig 7 600 x 600 Flooring increase Cost and Duration too

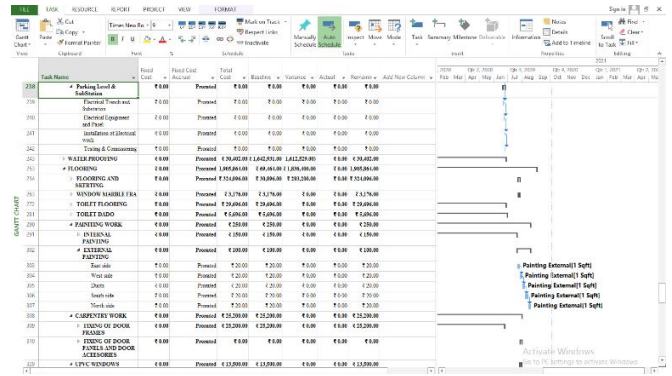


Fig 8 800 x 800 Granite tile use Flooring takes more Cost but less Duration

In Above the MSP Scheduling we have use Granite having Size 800 mm X 800 mm to reduce time of the project as compare to 2nd Project we use tile having size 600 x 600 It reduce cost but it take more time As compare to 1st project

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