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EARNED VALUE FEASIBILITY ANALYSIS FOR SOUTH GUJARAT REGION TO ENHANCE PROJECT PERFORMANCE

Mr. Divyesh Joshi[1], Mr. Vyom B. Pathak[2], Ms. Neetu B. Yadav[3]
M.E. Student, Civil Eng. Dept., SNPIT &RC, Umrakh (GTU), Bardoli, Gujarat, India[1]
Asst. Professor, Civil Eng. Dept., SNPIT &RC, Umrakh (GTU), Bardoli, Gujarat, India[2]
Asst. Professor, Civil Eng. Dept., SNPIT &RC, Umrakh (GTU), Bardoli, Gujarat, India[3]

Abstract: ***Earned value management system is unique way of tracking project cost and schedule performance. We can also say that after a set of project activity completion if we apply this system on the projects then we can easily know how much we have earned in terms of Cost, Schedule and performance. Ultimately further modifications can be possible to do. In this paper a questionnaire survey is carries out for introducing the EVM for residential construction projects and to check how much value we can earn by using this tool. So its advantage can be taken by the construction industry as day by day its volume and cost wise enhancement it increasing with the urbanization. The analysis of received response is done by RII and ms excel. Based on the feedback received we can say that it's a help full tool and gives us early warning to do modifications on time so project of-tacking can be reduce.***

Keywords: **Construction Project, Earned value, planned value, Project performance.**

I. INTRODUCTION

In developing countries like India, the construction industry faces a lot of project over runs due to the large amount of uncertainties. These project overruns are primarily attributed to time and cost overrun. The traditional method of project cost monitoring is based on simple parameters using two data sources that is the budget (or planned) expenditure and the actual expenditure. Besides, it does not relate any current performance trend to forecast future performance. Currently available methods are mostly deterministic, overly simplified, or inconsistent in application and assumption, which make them unreliable or impractical. Ultimately problems like time and cost overruns , lack of management and timely execution of the activities is not takes place and ultimately project cannot complete with predefine frame. Earned Value Management introduces a third variable called Earned Value which would give a clearer understanding of the budgeted cost and the schedule. It acts as an early warning to the project manager to spot and control potential problems that may arise so as to maximize profits and minimize delays.

II. OBJECTIVES OF THE EVM

The objectives of Earned Value Management are: Relation between times phased budgets with tasks, to capture progress assessment of work related with plan. Elaborates the relation

between performance indices like technical, schedule, and cost Data obtained is valid and informative for management to take necessary action. Helps to take effective decision at practical level Contractor as well as customer can get significant benefits by implementing designed EVM system. Contractor can quickly respond and control the issues to meet easily the schedule of project, cost and other technical objectives. This improves contractor's ability to identify the problems in time, manage the project, and control the cost and schedule of the project which benefits the customer directly.

III. NEED OF EARNED VALUE MANAGEMENT SYSTEM

The Earned Value Management System is needed for following reasons,

1. To check whether we are ahead or behind the schedule of the project.
2. To check whether we are currently under or over budget of the project.
3. To check how efficiently we are working with the project.
4. To know when the project is likely to be complete.
5. To know what is the remaining or entire project is likely to cost.

IV. TERMS OF EVM

The basic terms associated with Earned Value Management are,

- **Planned Value (PV):** It is the amount of money budgeted to be spent at a particular point of time.
- **Earned Value (EV):** It is the amount of work in terms of cost that is actually accomplished at a particular point of time with respect to the planned value.
- **Actual Cost (AC):** It is the actual amount of money spent for the corresponding planned and earned value.
- **Cost Variance (CV):** It is the difference between Earned Value and Actual Cost. (EV-AC)
- **Schedule Variance (SV):** It is the difference between Earned Value and Planned Value. (EV- PV)
- **Cost Performance Index (CPI):** It is the ratio between Earned Value and Actual cost. If CPI greater than 1 then the project is under budget and CPI less than 1, then the project is under budget.
- **Schedule Performance Index (SPI):** It is the ratio between Earned Value and Planned Value. It indicated how much ahead or behind schedule the project is at a particular point of time.
- **Critical Ratio (CR):** It is the product of Cost Performance Index and Schedule Performance Index. It indicates the overall performance of the Project with respect to both cost and time.
- **Estimate at Completion (EAC):** It's a predict ion of the total project cost based upon the current trends in project performance.
- **Variance at Completion (VAC):** It is the difference between the planned budgets at the beginning of the project to the Estimate at Completion. This value denotes how much more profit or loss the contractor will make on that Project.
- **Time Estimate at Completion (EACt):** It predicts the completion time of a Project based on its current performance. EACt = (BAC / SPI) / (BAC / months)

V. DEVELOPMENT OF CRITERIA FRAMEWORK

For the development of criteria framework for the factors of the problems related to time schedule and their importance and Necessity of earned value management (EVM) literatures have been referred. First part of questionnaire is general information about the project and second part is for techniques & awareness of EVM is prepared for general project review and awareness of people about EVM. As the outcome, total 12 factors for the problems related to time schedule and their importance that may be encountered in a construction project were identified. Another 14 factors of necessity of EVM also were identified.

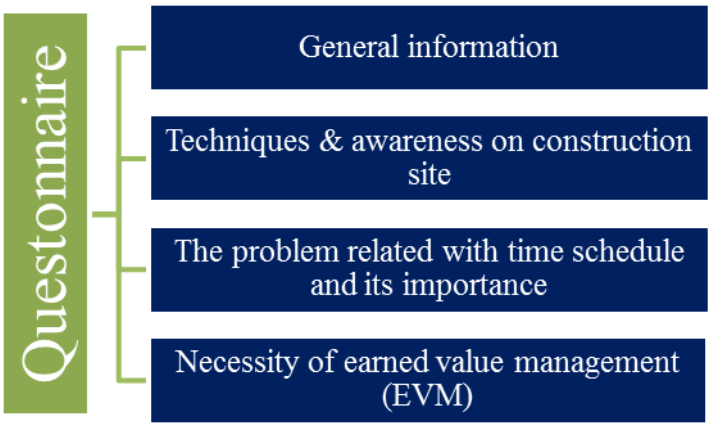

Figure 1: Main criteria of questionnaire

VI. Data analysis

The relative importance index (RII), is computed for each factor to identify the most significant factor. The factors are ranked based on RII values. From the ranking assigned to each factor of the problems related to time schedule and their importance and Necessity of earned value management (EVM), it is possible to identify the most important factors of the problems related to time schedule and their importance and Necessity of earned value management (EVM) in residential construction projects of Surat city. The table 1 & 2 shows the ranking of all factors.

Based on the ranking, the top 5 most important factors of the problems related to time schedule and their importance as perceived by all respondents are following:

Table 1: Top 5 Factors of the problems related to time schedule and their importance

RANKING	DESCRIPTION	RII
1	Without time schedule, time performance of the project cannot be identified properly	0.94
2	Time Schedule is useful forecasting final cost and time of completion of the project.	0.94
3	It is important to identify problems early, in taking corrective actions.	0.93
4	Time schedule helps to improve the progress of the project.	0.93
5	Time schedule is useful in identifying problems early to take corrective actions.	0.87

Table 2: Top 5 factors of Necessity of earned value management (EVM)

RANKING	DESCRIPTION	RII
1	Planned Value is influence on cost performance of project	0.94
2	Estimate at Completion is correlated with forecasting process of project	0.93
3	Independent Estimate at Completion (Time) is correlated with forecasting process of project	0.93
4	Estimate to Completion is correlated with forecasting process of project	0.93
5	Actual Cost is influence on cost performance of project	0.91

This part gives the general information about the organization and the relevant techniques are used to measure performance. Why and when they used relevant techniques. Percentage wise answer given in table which gives us the adaptability of techniques on sites as well as awareness of the techniques also knows by questionnaire survey. In table 3 question wise response describe in form of percentage which is given by respondents.

Table 3: Factors of Techniques & awareness on construction site

Sr. No.	Questions	Yes, Have experience (%)	Yes, known concept(%)	Just heard the concept(%)	Don't know(%)
1	Do you know about Work Breakdown Structure?	58.33	22.22	19.44	0.00
2	Application of PERT Analysis (Network diagram method)?	41.67	38.89	19.44	0.00
3	Do you know about Earn Value Management?	0.00	0.00	47.22	58.33
4	Are you practicing Earn Value management in your organization?	0.00	0.00	27.78	72.22
5	Do you update the performance of project by primavera?	13.89	30.56	41.67	13.89
6	Do you utilize CPM/PERT on site for measuring time performance of project?	0.00	41.67	58.33	0.00
7	Do you utilize MS Excel on site for measuring cost performance of project?	69.44	30.56	0.00	0.00
8	Do you utilize MS Project on site for measuring cost performance of project?	13.89	30.56	41.67	13.89
9	Do you maintain your record register on site?	83.33	16.67	0.00	0.00

VII. CONCLUSION

With the introduction of Earned Value Analysis monitoring of the project is easy. It is good tool for the measuring the performance with the parameters of EVM. It shows how much ahead of schedule or behind schedule the project is at a particular point of time. It also helps in the monitor if the corrective actions done to improve the performance of work are actually working. With the help of data analysis of questionnaire by RII method top five factors are ranked of necessity of EVM and problem related with time schedule and their importance. In part of techniques and awareness one can see that 58.33% respondents don't know about performance measuring tool EVM and 72.22% respondents don't use EVM tool ever so with this survey held on south gujarat region basic ideas and mind set of people should know by questionnaire.

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