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RESEARCH ARTICLE

EARNED VALUE MANAGEMENT SYSYTEM AND ITS APLICABILITY IN GOVERMNMENT DEPARTMENTAL EXECUTING AGENCY IN INFRASTRUCTURE DEVELOPMENT

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ABSTRACT

The management of multi-disciplinary infrastructure projects requires monitoring and controlling tools for effective project management. The Earned Value Management System (EVMS) is a useful management tool available for project managers to monitor and control multi-disciplinary projects. EVMS measures project performance by comparing the amount of work planned against the amount of work actually carried out and the actual cost incurred. EVMS combines the work scope, schedule and the cost elements of a project and facilitates the integrated reporting of a project's progress and cost status.1 Government departmental executing agency considers physical percentage and financial progress of a job as a management and controlling tool .In cases where the difference between financial and physical percentage progress exceeds certain prefixed limit, then financial expenditure pertaining to that job is prohibited. This control is exercised with an intention that whatever expenditure has been incurred for mobilization of resources has to be culminated in physical progress. This paper discuss the applicability of EVMS as an effective tool for the government departmental executing agency and only monitoring physical and financial progress is not sufficient as management and controlling tool.

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INTRODUCTION

Infrastructure is basic physical structure needed for the operation of society & enterprise such as road, bridge, rail, dam, water supply etc. Infrastructure is one of the important aspect for development of any country especially for developing countries.2 Infrastructure development in any developing country facilitates the socio-economic development, although linear regression between infrastructure development index and GDP of nation is not firmly established. Infrastructure sector need considerable time and resources. Most of these projects undergoes delays and cost overrun due to poor planning and project tracking. These delay and additional economic burden adds up the opportunity loss of the planned infrastructure. Hence the project tracking is important as far as completion of project on time and within estimated cost. Monitoring and controlling is the process of overseeing all tasks or activities to ensure that the approved project is within scope, on time and on budget so that it proceeds with minimal risk of delay and cost overrun.

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This involves comparing actual performance with planned performance along with taking corrective action to yield the desired outcome. This process is continuously performed throughout the project life cycle. 2 There are many Govt. Departmental executing agency engaged in infrastructure activities with certain departmental execution capabilities in addition to the contractual capabilities. In order to justify the resources held with the department certain portion of the job is to be completed through departmental resources, which at times are augmented by supply/ execution contracts. These agencies still considers physical and financial progress of a job as monitoring and controlling tool. When financial percentage progress exceeds physical percentage progress certain prefix limit, then freezing of job is done. Freezing of job is uplifted only when difference between physical and financial percentage progress falls within the said limit. There are several management tools used for project tracking but this paper represents the application of Earned value management to project for monitoring & controlling purpose. Earned value management (EVM) initially was a government contractual mandate was adopted by U.S. government in the management of its internal projects in defense agencies. EVMS is very effective and commonly used project performance

measurement tool which integrates cost and schedule performance of the project. It examines concurrent cost and schedule variance, which gives a holistic idea about project progress.3 It is widely used for tracking purpose in construction projects.2 The suitability and applicability of EVMS is considerably accepted in abroad and trend for its acceptance in private infrastructure companies in India shows incremental pattern.

- Cost Variance: CV = EV - AC (difference between earned value and actual cost). A negative value points more has been spent for the activities than planned & positive value points less spent than planned cost. It can be expressed as a percentage (%CV) by dividing the cost variance (CV) by the earned value (EV).
- Schedule Variance: SV = EV - PV (difference between earned value & planned value) A negative value means that the project is behind schedule & a positive value means ahead of schedule. It can be expressed as a percentage (%SV) by dividing the schedule variance (SV) by the planned value (PV)
- Cost Performance Index (CPI) - The ratio of cost of work performed (BCWP) to actual cost (ACWP) A CPI of less (more) than one means that the project is currently running over (under) budget.
  Cost Performance Index (CPI) – BCWP/ ACWP
- Schedule Performance Index (SPI) - The ratio of work accomplished (BCWP) to work planned (BCWS). A SPI of more (less) than one means that the project is ahead of (behind) plan.
  Schedule Performance Index (SPI) – BCWP/ BCWS

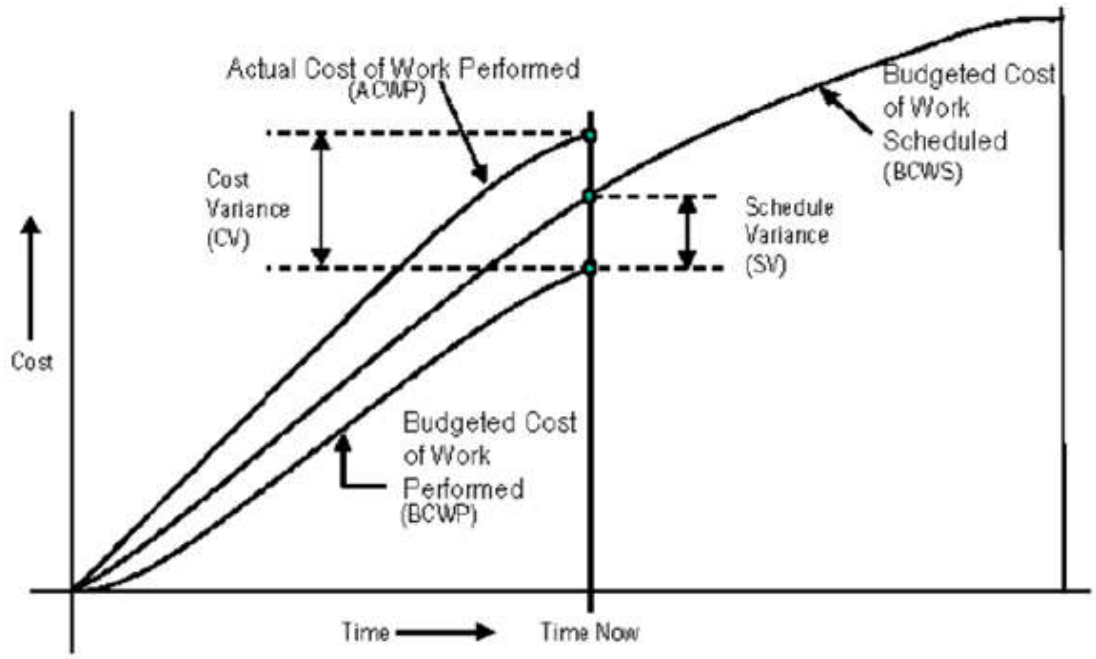

Fig. 1. Graphical reparesentation of earned value parameters

Interpratation

S.No.	Cost		Schedule		Interpratation
	Variance	Index	Variance	Index	
1	Negative	<1	Negative	<1	Project is having cost over run and is running behind schedule.
2	Negative	<1	Positive	>1	Project is having cost over run and is running ahead schedule. This could mean the probably activities are being 'crashed' without considering the 'Time – Cost trade off'.
3	Positive	>1	Negative	<1	Project is saving on cost but is running behind schedule.this could be desirable if there is no pressure on time to complete the project.
4	Positive	>1	Positive	>1	The project is having cost saving and is ahead of schedule.

Elements of concept of EVMS 2, 3, 4,

There are different terminologies used in EVM such as ACWP(AC), BCWP(EV), BCWS(PV), CV, SV, CPI, SPI.

- ACWP (AC):- Actual Cost of Work Performed (ACWP) or Actual Cost (AC) is the actual cost incurred in accomplishing the work performed within a given time period.
- BCWP (EV):- Budgeted Cost of Work Performed (BCWP) or Earned Value (EV) is the sum of budgets for completed work packages and completed portions of open work packages.
- BCWS (PV):- Budgeted Cost of Work Scheduled (BCWS) or Planned Value (PV) is the sum of budgets for all work packages scheduled to be accomplished within a given time period.
- Cost variance (CV), Schedule Variance (SV), Cost performance index (CPI) & Schedule performance index (SPI) are the performance measures of construction project and these measures can be derived

MATERIALS AND METHODS

Govt. Departmental executing agencies engeged in minor/ major infrastructural activities which is having departmental capability in addition to contractual obligation. Fourteen jobs randomly selected and analysied as per description given in for

the month of March 2016 and Jun 2016. Jobs which were under progress was only cattered for analysis.

Inferences in Job No. 14 and 13

- Since financial expenditure carried out without physical progress made on the ground ie. Expenditure made of resource mobilisation. Job appears to be ahead in terms of cost but much behind the schedule. So CV or SV may not appear to be a single parameter to access the performance of Job.
- Even without making any financial progress on account of mobilisation of resources the performance of job underwent a negative progress in terms of schedule. So CV cannot be allowed to remain +ve for many period.
- Table.4, lists all the job showing positive cost variance and negative schedule variance mean these job are ahead of cost and behind the schedule

Conclusion

- CV and SV independently not adequate as a job performance tool.
- In view of above CPI (Cost Performance Index), SPI (Schedule Performance Index) and CSI (Cost Schedule Index) are better criteria for accessment of Job.
- In Govt. agency/ Govt sponser project where the cost on account of delay in operation requires some accountability fixation as it leads to opportunity cost.

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