

# Application of Earned Value Management System In Infrastructure Projects - A Review

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**Abstract:** Today Infrastructure projects in India are in a development phase and well-controlled projects will play a significant role in Indian Infrastructure development. Earned Value Management System is a useful management technique or tool available for project managers to Plan, Schedule, Monitor and Control major multi-disciplinary projects. This paper summarizes the concept of Earned Value Management System and its application in infrastructure projects.

**Keywords—** Earned Value Management (EVM), Planning, Scheduling, Cost Performance Index (CPI), Schedule Performance Index (SPI),

## 1 Introduction

Now-a-days projects are executed within the constraints of quality, time and finance and a project manager should exercise control to ensure project delivery within these constraints. Most of the infrastructure development projects are developed with a backdrop of urgent need, with a high pressure to deliver and along with preciseness in work. The management infrastructure projects of multi-disciplinary requires monitoring and control tools for effective project control. The Earned Value Management System (EVMS) is one of the technique for measuring project performance by comparing the amount of work planned against the amount of work actually done and the actual cost incurred. Earned Value Management System includes various parameters like Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI) which helps to monitor the project with respect to planning, scheduling and costing.

## 2 Literature Survey

In the literature survey various research papers are studied along with the reference books to understand the concept of Earned Value Management and its related terms such as Project Planning, Project Cost and Schedule.

In the research done by Dr. P.B.G. Dissanayake (2010), this paper summarizes the basic concepts and the theory of EVMS, briefly explains how EVMS can be implemented, the challenges encountered during implementation and its benefits to a project as a project management tool

In the research study done by Mohd Faris Khamidi Waris Ali Khan, Arazi Idrus (2011), the study suggests cost

monitoring through Earned Value Analysis is an effective approach for finance management of construction projects. The calculation of Earned Value Performance variances and indices and from this case study it is possible to examine the current and future cost performances of projects in many ways. With Earned Value Analysis, it is possible to monitor and forecast the cash flows and points out cost overruns which may happen during the project cycle.

In the research study done by Fernando Acebes, Javier Pajares, Jose Manuel Galan, Adolfo Lopez-Paredes (2012), in this research paper, it is proposed an innovative and simple graphical framework for project control and monitoring, to integrate the dimensions of project cost and schedule with risk management, therefore extending the Earned Value methodology. Earned Value Management allows Project managers to know whether the project has overruns (over-costs and/or delays), but project managers do not know when deviations from planned values are so important that corrective actions should be taken or, in case of good performance, sources of improvement can be detected.

In the research study done by N. H. Nkiwane, W. G. Meyer & H. Steyn (2016), this study has revealed some insights into the implementation of Earned Value Management in construction projects. A wider population of project professionals is studied by using a survey research design. The use of Earned Value Management by contractors was revealed as an unexplored subject, with suggestions that Earned Value Management provides only high-level control. Earned Value Management applicability to such contractors with all the relative information and awareness of importance of the concept will be very beneficial to the contractors and overall growth of progress of the project.

In the research study done by Jose Angelo Valle, Carlos Alberto Pereira Soares (2013), this article explains the present and discuss the main factors involved in the use of Earned Value Analysis in the cost management of civil construction projects. The important factors include advantages and disadvantages, difficulties and benefits, problems and solutions and criteria and results based on the experience of a real case study in Brazil. The results states the Earned Value Analysis contribution to the success of the case study project which finished on time and in budget.

In the research done by Prof. Vanhoucke (2012) he explains the empirical evidence presents for most of the theories treated in literature concerning the Earned Value Management methodology. In addition, the study reached interesting findings concerning whether or not project managers should opt for this concept. Thus the study clearly suggests that Earned Value Management methodology definitely helps project managers control construction projects by providing accurate forecasts and early warning signals, However, these effort only needs to be done at the beginning of the project and will eventually prove valuable throughout the course of the project.

In the research study done by Milind Padalkar, Saji Gopinath (2013), in this paper, they have done a survey of academic and practitioner literature on Earned Value Management and its extensions, and attempt to reconcile the debate by the claims and counterclaims against parallel research streams in project management. We suggest an integrative ground the technique amidst the various bodies of research opinions in order to elicit future directions. It is seen that Earned Value Management serves two main purposes. First, it tells the project manager where the project is, by connecting work completion, costs incurred and time taken. Second, it supplies the arithmetic to predict the cost and time parameters at completion.

In the research study done by Sangram M. Patil, D.B.Desai, Dr.A.K.Gupta (2015), this study shows importance of implementation and unique features of earned value management that benefits project manager and ultimately results in project success. The companies which do not use Project Management software tools efficiently have to increase their investments in training and educating their employed project teams, as well as in establishing information technology systems that will support and help Project Management teams. The use of such software's helps to complete the project on schedule time and cost.

In the research paper by Andrzej Czemplik (2014), the author explains the concept of Earned Value Management System and its effective use in construction works. In the research study done by Shuheng Zhong and Xin Wang (2011) they explain the application part of Earned Value Management and the improvement of the project. The research study done by A.V.Vakhrushki, Mishakova and K.D.Borshcheva (2017) they explain the basic tools of the Earned Value concept along with the effectiveness of the monitoring of a project.

Along with the research papers various reference books and articles are also studied to understand the theoretical concept and implementation process. Also reference books like Construction Engineering and Management by S.Seetharaman, Construction Planning and Management through System Techniques by Mahesh Verma, Construction Project Management by K.K.Chitkara

were also used for studying the conceptual part of the Earned Value Management System.

### 3 Conclusion

1. The EVMS provides a clear insight in to the project progress. It facilitates the project team to carry-out more in-depth assessment of project status and predicts future performance trends as well.
2. The implementation of the EVM methodology on construction projects requires some effort in the initial phase. However, this effort only needs to be done at the beginning of the project and will eventually prove valuable throughout the duration of the project.
3. Many Researchers suggest that precise work breakdown structure of the project is the key to successful implementation of Earned Value Management to obtain positive results and keep a check on the project schedule.
4. Using Earned Value Management defines clear responsibility of the work and accordingly the work responsibilities can be assigned in a proper manner.

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