

Project Management in Construction using Earned Value Analysis

Earned Value Analysis (EVA) is a proactive way of managing and controlling projects and is used extensively in a range of industries and is increasingly being used as a project management tool in construction.

In principle EVA compares the amount of work planned and its budget against the amount of work actually carried out, its budget and its actual cost. The measurement of this data can be used to show the current status of a project in terms of cost and time measured against the baseline plan and also to forecast the outturn positions.

Preparation for using EVA should commence at the outset of a project. Initially a Work Breakdown Structure must be developed breaking down the work into appropriate elements reflecting the way the project is to be managed. Typically this will be in trade packages. The work elements are then developed, quantified and priced and resources allocated to activities on the programme schedule. This schedule forms the baseline for monitoring and control of the project using EVA.

During the implementation of the project, progress percentages are assessed at regular intervals for each activity along with resource utilisation taken from allocation sheets and cost data taken from cost reports.

Comparing the actual information collected in this manner against the baseline plan will allow the following indices to be calculated:

Earned Value	$\% \text{ Complete} \times \text{Budget for each activity}$
$\% \text{ Planned Complete}$	$\text{Planned Value} / \text{Total Budget}$
$\% \text{ Achieved Complete}$	$\text{Earned Value} / \text{Total Budget}$
Schedule Performance Index (SPI)	$\text{Earned Value} / \text{Planned Value}$
Cost Performance Index (CPI)	$\text{Earned Value} / \text{Actual Cost}$
Schedule variance (SV)	$\text{Earned Value} - \text{Planned Value}$
Cost variance (CV)	$\text{Earned Value} - \text{Actual Cost}$

EVA highlights trends and allows outturns to be predicted and has been shown to be a very accurate project management tool. Much of the reason for this is that it imposes good project management disciplines. In the development phase it requires detailed pre-planning and the preparation of a



resourced programme linked to the price or budget for the project. Subsequently during the implementation phase, it requires the collection of as-built records and the analysis of actual performance against the plan.

Practical difficulties, such as a potential reluctance by trade contractors to provide required information, must be anticipated and pre-empted. Tender documentation should be drafted to include a stipulation that detailed cost and resource information must be provided and in this way EVA can be used to manage trade packages as well as the project as a whole.

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