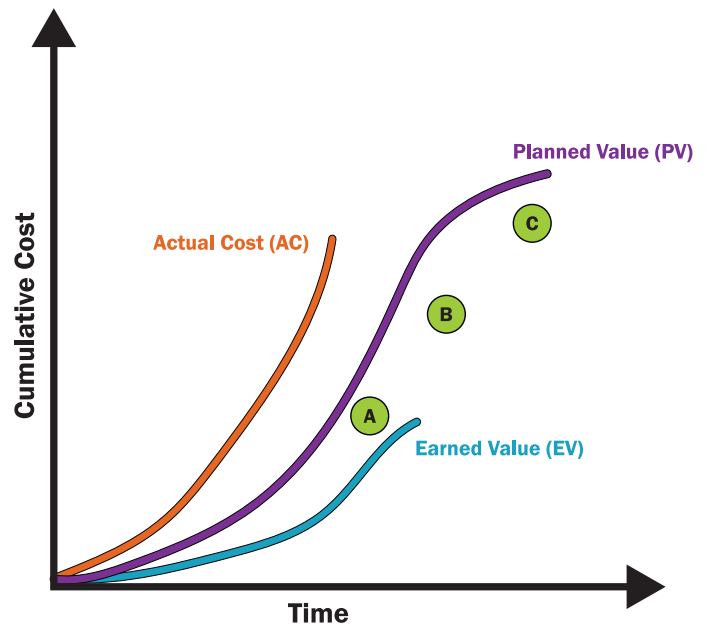


CONCEPT Budgeting is a critical aspect of engineering process/project management as it ensures that projects are completed within the allocated resources of time and money. Time and cost estimates are developed during the planning phase and are used to create a project budget to guide the project's execution. Time and money are two finite resources that need to be managed effectively to ensure project success. Time constraints and cost limitations can have a significant impact on project schedules, resource allocation and project scope. The project manager is responsible for managing the budget, tracking expenses, monitoring progress and implementing corrective actions as necessary to keep the project on track.

BACKGROUND

The focus on managing time and money in projects was driven by the need to improve efficiency and reduce waste in industrial settings. The emergence of project management as a discipline in the mid-20th century brought a more systematic approach to managing projects with tools such as the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) to manage time and cost constraints. The 1980s saw the development of Earned Value Management (EVM) as a tool for tracking project performance against budgets.

EARNED VALUE MANAGEMENT ANALYSIS



- A** Delay in Units of Time
- B** Schedule Variance (SV)
- C** Cost Variance (CV)

EXAMPLES

COST ESTIMATE: This is the initial estimation of the costs that will be incurred during the project. It should include all relevant expenses such as labor, materials, equipment and any other costs associated with the project.

BUDGET WORKSHEET: This outlines the project's estimated costs and actual expenditures. It is used to monitor the project's progress and identify areas where cost savings can be made.

SCHEDULE: This is a timeline that outlines the project's expected completion date and milestones that need to be achieved along the way. It helps to manage the time allocated for the project and identify any delays that could impact the budget.

CHANGE ORDER: This document outlines any changes to the project scope, schedule or budget that are requested during the project. It helps manage scope creep and ensure changes are properly documented and approved.

RISK REGISTER: This document identifies and assesses the potential risks associated with the project. It helps mitigate any potential risks that could impact the project's budget or schedule.

EARNED VALUE MANAGEMENT (EVM): This is a methodology used to track the project's progress against the budget and schedule. It uses metrics such as Planned Value (PV), Earned Value (EV), and Actual Cost (AC) to assess the project's performance and identify any areas where corrective actions may be required.

Make sure it measures up



REAL WORLD CONNECTIONS

Construction of the new Lincoln South Beltway project, which is estimated to cost \$352 million, will construct a new 11-mile, four-lane divided freeway on the south side of Lincoln, Nebraska, connecting Highway 77 and Highway 2. Construction began in 2020 and the project's completion is scheduled for the fall of 2024. The budget for the project includes estimates for the cost of materials, equipment, labor and other expenses associated with the project's construction. The project manager uses a range of tools and techniques, such as cost estimates, schedules and change orders, to manage the project's budget, track expenses and ensure the project is completed on time and within budget.



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