Assignment:

Earned Value Management

Duration: 60 Minutes

Controlling the Project Costs

One of the most important processes in project management is cost control. Once a project has been estimated, a budget has been created, and funds are being spent, the project manager must control the project costs. This process focuses on preventing change in the project from affecting the cost of the project. Consider errors, mistakes, rework, fluctuations in resource costs, and work performance and how small differences between what was planned and what was experienced can affect the overall project costs.

Controlling the project costs is also concerned with incorporating the cost of approved changes into the cost baseline. When stakeholders create change requests and the changes requested will add things to the project scope, chances are the change will also bring additional costs. Some changes to cost, such as variable costs like shipping and travel, can't be avoided. These changes, however, still need to pass through the cost change control system, be examined, and communicated to the project stakeholders.

One of the most important PMP exam topics falls under the controlling cost process: earned value management. Earned value management is a suite of formulas that show how well the project is performing and these formulas can help predict the project performance. Earned value management assigns a cost element to the work that has been completed, the actual costs of the work that has been completed, and a value for the work that should have been completed by this point in time.

Learning Objectives

In this assignment you'll complete the calculations for all of the earned value management formulas. By the end of this assignment you'll be able to

- Define all of the earned value management formulas
- Discuss the results of the earned value management formulas
- Evaluate a project's performance based on earned value management

Assignment Material and Setup

You should do these questions with just a calculator and some scratch paper – just as you will in the actual PMP exam.

Complete Earned Value Management Formulas

You are the project manager of the Dive11 Project for your company. This project is scheduled to last 18 months and has a budget at completion of $1,500,000. The project is currently 30 percent complete, though you were supposed to be 35 percent complete at this time. Due to some unforeseen errors, your project has been delayed and you've spent $485,230.

1. Given this information, complete the following table of earned value management formulas:

Name	Formula	Formula Result
Actual Costs (AC)	Actual monies spent	
Planned value	PV= percent complete of where the project should be	
Earned value	EV = percent complete × budget at completion	
Cost variance	CV = EV – AC	
Schedule variance	SV = EV – PV	
Cost performance index	CPI = EV / AC	

Name	Formula	Formula Result
Schedule performance index	SPI = EV / PV	
Estimate at completion	EAC = BAC / CPI	
Estimate to complete	ETC = EAC – AC	
To-complete performance index (BAC)	(BAC – EV) / (BAC – AC)	
To-complete performance index (EAC)	(BAC – EV) / (EAC – AC)	
Variance at completion	VAC = BAC – EAC	

Assignment Analysis Test

1. A project manager has elected to use an analogous estimate for her cost estimating approach. What is an analogous estimate, and what are the pros and cons of this estimating technique?

2. Give an example of a parametric cost estimate.

3. A project manager has created an optimistic estimate of $1,450, a most likely estimate of $2,300, and a pessimistic estimate of $3,650 for a portion of his project. What is the three-point estimate in this scenario?

4. A project has a BAC of $250,000 and is supposed to be 50 percent complete, but the project is only 40 percent complete. The project manager on this project has spent $145,000 due to some errors in the project work. What is this project's estimate to complete?

5. A project has a BAC of $250,000 and is supposed to be 50 percent complete, but the project is only 40 percent complete. The project manager on this project has spent $145,000 due to some errors in the project work. What is this project's variance at completion?

Assignment Solution: Controlling the Project Costs

You are the project manager of the Dive11 Project for your company. This project is scheduled to last 18 months and has a budget at completion of $1,500,000. The project is currently 30 percent complete, though you were supposed to be 35 percent complete at this time. Due to some unforeseen errors, your project has been delayed and you've spent $485,230.

1. Given this information, complete the following table of earned value management formulas:

Name	Formula	Formula Result
Actual Costs (AC)	Actual monies spent	$485,230
Planned value	PV= percent complete of where the project should be	$525,000
Earned value	EV = percent complete × budget at completion	$450,000
Cost variance	CV = EV – AC	–$35,230
Schedule variance	SV = EV – PV	–$75,000
Cost performance index	CPI = EV / AC	0.93
Schedule performance index	SPI = EV / PV	0.86
Estimate at completion	EAC = BAC / CPI	$1,617,433
Estimate to complete	ETC = EAC – AC	$1,132,203
To-complete performance index (BAC)	(BAC – EV) / (BAC – AC)	1.03
To-complete performance index (EAC)	(BAC – EV) / (EAC – AC)	0.93
Variance at completion	VAC = BAC – EAC	–$117,433

Answers to Assignment Analysis Test

1. A project manager has elected to use an analogous estimate for her cost estimating approach. What is an analogous estimate, and what are the pros and cons of this estimating technique?

   An analogous cost estimate creates an analogy between the current project and similar, but finished, project. It requires historical information to create. The pros of this estimating technique are that it's quick, easy, and based on historical information. The cons of this approach are that the projects must be similar enough to create a reliable estimate, and the historical information must be accurate enough to predict an accurate cost of the project.

2. Give an example of a parametric cost estimate.

   A parametric cost estimate is any estimate that uses a parameter to predict the cost of the project. You could refer to cost per unit, cost per metric ton, cost per square footage, cost per hour, or any other cost per identified metric to predict the project costs. The more units that are used the more the project will cost.

3. A project manager has created an optimistic estimate of $1,450, a most likely estimate of $2,300, and a pessimistic estimate of $3,650 for a portion of his project. What is the three-point estimate in this scenario?

   A three-point estimate will find the average of $1,450, $2,300, and $3,650. In this example the three-point estimate is $2467 when rounded up.

4. A project has a BAC of $250,000 and is supposed to be 50 percent complete, but the project is only 40 percent complete. The project manager on this project has spent $145,000 due to some errors in the project work. What is this project's estimate to complete?

   The formula for the estimate to complete is the Estimate at Completion minus the actual costs. This is formula that is reliant on several other formulas to find the answer. Here are the steps to find the estimate to complete:

   1. Find the EAC using the formula EAC = BAC / CPI.
   2. Find the CPI using the formula EV / AC.

3. The earned value is $100,000, and the actual costs are $145,000, so the CPI is 0.69.

4. You can now find the EAC; in this example it's EAC = $250,000 / 0.69, for a result of $362,500.

5. Now you can find the ETC by using the formula ETC = $362,500 – $145,000, for a result of $217,500. The project's estimate to complete is $217,500.

5. A project has a BAC of $250,000 and is supposed to be 50 percent complete, but the project is only 40 percent complete. The project manager on this project has spent $145,000 due to some errors in the project work. What is this project's variance at completion?

   To find the variance at completion, you'll use the formula BAC – EAC. This is another example of a nested formula, as you'll need to find the EAC to determine the project's variance at completion. The EAC uses the formula BAC/CPI, which in this example is $250,000 / 0.69, for a result of $362,500. The variance at completion is $250,000 minus $362,500, for a result of –$112,500.