

PMP Exam Tips on Cost Management

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Parallels between Cost and Time estimating:



There are strong parallels between **Cost** estimating and **Time** estimating so you should have experienced some déjà vu when you first read it.

The **WBS** is the “big picture” and contains the **entire** project, so it should be no surprise that the WBS is a major input to the cost estimating process.

As a project manager (and for the exam) it is your **responsibility** to estimate, budget, and manage costs and to know the mechanisms and formulae.

As with cost **estimates**, use **documented** sources (e.g. historical information – remember this is important everywhere). Again the recollections of a team member **can** be used when all else fails, but it should be **corroborated** if at all possible, especially with documented evidence.

And as with Time management, for **general tasks** the best person to provide the estimate is the person who will do the work.

Cost and time estimates should **not** be accepted from **management** (another PMBOKism).

Please remember that although you **learn** the topics almost in **isolation**. e.g. almost as if Risk and Cost are not related, in the exam they will happily **mix and match** and cross boundaries.

Three estimating methods:

1. "**Analogous**" a **comparison** with **previous** (or parts of previous) similar projects, and the amount multiplied by an estimated “complexity figure”. This information comes from your historical records.

This is a **top-down** approach, so it costs less than other more detailed methods, but of course is less accurate. Sometimes this method is used to provide a “ball-park figure”, and is followed up by one of the following methods.

Note that for analogous estimating it is very important of course that the projects being compared are **truly similar** (and that the **conditions** are similar, e.g. an outdoor construction project in winter might be quite different in summer). Again, Analogous Estimating is a form of **expert judgment** (the “expert” is the ever-popular historical information).

2. **Bottom-up** so named because you start with nothing and gradually **add** in the **estimated** costs for all the parts. Important: use experts, historical records, and industry tables etc – DON'T GUESS.
3. **Parametric modeling** Uses a **parameter** for labor and other resources to calculate the cost of the project. For example cost per square meter, per

ton, per line of code, or whatever, then multiply by the number of units required.

For the exam you need to know that **Regression Analysis** (a scatter chart), and **Learning Curve** are **parametric** modeling methods (see learning curve below in exam tips). And you need to know that **Computerized Estimating Tools** are computer packages.

Cost like time is subject to progressive elaboration and refinements as more detail becomes available, and basing estimates on the WBS improves accuracy.

Progressive elaboration implies an increasingly accurate estimate.

Estimating (THESE PERCENTAGES ARE IMPORTANT FOR THE EXAM):

- Order of magnitude Accuracy **-25% to +75%**, used in the **initiation** process and in top-down estimating.
- Budget estimate Accuracy **-10% to +25%**, used **early** in the planning process and also in top-down estimating.
- Definitive estimate Accuracy **-5% to +10%**, used **late** in the planning process and in bottom-up estimating.

In fact look out for any numbers, ranges, percentages etc in the PMBOK, as all are probable questions.

The tools for measuring project performance are Earned Value Management (EVM). Earned value is the budget at completion multiplied by the percentage of the project work that has been completed.

The Cost Performance Index shows how well the project is performing financially.

It is calculated by dividing EV by the actual costs spent on the project.

The most common formula for finding the Estimate at Completion is

$$EAC=BAC/CPI.$$

The most common method for showing project performance is through earned value analysis and this information must be communicated regularly to concerned stakeholders, such as customers, management and the project team

A question about an Index is a division question. An index of less than 1 is bad

A question about a Variance is a subtraction problem. A negative variance is bad

When EV (Earned Value) appears in a formula the EV always comes first (i.e. in SPI, CPI, SV and CV).

Memorize the following table – this is important:

- Variance VAR = BAC - AC

- Earned Value $EV = \%complete \times BAC$
- Cost Variance $CV = EV - AC$
- Schedule Variance $SV = EV - PV$
- Cost Performance Index $CPI = EV / AC$
- Schedule Performance Index $SPI = EV / PV$
- Estimate at Completion $EAC = BAC / CPI$
- Estimate to Complete $ETC = EAC - AC$
- Variance at Completion $VAC = BAC - EAC$

More Exam tips

On a complex project where you are in unfamiliar territory you need to employ a **Subject Matter Expert** (SME – not to be confused with a Small to Medium Enterprise). And where the team in general is lacking necessary skills you should provide training for them. The SME and training courses will need to be budgeted for (cost and time). If the team's skills are still not up to the task then consider outsourcing part of the project to spread the risk (at a cost).

"Sunk Costs" (money already spent on a project) must not be considered when deciding if a project should continue –only consider what part of the budget is still outstanding. (This is a PMBOKism)

When a project is performed under contract, know the difference between **cost estimating** and **pricing**.

Cost estimating means "how much will it **cost us** to provide the product or service?"

Pricing is a business decision, "how much **will we charge** the customer for the product or service?"

Of course the cost estimate is an input to pricing decisions.

Cost estimating should also consider alternatives, e.g. would employing additions SME's, leasing more advanced machinery, or larger premises, or investing more time in the planning stages save money in the long run?

Bottom-up estimating is a team-building tool and assists with team buy-in, because everyone gets involved and has input to the process. This is why the WBS is also considered a team-building tool.

Learning curve. There is a reasonable chance you will see this on the exam. Simply put, people get faster/better with practice so with some tasks you can expect to see a decrease in cost and/or time with repetition.

When I was an accountant in Belfast I was involved in the audit of a bus building company. The new buses required 5 coats of paint applied by brush (not spray). The buses had up to now been painted in Manchester and shipped over, but recently the company had set up their own paint shop.

Management had the dreaded time-and-motion study experts observe the painting of buses, and they calculated an average of 390 person-hours to paint a single bus. It was then agreed with the union that times under 390 hours would attract a bonus. So far so good. I returned one year later and discovered that the average time to paint a bus had dropped to 310 hours (so bonuses all round). But one individual was able to paint a bus single-handed (well maybe he used both hands – who knows? ☺) in 39 hours!!! Guess who was getting a humungous bonus. Yet his work passed **all** quality tests.

There will be no project management software-specific questions on the exam but there may be questions where it is necessary to know how PM software can help the project manager generically (creating graphs and charges, performing calculations etc).

The budget is calculated using the same tools as for estimating the costs (analogous, bottom up etc).

Estimate At Completion (**EAC**) may be calculated using 4 formulas. The **most frequently** occurring one in the exam is:

$$\mathbf{EAC = BAC / CPI.}$$

But know them all.

Over the last four years there has been an average of **twelve Earned Value** questions in the exam, and **only half** of them involved calculations. And they are very easy if you know the formulae.

You will need to know how to calculate simple **Straight-Line Depreciation**.

All you will need to know for “**Accelerated Depreciation**” is that it depreciates **faster** than straight-line, and that there are **two types**:

- **Double Declining Balance**, and
- **Sum of the Years Balance**”

You **don't** need to calculate these.

Life-cycle Costing – the costs incurred by the product of the project **after** the project is completed (ongoing maintenance etc). All you need to know is that it happens **after** the end of the project and project managers **should consider** it when planning the project (i.e. planning the project the cheapest way may cost the company more in the long run). It hasn't been on for a while, so maybe this is the year for it?

Value Analysis – another PMBOKism, it means **examining** the project with a view to **reducing** project cost or time, but **maintaining** the same project **scope**.

Hey if you got that question, you'd have only another [136] to go ☺

N.B. Some project managers may have different viewpoints or opinions to those expressed here – but PMI are marking your exam, so the PMBOK is **always** right and if I say anything that appears to contradict the PMBOK, then believe the PMBOK.

PS I've made every effort to get this right to help you in your exam – but if I've missed something please let me know.

Regards, Jim Owens PMP

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