PROJECT COST MANAGEMENT

PROJECT COST MANAGEMENT

WHAT DOES THE COST KNOWLEDGE AREA INCLUDE?

- Processes involved in estimating, budgeting, and controlling costs so that the project can be completed within the approved budget.
- Primarily concerned with resource costs of schedule activities.
- The work involved in performing the three processes of Project Cost Mgmt. is preceded by a planning effort of the project mgmt. team. This planning effort is the part of the Develop Project Mgmt. Plan process, which produces a cost management plan that sets out the format and establishes the criteria for planning, structuring, estimating, budgeting, and controlling project costs.

PROJECT COST MANAGEMENT

WHAT DOES THE COST KNOWLEDGE AREA INCLUDE?

- The cost management processes and their associated tools and techniques are usually selected during the project life cycle definition (read Sec. 2.1), and are documented in the cost mgmt. plan.

Life Cycle Costing

- It is defined as the cost of using, maintaining & supporting the product, service or result of the project, but it's not part of the project's budget (will get many questions on life cycle costing).

- Uses the Cost Management Plan (which is a part of the Project Management Plan)

PROJECT COST MANAGEMENT

Types of Costs : Let us illustrate using an example: Seminar

- Fixed- rent of the seminar room is a fixed cost
- Variable – cost of food to participants varies with number of participants
- Direct – hiring of PA system for the seminar
- indirect – cost of electricity of the venue is shared by all the other users

COST PROCESSES
COST PROCESS DEFINITIONS

7.1 Estimate Costs
• Develop cost approximations of all monetary resources needed to complete project activities.

7.2 Determine Budget
• Aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

7.3 Control Costs
• The process of monitoring the status of the project to update the project budget and managing changes to the cost baseline.

In smaller projects, Cost Estimating & Cost Budgeting can be one single process

COST PROCESSES

Processes by process group

Planning	Monitoring and controlling
7.1 Estimate Costs	7.3 Control Costs
7.2 Determine Budget	

ESTIMATE COSTS

HOW DO YOU ESTIMATE COSTS?

Get a cost approximation of the monetary resources needed to complete each schedule activity

Resources should include:

- Labour & services
- Materials, equipment & facilities
- Information technology
- Inflation, cost contingency reserves
- Cost estimates are generally expressed in units of currency (or hours)
- Possible causes of variations should be considered (risk)
- Accuracy should increase as project progresses
- Some organizations have formally trained project cost estimators

Powered by POeT Solvers Limited
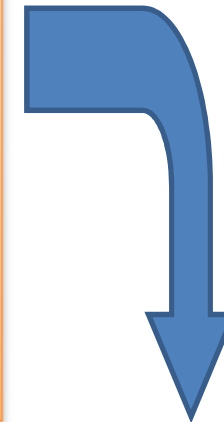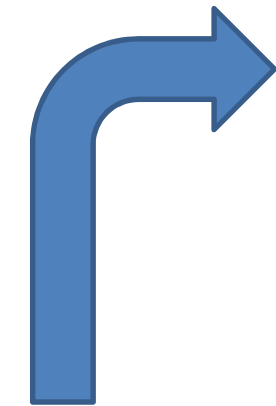
ESTIMATE COSTS

Salient Features:

- Cost estimating includes identifying and considering various costing alternatives
- Cost estimates are expressed in units of currency
- Cost estimates are normally refined during the course of the project. The accuracy of a project estimate will increase as the project progresses through the project life cycle.
- A project in initial phase could have a rough order of magnitude (ROM) estimate in the range of -50 to +50%.
- Later in the project, as more info. Is known, estimates could narrow to a range -10 to +10%.

ESTIMATE COSTS

PM tutor
Empowering Excellence

TOOLS & TECHNIQUES

- **Expert judgement**
- **Analogous estimating**
- **Parametric estimating**
- **Bottom-up estimating**
- **Three-point estimates**
- **Reserve analysis**
- **Cost of quality**
- **Project management estimating software**
- **Vendor bid analysis**

INPUTS

Scope baseline
- **Project schedule**
- **Human resource plan**
- **Risk register**
- **Enterprise environmental factors**
- **Organizational process assets**

OUTPUTS

- **Activity cost estimates**
- **Basis of estimates**
- **Project document updates**

ESTIMATE COSTS - INPUTS

INPUTS

Scope Baseline
• Scope statement
• Work breakdown structure
• WBS dictionary

Project Schedule
The type and quantity of resources and the amount of time which those resources are applied to complete the work of the project are major factors in determining the project cost. Schedule activity resources and their respective durations are used as key inputs to this process.

Human Resource Plan
The following are necessary components for developing the project cost estimates
• Project staffing attributes
• Personnel rates
• Related rewards/recognition

ESTIMATE COSTS - INPUTS

INPUTS

Risk Register
The risk register should be reviewed to consider risk mitigation costs

Enterprise Environmental Factors
The cost estimating process considers
• Marketplace conditions
• Commercial databases

Organizational Process Assets
• Cost estimating policies, procedures & guidelines
• Cost estimating templates
• Historical information
• Project files
• Project team knowledge
• Lesson learned

Powered by POeT Solvers Limited

ESTIMATE COSTS – T&T

TOOLS & TECHNIQUES

Expert Judgment

Analogous Estimating
Using actual cost of previous, similar projects as the basis for costing current project. This method is <u>less costly</u> than other techniques, but is <u>less accurate</u>. Most reliable when previous projects are similar.

ESTIMATE COSTS – T&T

Parametric Estimating

Uses statistical relationship between historical data and other variables (e.g. required labor hours, square footage in construction etc.)

Bottom-up Estimating

Estimating the cost of individual work packages or schedule activities with the lowest level of detail. This detailed cost is then summarized or "rolled up" to higher levels for reporting and tracking purposes. More accurate than Analogous Estimating.

Three-Point Estimates

PERT uses three estimates to define an approximate range for an activity's cost as under:

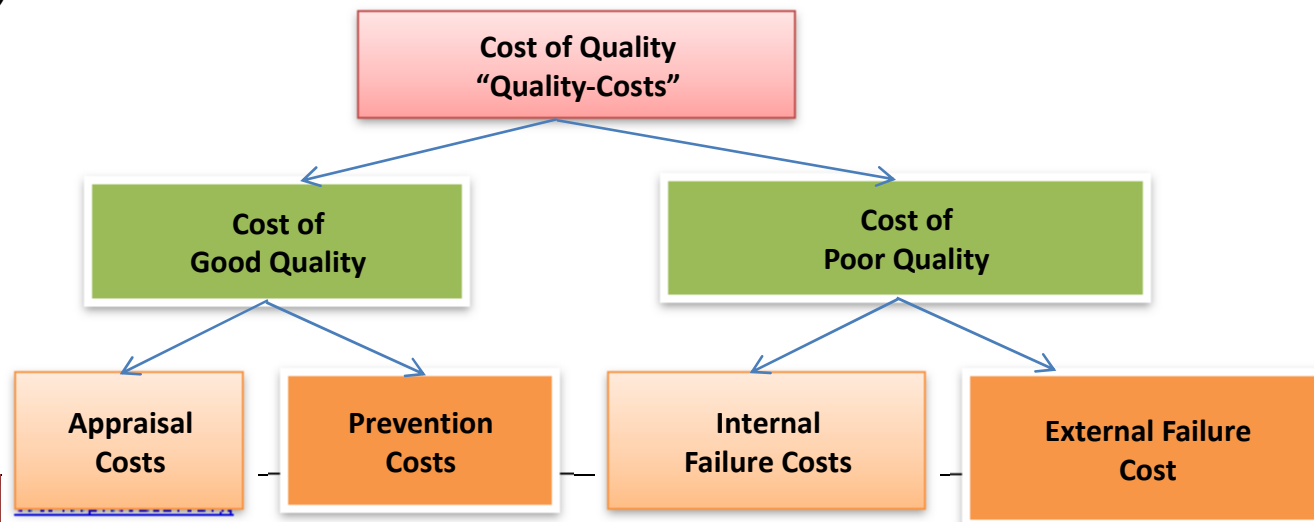{Optimistic + (4 * Most Likely) + Pessimistic} / 6

ESTIMATE COSTS – T&T

Reserve Analysis

- Cost estimate may include "Contingency Reserve" (or contingency allowances) to account for cost uncertainty.
- PM's discretion to deal with anticipated, but not certain events ("known unknowns"). These events are part of the project scope and cost baselines.
- Contingency reserve may be a percentage of the estimated cost.
- A schedule reserve can be a zero duration activity.

Cost of Quality

Can also be used to prepare the schedule activity cost estimate (see section 8.1.2.2 in PMBOK)

```
                    Cost of Quality
                    "Quality-Costs"
                    /            \
        Cost of                      Cost of
      Good Quality                 Poor Quality
       /       \                    /        \
  Appraisal   Prevention      Internal       External Failure
   Costs        Costs      Failure Costs          Cost
```

ESTIMATE COSTS – T&T

Project Management Estimating Software
Cost estimating software applications, computerized spreadsheets, simulation and statistical tools are becoming more widely accepted to assist with cost estimating.

Vendor Bid Analysis
Analyze vendor bids to determine price of individual products.

Activity Cost Estimates

Quantitative (numerical) assessment of the likely costs of the resources required to complete schedule activities. This includes, but not limited to, labour, materials, equipment, services, facilities, information technology and special categories such as an inflation allowance or cost contingency reserve.

ESTIMATE COSTS - OUTPUTS

Basis of Estimates

- The amount and type of additional details supporting schedule
  activity cost estimate vary by application area.

- Supporting detail for activity cost estimate vary by application area.
  Supporting detail for activity cost may include:
- Documentation of the basis of the estimate,
- Documentation of all assumptions made,
- Documentation of any known constraints,
- Range of estimates {e.g.$ 10K (-10% / + 10%) or between $9K and $11K}
- Indication of the confidence level of the final estimate

Project Document Updates

Project documents that may be updated include, but are not limited to, the risk register.
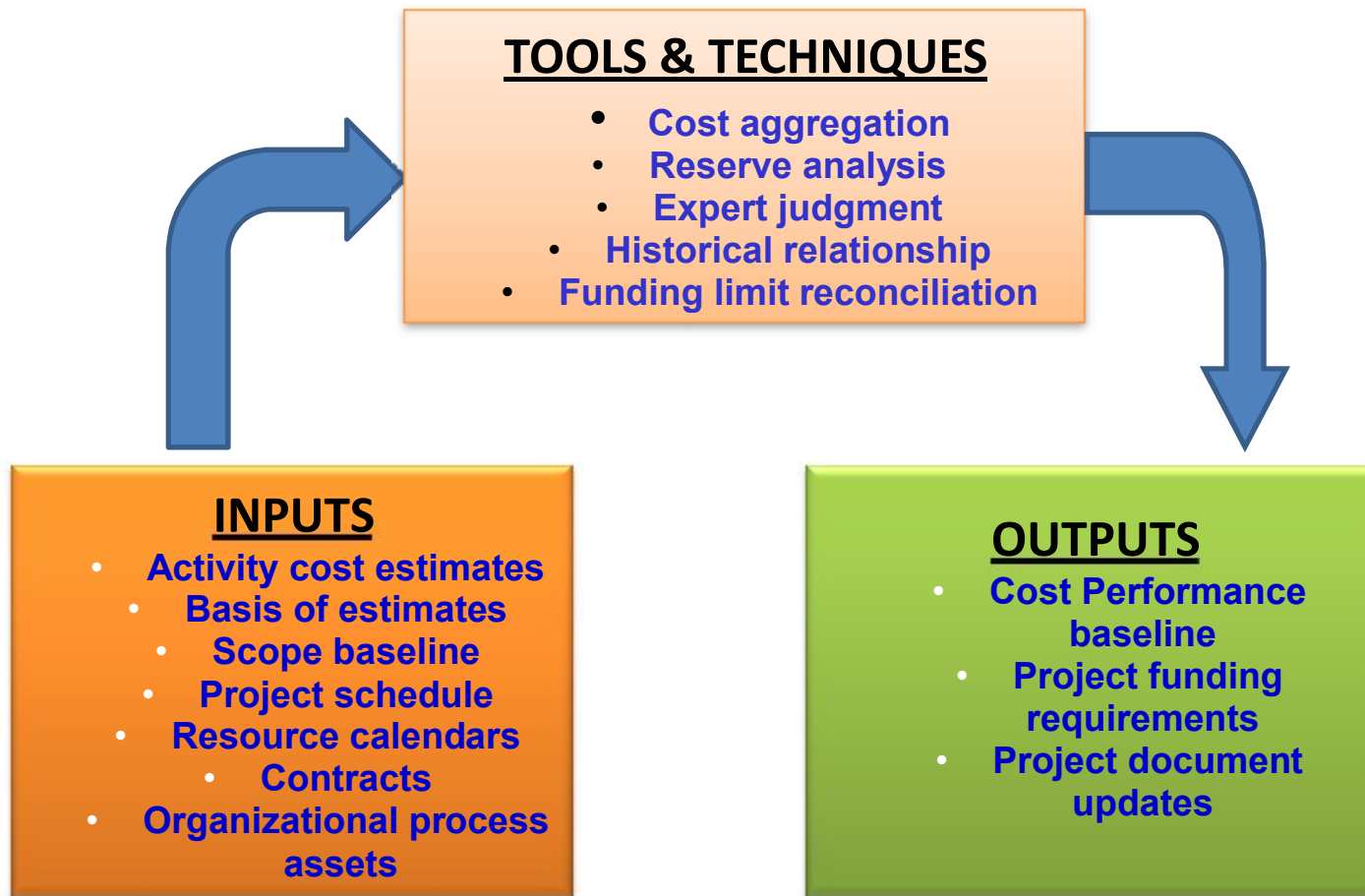
Powered by POeT Solvers Limited

COST PROCESSES

Processes by process group

Planning	Monitoring and controlling
7.1 Estimate Costs	7.3 Control Costs
7.2 Determine Budget	

DETERMINE BUDGET

WHAT HAPPENS IN DETERMINE BUDGET?

- Aggregating the estimated costs of individual schedule activities or work packages to establish a total cost baseline for measuring performance. It establishes the Project's funding requirements.

- Remember that the project scope statement provides only the summary budget.

DETERMINE BUDGET

TOOLS & TECHNIQUES

- Cost aggregation
- Reserve analysis
- Expert judgment
- Historical relationship
- Funding limit reconciliation

INPUTS

- Activity cost estimates
- Basis of estimates
- Scope baseline
- Project schedule
- Resource calendars
- Contracts
- Organizational process assets

OUTPUTS

- Cost Performance baseline
- Project funding requirements
- Project document updates

DETERMINE BUDGET - INPUTS

INPUTS

Activity cost estimates
Basis of estimates
Scope baseline
Project Schedule
Resource Calendars
Contracts
Organizational process assets

DETERMINE BUDGET - T&T
TOOLS & TECHNIQUES

Cost Aggregation

- Cost estimates of all activities in each work package are aggregated in accordance with the WBS.
- Total all work packages for higher component levels of WBS, such as "control accounts" & get the entire project total expected budget by period.

Reserve Analysis

Establishes contingency reserves, such as the management contingency reserve, that are allowance for "unknown unknowns" risks identified in risk register. PM needs approval for using such reserves. They are not part of project cost baseline, but are included in the budget for the project.

- Review your reserves through the project to ensure you have the right amount
- Contingency reserves (spare funds) allow for unplanned, but potentially required changes that may result from identified risks (to cost baseline)
- Management reserves account for "unknown unknowns":
  a) Included in performing organization's management budget
  b) Not included in project budget, cost baseline or earned value calculations

Expert Judgment

Historical Relationship

Any historical relationships that result in parametric estimates or analogous estimates involve the use of project characteristics (parameters) to develop mathematical models to predict total project costs. Such models can be simple (e.g., residential home construction is based on a certain cost per square foot of space) or complex (e.g., one model of software development costing uses multiple separate adjustment factors, each of which has numerous points within it).

DETERMINE BUDGET – T&T
Tools & Techniques

Funding Limit Reconciliation

- The expenditure of funds should be reconciled with any funding limits on the commitment of funds for the project.

- A variance between funding limits and the planned expenditures will sometimes necessitate the rescheduling of work to level out the rate of expenditures. This can be accomplished by placing imposed date constraints for work into the project schedule.

Cost Performance Baseline

The cost baseline is an authorized time-phased budget at completion (BAC) used to measure, monitor, and control overall cost performance on the project. It is developed as a summation of the approved budgets by time period and is typically displayed in the form of an S-curve, as is illustrated in Figure 7-6 (page 178).

In the earned value management technique the cost performance baseline is referred to as the performance measurement baseline (PMB)

DETERMINE BUDGET – OUTPUTS
OUTPUTS

Project Funding Requirements

- Get funding *requirements,* total & by period (e.g. annual or quarterly) and derived from cost baseline, which can exceed (usually by a margin) to allow for either early progress or cost overruns
- Funding usually occurs in incremental amounts, not continuous, appears as a step graph (see Figure 7-6, p.178)
- Total required funds is cost baseline plus management contingency reserve

Project Document Plan Updates

- Risk register,
- Cost estimates, and
- Project schedule

Powered by POeT Solvers Limited

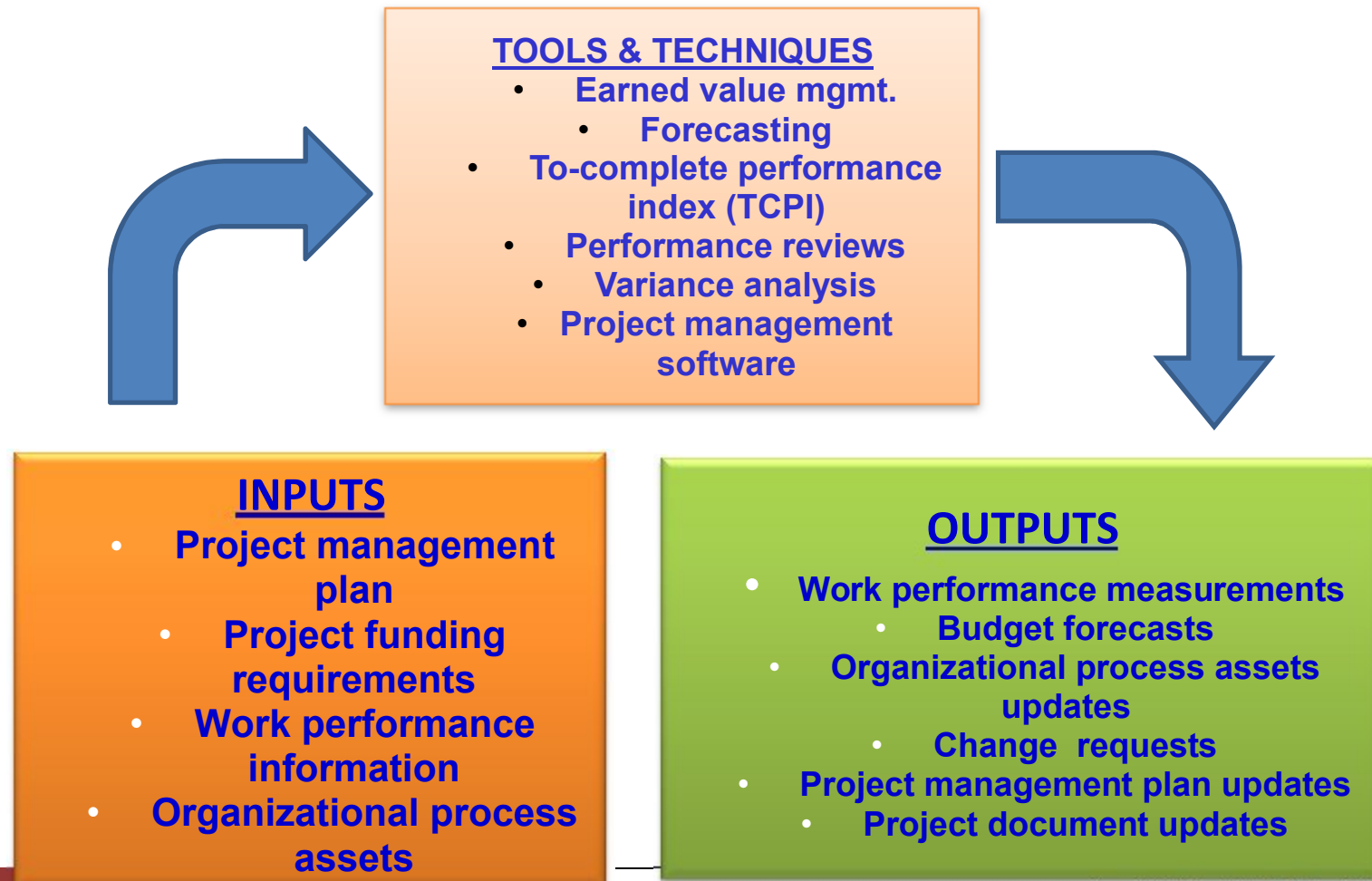# COST PROCESSES

Processes by process group

Planning	Monitoring and controlling
7.1 Estimate Costs	**7.3 Control Costs**
7.2 Determine Budget	

Powered by POeT Solvers Limited

CONTROL COSTS

WHAT SHOULD YOU DO IN CONTROL COSTS?

- Influencing the factors that create changes to the cost baseline,
- Ensure that all change requests are acted on in a timely manner,
- Manage the actual changes when and as they occur,
- Make sure that cost expenditures don't exceed authorized funding (by period & in total) for the project,
- Monitor cost performance to isolate and understand variances from approved cost baselines,
- Monitor work performance against funds expended,
- Prevent unapproved changes from being included in the reported cost or resource usage,
- Inform appropriate stakeholders of approved changes and associated cost, and
- Act to bring expected cost overruns within acceptable limits

CONTROL COSTS

TOOLS & TECHNIQUES
- Earned value mgmt.
- Forecasting
- To-complete performance index (TCPI)
- Performance reviews
- Variance analysis
- Project management software

INPUTS
- Project management plan
- Project funding requirements
- Work performance information
- Organizational process assets

OUTPUTS
- Work performance measurements
- Budget forecasts
- Organizational process assets updates
- Change requests
- Project management plan updates
- Project document updates

CONTROL COSTS - INPUTS

INPUTS

- Project Management Plan
  - Cost Performance Baseline
  - Cost Mgmt. Plan

- Project Funding Requirements

- Work Performance Information

- Organizational Process Assets

CONTROL COSTS - T&T
TOOLS & TECHNIQUES

Cost Change Control System

Performance Measurement Analysis

- An important part of cost control is to determine:
  - Cause of variance
  - Magnitude of a variance
  - Decide if variance requires corrective action
- Performance measurement techniques (called EVT) help to assess the magnitude of any variances that will invariably occur.
- Earned Value Technique (EVT) compares the value of the budgeted cost of work performed (earned) at the original allocated budget amount to both
  - the budgeted cost of work scheduled (planned)
  - to the actual cost of work performed (actual)

This technique is especially useful for cost control, resource management & production.

CONTROL COSTS - T&T

Earned Value Management

- Earned value mgmt. (EVM) in its various forms is a commonly used method of performance measurements.

- It integrates project scope, cost, and schedule measures to help the project mgmt. team assess and measure project performance and progress.

- It is a project mgmt. technique that requires the formation of an integrated baseline against which performance can be measured for the duration of the project.

- The principles of EVM can be applied to all projects, in any industry.

CONTROL COSTS - T&T

Earned Value Management (Contd.)

- EVM) develops and monitors three key dimensions for each work package and control account:

    - Planned Value (PV): budgeted cost for the work scheduled (in planned time) to be completed

    - Earned Value (EV): budgeted amount for work actually completed

    - Actual Cost (AC): actual money spent in finishing the work (actual cost)

Powered by POeT Solvers Limited

CONTROL COSTS - T&T

For example,

You've hired a man to paint your house. It should take 3 months & you'll pay him $2,700 ($900/mo.). Paint is estimated at $3,600. After, one month, he's completed 20% of the work, but used 40% of the paint, therefore the:

PV = {($2,700 + $3,600) / 3 } = $2,100
EV = 20% of $6,300 = $1,260
AC = $900 + 40% of $3,600 = $ 900 + $1,440 = $2,340

CONTROL COSTS - T&T

EV= 1,260   PV= 2,100   AC=2,340
(See Figure 7-9, p.183)

Cost Variance (CV) (sometimes called burn rate)
= EV - AC
= $1,260 -$2,340 = -$1,080 (over budget)
CV%=CV/EV (<u>many a time asked in exam</u>)

Schedule Variance (SV) = EV-PV
=$1,260 -$2,100 = -$840 (behind schedule)
SV%=SV/PV (<u>many a time asked in exam</u>)

CONTROL COSTS - T&T

EV= 1,260   PV= 2,100   AC=2,340

Cost Performance Index (CPI) -Cost efficiency ratio (cost trend analysis)
CPI = EV / AC = $1,260/ $2,340 = 0.54
CPI < 1 -over budget
CPI> 1 -under budget

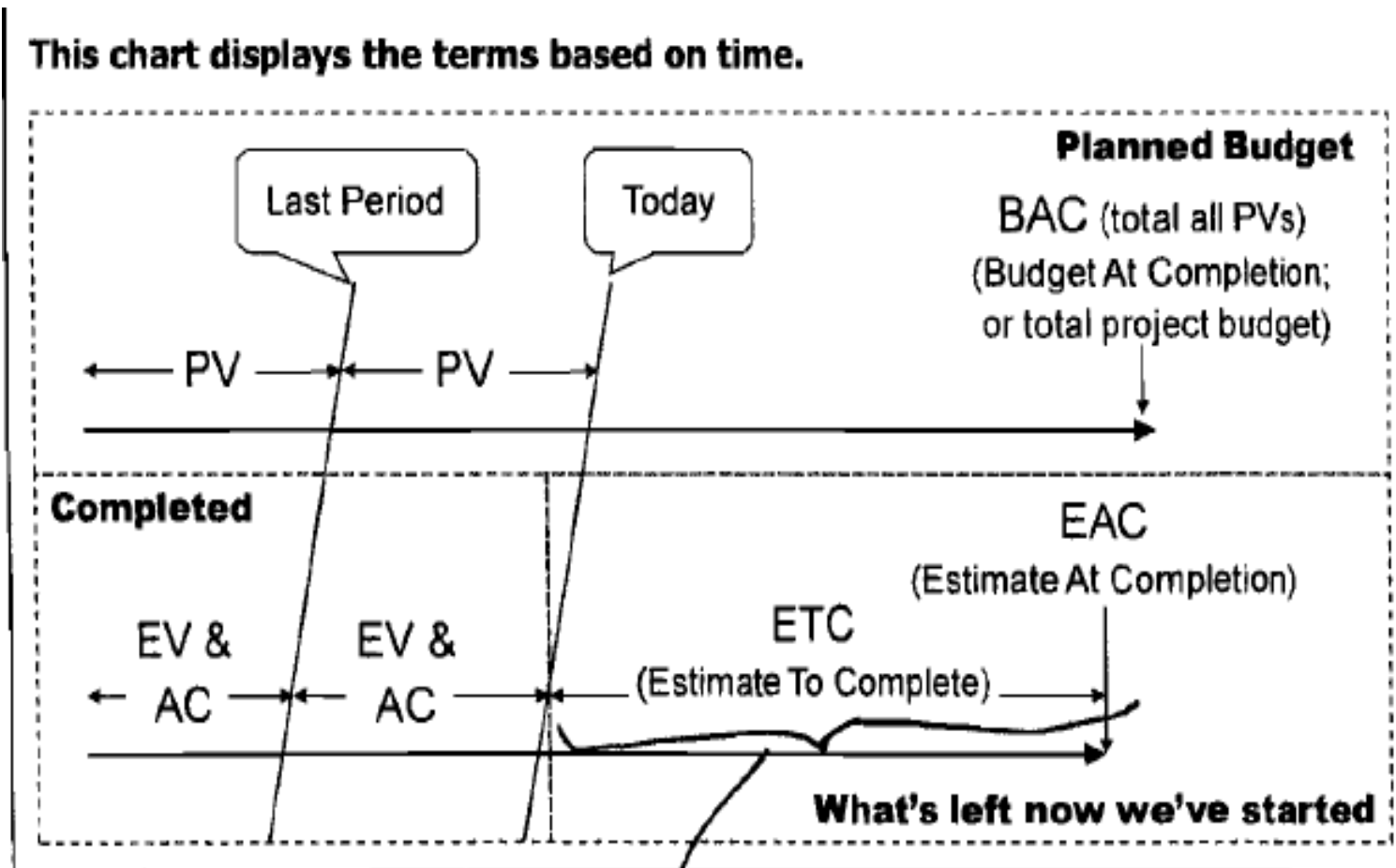This is the ratio of what you expected to spend for the work you've earned (done) to what you really spent for it.

Schedule Performance Index (SPI) -Schedule efficiency ratio (schedule trend)
 SPI = EV / PV = $1,260/ $2,100 = 0.6
 SPI < 1 -behind schedule
 SPI > 1 ahead of schedule. This is the ratio of what you planned on doing to what you really did.

CONTROL COSTS - T&T

This chart displays the terms based on time.

Last Period

Today

Planned Budget

BAC (total all PVs)
(Budget At Completion;
or total project budget)

← PV → ← PV →

Completed

EAC
(Estimate At Completion)

EV &
← AC →   EV &
← AC →

ETC
(Estimate To Complete)

What's left now we've started

Powered by POeT Solvers Limited

CONTROL COSTS - T&T

Forecasting: Predicts or estimates future values of *Estimate to Complete (ETC)* and *Estimate at Completion (EAC)*

The earned value technique parameters are:

Budget At Completion (BAC) : total of all PV's (project's total cost baseline) = PV^c (also called Cumulative Planned Value)

Project Cost Variance (CV) - After project is complete, difference between budget at completion (total project budget) & actual amount spent

CV = BAC- AC

Variance at Completion (VAC) - Before project is complete, difference between budget at completion (total project budget) & estimate at completion (now that project is underway)

VAC = BAC −EAC

CONTROL COSTS - T&T

Estimate to Complete (ETC) - Expected cost to finish all the remaining work

ETC based on new estimate – Revised (New) estimate for the work remaining (uses standard estimating techniques) because original estimate was flawed, e.g. in a project installing the latest version of Primavera on 500 computers, the team though initially had expected current hardware would be okay, found that 20% of the computers require upgrading; thus a revised new estimate.

ETC based on _atypical_ variances –PM team expectations are that similar variances will **not** occur in future.

$$ETC = BAC\text{-}EV$$

ETC based on typical variances – This approach is used when current variances **are seen as typical of future variances** (is expected to occur in future as well).

$$ETC = (BAC\text{ -}EV)/\ CPI\ (factors\ in\ CPI\ for\ trend)$$

CONTROL COSTS - T&T

Estimate at Completion (EAC) - Most likely total cost of the project (or activity) based on performance to date (often called latest revised estimate)

EAC using a new estimate - Actual costs to date plus new estimate for the remaining work. Used when original estimate was flawed or no longer relevant.

$$EAC = AC + ETC \text{ (doesn't rely on original budget BAC)}$$

EAC using remaining budget - Similar variances **not** expected to occur in future (atypical)

$$EAC = AC + BAC - EV$$

EAC using CPI - Similar variances **are** expected to occur (is typical)

$$EAC = AC + (BAC-EV)/CPI$$

CONTROL COSTS - T&T

To-complete Performance Index (TCPI)

The to-complete performance index (TCPI) is the calculated projection of cost performance that must be achieved on the remaining work to meet a specified management goal, such as the BAC or the EAC. If it becomes obvious that the BAC is no longer viable, the project manager develops a forecasted estimate at completion (EAC). Once approved, the EAC effectively supersedes the BAC as the cost performance goal.
Equation for the TCPI based on the BAC:

$$TCPI = (BAC-EV) / (BAC-AC)$$

The TCPI is conceptually displayed in Fig 7-10. The equation for the TCPI is shown in the lower left as the work remaining (defined as the BAC minus EV) divided by the funds remaining (which can be either the BAC minus the AC, or the EAC minus AC).

CONTROL COSTS - T&T

To-complete Performance Index(TCPI) – Contd.

If the cumulative CPI falls below the baseline plan (as shown in Fig.7-6), all future work of the project will need to immediately be performed in the range of the TCPI (BAC) (as reflected in the top line of Fig.7-6) to stay within the authorized BAC. Whether this level of performance is achievable is a judgment call based on a number of considerations, including risks, schedule, and technical performance.

Once the mgmt. acknowledges that the BAC is no longer attainable, the project manager will prepare a new estimate at completion (EAC) for the work, and once approved, the project will work to the new EAC value. This level of performance is displayed as the TCPI (EAC) line. The equation for the TCPI based on the EAC:

$$TCPI = (BAC - EV) / (EAC - AC)$$

Powered by POeT Solvers Limited

CONTROL COSTS - T&T

Performance Reviews

Compare cost performance over time, schedule activities or work packages overrunning & under running budget (planned value), and estimated funds needed to complete work in progress.
If EVM is being used, the following information is determined:

- **Variance analysis** -Compares actual to planned or expected cost and schedule variances are the most frequently analyzed.

- **Trend analysis** - Examines performance over time to determine if performance is improving or deteriorating. Graphical analysis techniques are valuable for understanding performance to date and for comparison to future performance goals in the form of BAC versus EAC and completion dates.

- **Earned value performance** – EVM compares the baseline plan to actual schedule and cost performance.

CONTROL COSTS - T&T

Variance Analysis

- Cost performance measurements (CV, CPI) are used to assess the magnitude of variation to the original cost baseline.
- Important aspects of project cost control include determining the cause and degree of variance relative to the cost performance baseline (section 7.2.3.1) and deciding whether corrective or preventive action is required.
- The % range of acceptable variances will tend to decrease as more work is accomplished. The larger % variances allowed at the start of the project can decrease as the project nears completion.
-

Project Management Software

PMS is often used to monitor the three EVM dimensions (PV, EV, and AC), to display graphical trends, and to forecast a range of possible final results.

CONTROL COSTS - OUTPUTS

OUTPUTS

- **Work Performance Measurements**
- **Budget Forecasts**
- **Organizational Process Assets Updates -**
- **Change Requests** –

- **Project Management Plan Updates -**
  - **- Cost performance baseline**

- **Project document Updates**
  - **- Cost estimates**
  - **- Basis of estimates**

DEPRECIATION

Straight Line Depreciation (SLD)

- Equal amount of depreciation is taken out each period (year)

Example below shows depreciation for 5 years where:

Depreciable value is $140,000 (purchase price) - $40,000 (salvage Value) = $100,000

Depreciation each year is $100,000 / 5 years = $20,000/year

Purchase Price	Salvage Value	Year	Depreciation	Depreciated Balance
$ 140,000	$40,000	0	0	$100,000
		1	$20,000	$80,000
		2	$20,000	$60,000
		3	$20,000	$40,000
		4	$20,000	$20,000
		5	$20,000	0
		Total	**$100,000**	

DEPRECIATION

Double Declining Balance (DDB)

- Depreciation taken out each period (year) by double straight line depreciation
- Usually, applied on the initial purchase price (don't subtract salvage value)

Example below shows depreciation for 5 years where:

Depreciation for 1st year is $140,000 / 5 years x 2 = $56,000 (or 40% of $140,000)
Depreciation for 2nd year is $84,000 / 5 years x 2 = $33,600 (or 40% of $84,000)

Purchase Price	Depreciation %	Year	Depreciation	Depreciated Balance
$ 140,000		0	0	$140,000
	40%	1	$56,000	$84,000
	40%	2	$33,600	$50,400
	40%	3	$20,160	$30,240
	40%	4	$12,096	$18,144
	40%	5	$7,257	$10,886 (Salvage)
		Total	**$100,000**	

DEPRECIATION

Sum of Years Digits Depreciation (SYD)

• Accelerated depreciation amount taken out each period (year) based on year's digits
 Example below shows depreciation for 5 years where sum of years' digits = 1+2+3+4+5 = 15
Depreciation factor for 1st year is 5 (reverse order of years) / 15 (sum of years)
Multiply factor by <u>original</u> balance to get depreciation for that year
Depreciation for 1st year is 5/15 x $100,000 = $33,333, 2nd year is 4/15 x $100,000 = $26,667

Purchase Price	Salvage Value	Depreciation Factor	Year	Depreciation	Depreciated Balance
$140,000	$40,000		0	0	$100,000
		5/15	1	$33,333	$66,667
		4/15	2	$26,667	$40,000
		3/15	3	$20,000	$20,000
		2/15	4	$13,000	$6,667
		1/15	5	$6,667	0
			Total	$100,000	

CONTROL COSTS - EARNED VALUE

Performance Measurement Baseline
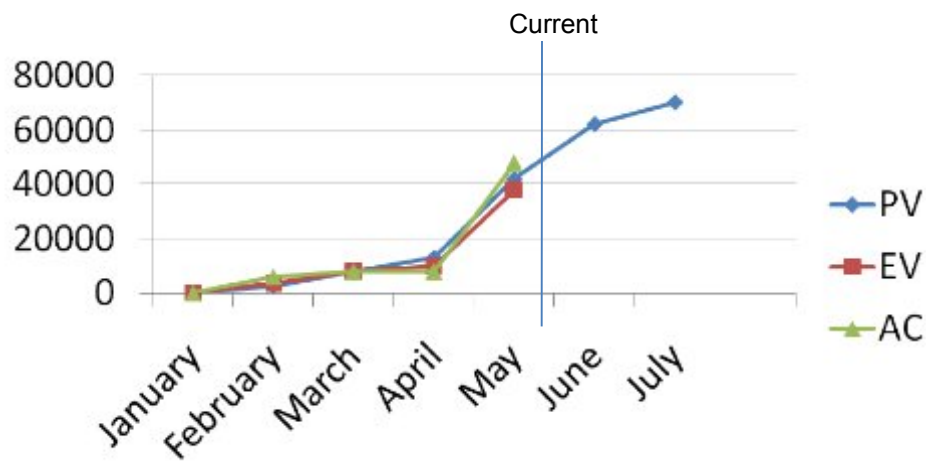
	PV	EV	AC
January	0	0	0
February	2500	3600	6000
March	8000	8000	8000
April	13000	10000	8000
May	**42000**	38000	48000
June	62000		
July	70000		

CONTROL COSTS - COST VARIANCE

From the last chart, we have these values and can make these calculations:

PV $42,000 EV = $38,000 AC = $48,000

Comparing original amount budgeted for work that's done (EV) to the amount spent to produce that work (AC), we can get cost variance (CV) as follows:

CV (= EV -AC) = $38,000 -$48,000 = -$10,000 (> spent than planned)

Comparing original amount budgeted for work that's done (EV) to the amount budgeted for that work In the plan (PV), we can get schedule variance (SV) as follows:

SV (= EV -PV) = $38,000 -$42,000 = -$4,000 «work than planned)

CONTROL COSTS - OTHER CALCULATIONS

CPI (= EV / AC) = $38,000/ $48,000 = 0.79
$0.79 worth of work was done for each $1.00 spent

SPI (= EV/PV) =$38,000/ $42,000 =0.90
$0.90 worth of work was done for each $1.00 worth of work planned
ETC (= BAC -EV) = $70,700 -$38,000 = $32,700
EAC (= AC+BAC-EV) = $48,000 + $70,700 -$38,000 = $80,700

VAC (= BAC -EAC) = $70,700-$80,700 =-$10,000
Project will exceed planned budget by $10,000

Powered by POeT Solvers Limited

More Calculations (slight possibility that these will be on the exam)

Given
BAC = $40K
EV = $20K
PV = $28K
AC = $26K

Calculate
% of work Scheduled
% of Budget Spent
% of Work Accomplished
To Complete Performance Index
(TCPI)
CV%
SV%

More Calculations

Answers

% of Work Scheduled → $PV/BAC = \$28K/\$40K = 0.7 \text{ or } 70\%$

% of Budget Spent → $AC/BAC = \$26K/\$40K = 0.65 \text{ or } 65\%$

% of Work Accomplished → $EV/BAC = \$20K/\$40K = 0.5 \text{ or } 50\%$

TCPI → $(BAC-EV)/(BAC-AC) =$

$(\$40K - \$20K)/(\$40K - \$26K) = 1.43$

CV% → $CV/EV = (\$20K - \$26K)/\$20K = 0.3 \text{ or } 30\%$

SV% → $SV/PV = (\$20 - \$28)/\$28K = 0.28 \text{ or } 28\%$

CONTROL COSTS - EARNED VALUE EXAMPLES

FOR BUDGET		
If CPI < 1	EV < AC	Over Budget
If CPI > 1	EV > AC	Under Budget
FOR SCHEDULE		
IF SPI < 1	EV < PV	Behind Schedule
IF SPI > 1	EV > PV	Ahead of Schedule

CONTROL COSTS - CASE 1

PV = $1,860
EV = $1,860
AC = $1,860

This is the ideal situation,
Where everything goes
According to plan

CONTROL COSTS - CASE 2 SCHEDULE

CASE 2 SCHEDULE

PV = $1,900

EV = $1,500

AC = $1,700

Here we see $400 worth of work is behind schedule in being completed. We are 21% behind where we planned to be.

SV = EV-PV = -$400

SV% = SV/ PV = -0.21 or -21%

CONTROL COSTS - CASE 2 COST

PV= $1,900
EV= $1,500
AC= $1,700

Also, we see "Actuals" (AC) exceed "Earned" (EV) $1,500 worth of work was accomplished, However; it cost $1,700 to do so. We have a $200 cost overrun (13% over budget)

CV = EV-AC = -$200
CV% = CV / EV = -0.13 or -13%

PV = $1,900
EV = $1,500
AC = $1,700

SPI = EV / PV = *$0.79*
CPI= EV / AC = $0.88

Case 2 is the worst case where all Performance indicators are negative.

This means only 79 cents worth of work was done for each $1.00 of work planned, and only 88 cents worth of work was actually done for each $1.00 spent.

CONTROL COSTS - CASE 3 INDICES

PV= $2,600
EV= $2,400
AC= $2,200

SV= -$200
SV% = - 8%
SPI= 0.92

This is bad news. Our work efficiency is a bit low. We are getting only 92 cents of work done per dollar. We are behind schedule.

Powered by POeT Solvers Limited

CONTROL COSTS – CASE 3 INDICES

PV = $2,600
EV = $2,400
AC = $2,200

CV = $200
 CV% = 8%
 CPI = 1.09
 SPI = EV/PV = 2400/2600 = 0.92

This is good news as we are under budget. We are getting $1.09 worth of work done for each $1.00 spent.

Case 3 is under budget, <u>but behind schedule.</u>