

Procurement and Project Management

Post Contract Project Cost Control Technique

Week 3

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Golden Rules

Please ensure that all mobile phones are on silent



iPods to be turned off and out of sight during lecture



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Golden Rules

If you must take a nap.....



Please do not snore!



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Highlights

- Current Project Challenges
- Earned Value – Overview
- Earned Value – Definitions
- Earned Value – Metrics
- Earned Value - Variance & Management Reserve
- Earned Value – Examples (including Revised Estimates)
- Earned Value – Criteria



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Cost Control

- Project cost control includes
 - monitoring cost performance
 - ensuring that only appropriate project changes are included in a revised cost baseline
 - informing project stakeholders of authorized changes to the project that will affect costs
- Earned value management is an important tool for cost control a post-contract stage



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Earned Value Management

Earned Value Management Make critical project decisions utilising the “early warning” signs based on data, variances & trend.



Earned value Mgt



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Current Project Challenges

Apportioned effort due to another work package

Ahead or behind schedule

Value for money

Project status with regard to cost & schedule

Estimated elapsed time

Whether the project funds were spent on the right tasks

Level of effort

Cost and schedule variance over time

Know over or under spent

The budgeted cost of the work quantifies the accomplishment



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Earned Value- Why & What

What

- Utilising Project Management methods, practices, process & tools
- Accurate definition of the defined deliverable(s), timeframe & total cost (direct & indirect) to deliver the product
- Detailed tasks / activities and work not in the WBS is out-of-scope
- Baseline of budget control a/c, schedule, work measurement by Control Account (hours, £, unit)

Why

- EV provides an “early warning” signs for prompt corrective action
- Provides an uniform unit of measure (Pounds or work-hours)
- Requires different measures of progress for different types of tasks
- Need to consolidate progress of many tasks into an overall project status



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Benefit of Earned Value

- Helps to make critical project decision based on actual vs. budget cost, variance, trends & to predict future performance
- Provides info about the project in terms of accomplishment as well as how much has been spent to-date
- Project's final cost and delivery date with certainty
- Improves project performance Improves project performance Identifies the problem, by analysing the data captured
- Creates a culture of openness, trust and honesty



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Earned Value – Criticism

- Time required for data measurement and manipulation can be considerable
- Quantifying / measuring work-in-progress (WIP) can be challenging
- Integration of financial expenditure information with schedule status



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Note...

- Adhere to Project Management Best-Practices
 - Baseline your schedule
 - Analyse variance from your expectations
 - Diligently update your schedule and expenditure
 - Understand work products produced by the project
 - Organize your estimation and schedule around work products

Do not re-baseline unless there is a formal, approved change in scope



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Earned Value Definition

Planned Value (PV)

- Planned expenditure cash flows based on the completion of tasks in accordance with the project's budget and schedule
- Planned cost of the total amount of work scheduled to be performed by the milestone date

Actual Cost (AC)

- Actual Project Expense based on completed tasks
- Cost incurred to accomplish the work that has been done to date

Earned Value (EV)

- The amount of the budget that should have been spent for a given amount of work completed
- The planned (not actual) cost to complete the work that has been done



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Definition

- **Planned Value (PV):** How much was planned to have been accomplished at a given point in time?
- **Actual Cost (AC):** How much was actually spent at a given point in time?
- **Earned Value (EV):** How much value (person-hours) in terms of base budget & what has been accomplished at a given point in time?



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What is the total project expected to cost?

Estimate at Completion (EAC)
or revised estimate (LRE)

$$EAC = AC + ETC$$

What is the expected to complete the project?

Estimate to Completion (ETC)

What is the expected under / over spend?

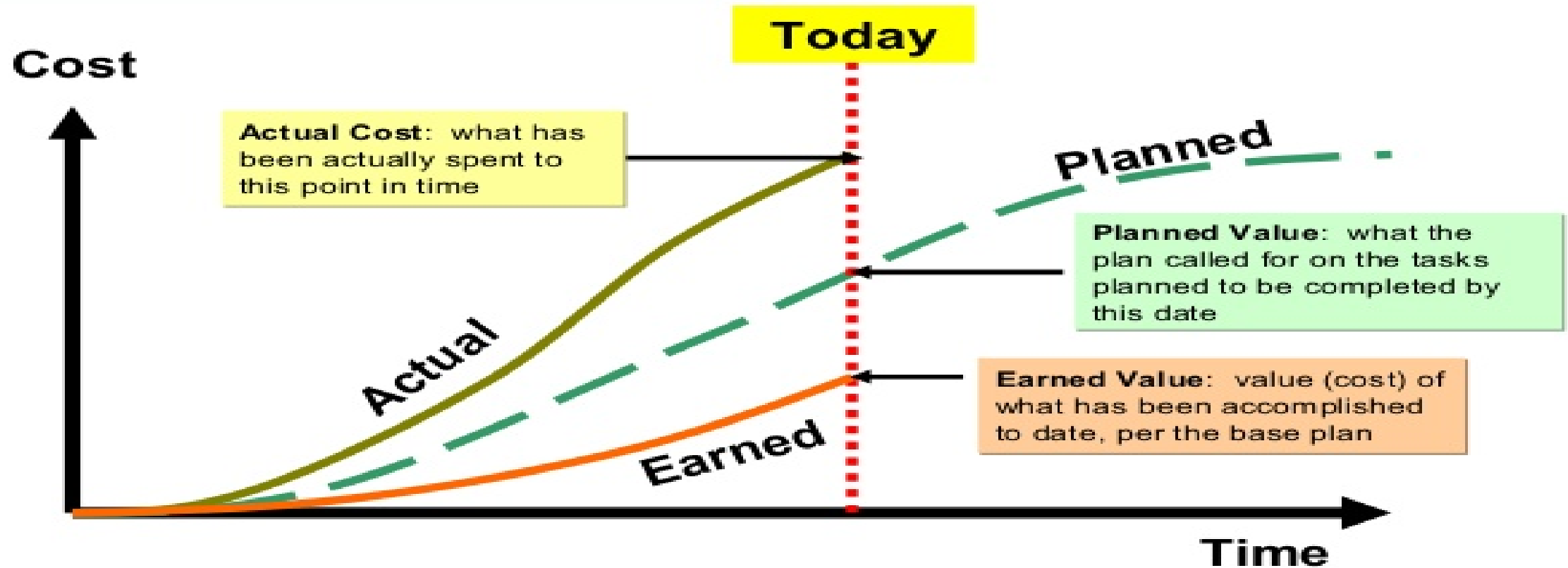
Variance at Completion (VAC) $VAC = BAC - EAC$

➤ What was the project supposed to cost = Budget at Completion (BAC)



Earned Value

Earned Value – AC, PV, EV



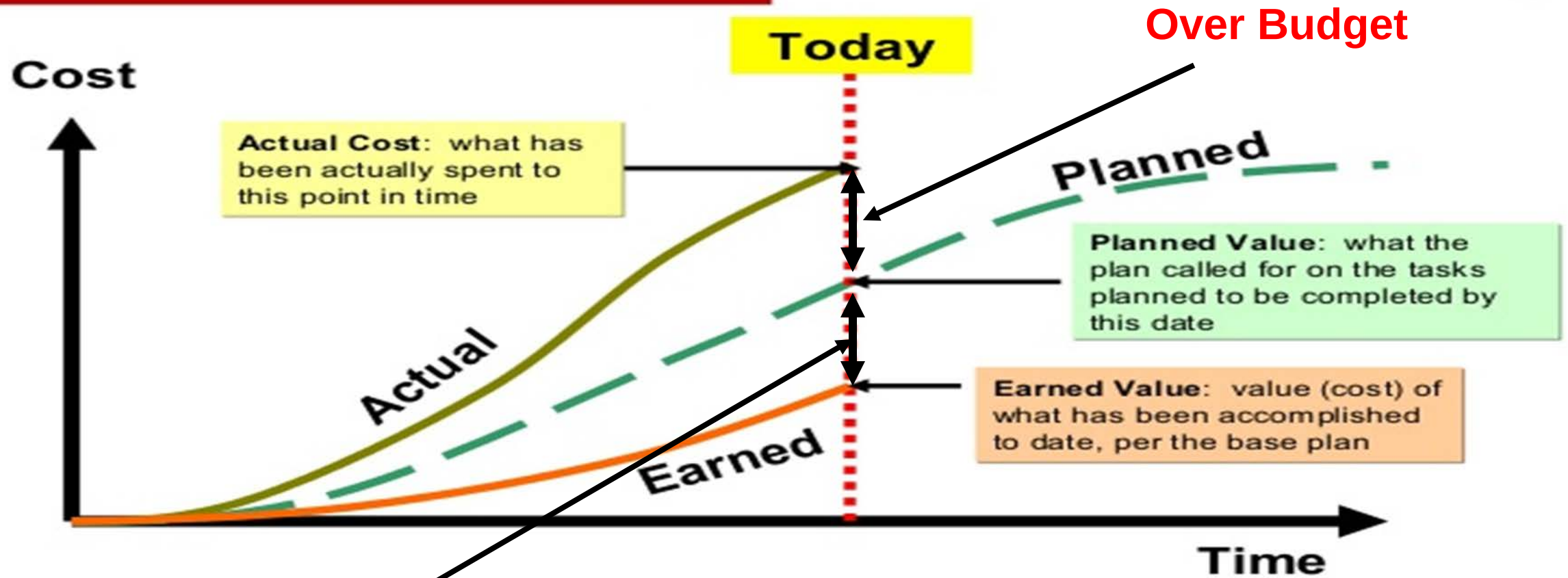
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Earned Value – AC, PV, EV



Behind Schedule



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Cost Metrics

Cost Metrics Cost Variance (CV)

Difference between a task's estimated cost and its actual cost

$$CV = EV - AC \text{ or } BCWP - ACWP$$

Negative Value = over budget and / or behind schedule (vice versa)

Deviations from the budget – not a measure of work scheduled vs. work completed

Cost Performance Index (CPI)

Percentage of work completed per pound spent

$$CPI = EV \div AC \text{ or } BCWP \div ACWP$$

Ratio > 1 = ahead of schedule and / or under budget (exceptional performance) – vice versa



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Schedule Metrics

Schedule Variance (SV)

Difference between the current progress and originally scheduled progress

$$SV = EV - PV \text{ or } BCWP - BCWS$$

A negative variance means the project is behind schedule

Deviations from work planned – not a measure of changes in cost

Performance Index (SPI)

Ratio of the work performed to the work scheduled

$$SPI = EV \div PL \text{ or } BCWP \div BCWS$$

Ratio > 1 = ahead of schedule and / or under budget (vice versa)



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Earned Value Metrics

Minimum funds needed if things do not get worse

Minimum funds = Original total budget $\div$ CPI

Funds needed if things continue to get worse at the same level of slippage

Funds needed = Original total budget $\div$ (CPI $\times$ SPI)



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Variance & Management Reserve



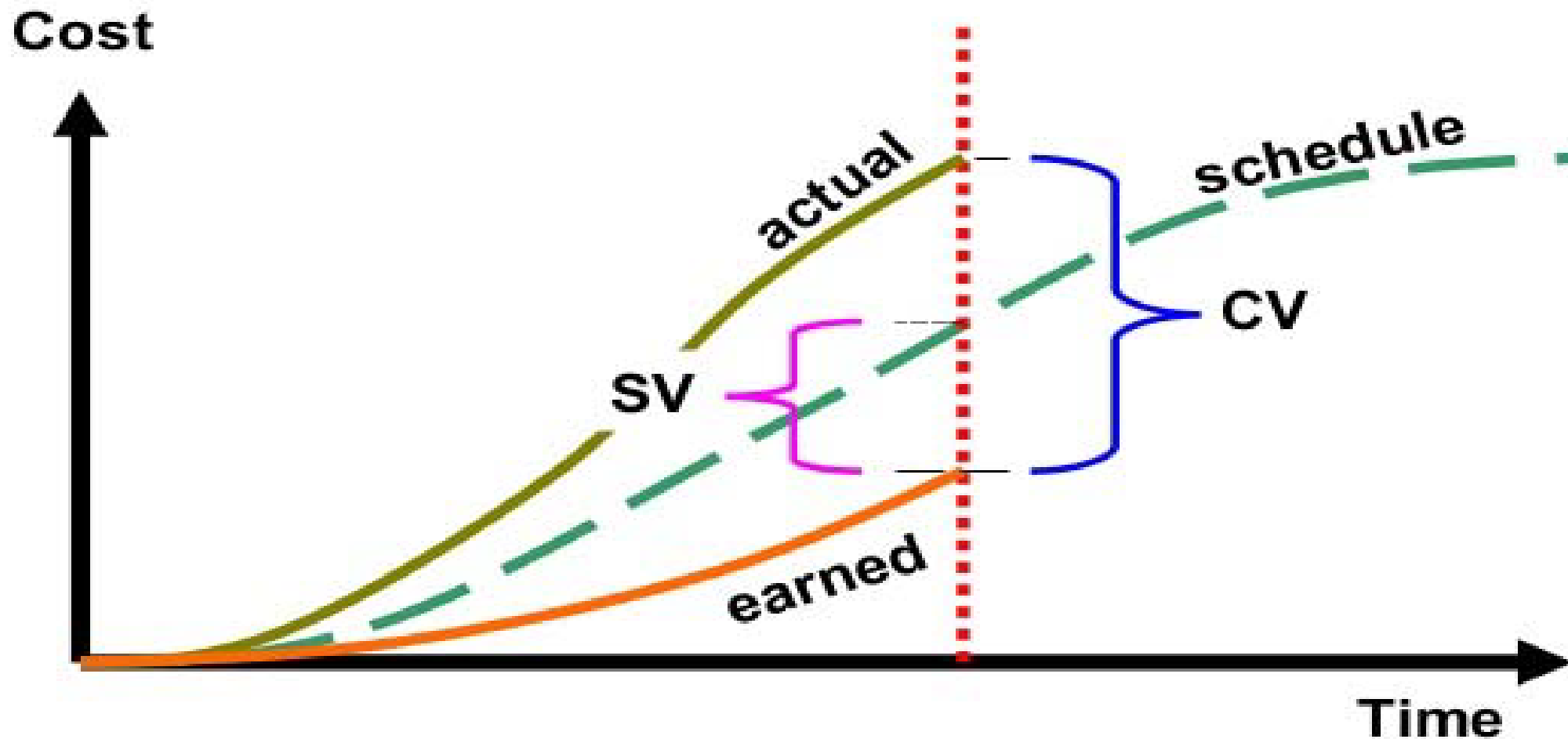
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Variance – SV & CV illustration



Variance - Do you know

- What is the problem causing the variance?
- What is the impact on other efforts, if any?
- What corrective action is planned or under way?
- What is the impact on time, cost & performance?
- What are the expected results of the corrective action?



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Variance – Depends on.....

- Estimate type
- Life-cycle phase
- Length of project
- Accuracy of estimate
- Length of life-cycle phase



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Management Reserve

- The padding added to a project for unexpected costs that are within project scope
 - NOT an allowance for changes to scope
 - NOT part of the cost estimate
- Added by upper management, NOT the project manager



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Earned Value – Example



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Example - Budget, Schedule, Tasks

Project Budget = £40,000

Schedule = 4 months

Tasks = 20 Tasks (evenly divided over 4 months)

£2,000 per task

5 tasks per month

Planned Value or BCWS = £10,000 / month



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Example - Budget, Schedule, Tasks

Invoice – 1st Month Payment = £8,000 Actual Cost or ACWP

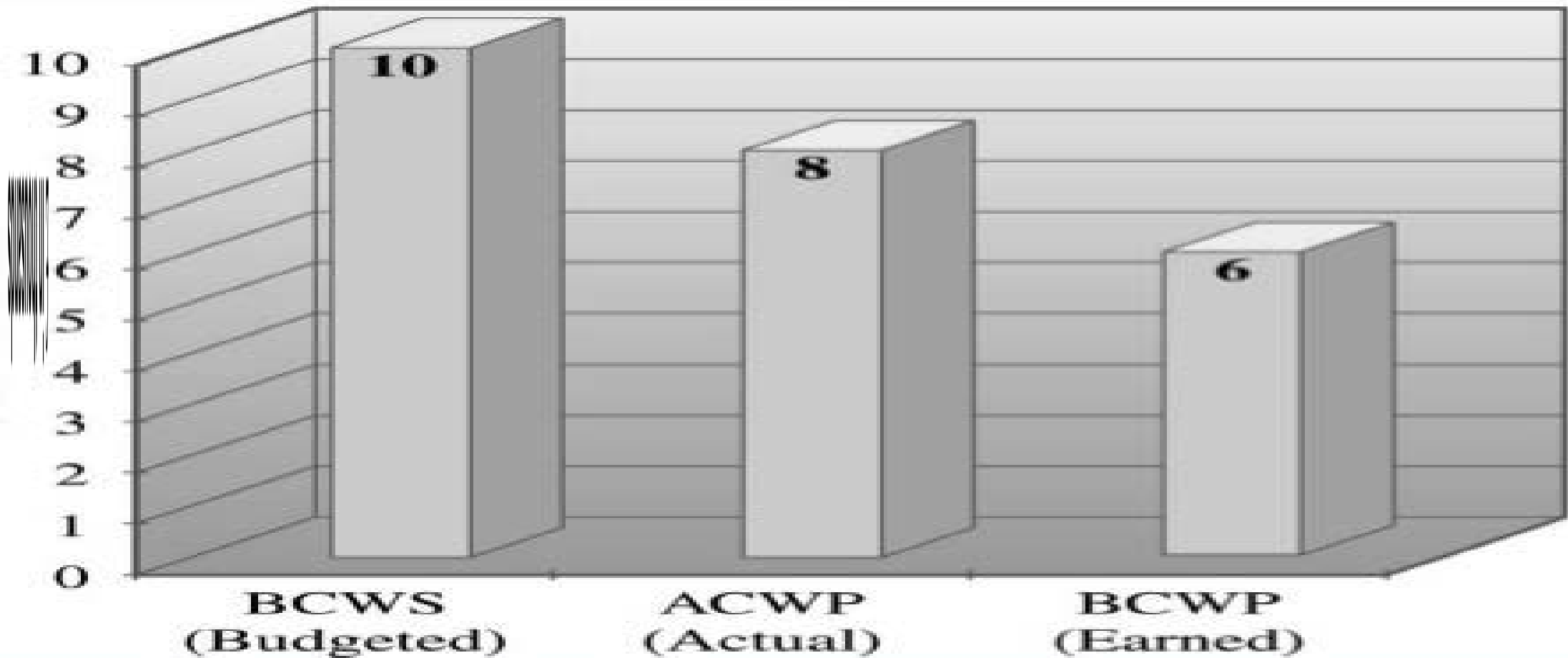
Work Completed – 1st Month, 3 tasks costing= £8,000 as against
£6,000 (£2,000 x 3)

Earned Value or BCWP = £6,000



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Comparison – PV, AC & EV

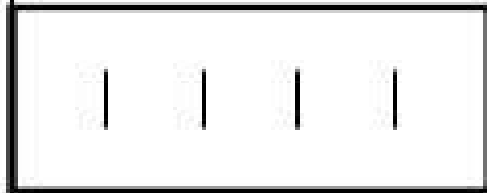


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Cost Performance Indicator

PV / BCWS

1 month

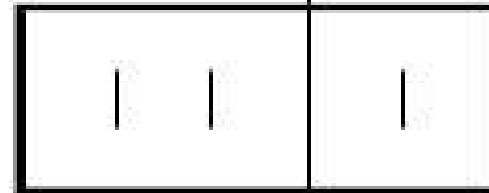


£1,000

Scheduled / Budgeted
to do **£10,000** work over
5 tasks in a month
window
BCWS = **£10,000**

EV / BCWP

1 month

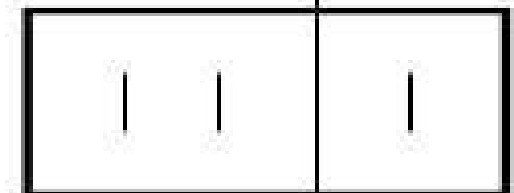


£6,000 **£4,000**

Schedule slippage
permits only
3 tasks/ **£6,000**
work to be
performed
BCWP = **£6,000**
Schedule variance = **£4,000**

AC / ACWP

1 month



£8,000 **£2,000**

Actual cost of
work performed = **£8,000**
ACWP = **£8,000**
Actual cost
variance = **£2,000**



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EV – Example (utilising Revised Estimates)



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Example - Latest Revised Estimate

Total budget (BAC) = £ 5,000

Work scheduled (PV) = £ 2,000

Work accomplished (EV) = £ 1,800

Actual cost (AC) = £ 2,400

Latest Revised Estimate (LRE) = £ 5,600



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Example – LRE (Contd.)

TCPI (To Complete Cost Performance Index)

$$\text{CPI} = \text{EV} / \text{AC} (£ 1,800 / £ 2,400) = 0.75$$

$$\text{TCPI (at BAC)} = \text{Work Remaining (BAC - EV)} / \text{Budget Remaining (BAC - AC)}$$

$$\text{TCPI (at BAC)} = (£5,000 - £1,800) / £5,000 - £2,400 = 1.23$$

$$\text{TCPI (at LRE)} = \text{Work Remaining (BAC - EV)} / \text{Estimate Remaining (LRE - AC)}$$

$$\text{TCPI (at LRE)} = (£5,000 - £1,800) / £5,600 - £2,400 = 1.00$$

Based on the LRE (£ 5,600), the project will come on budget (1.00) & revised estimate appears reasonable



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Earned Value- Success Criteria



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Criteria

Organisation

Detailed WBS & OBS prepared

Use RASCI chart & integrate OBS & WBS & provide info to finance

WBS & OBS utilised (plan, budget, authorise work schedule, perform measurement and cost accumulation)

Org responsible for overhead control

Budgets and Schedule

Detailed schedule include interdependencies, milestone

Phased budgets at the a/c code / cost element to capture work complete, WIP & O/H

Performance measurement baseline, Mngt reserve (MR), (Un) distributed budget maintained

Accounts / Finance

Direct and indirect costs are captured at the lowest level of the WBS / OBS

Cost elements including coding are in line with the organisation's accounting system

Earned Value Management and Reporting

Mgt reports highlight schedule cost performance, actual vs. budget, variance & reasons

Utilise WBS & OBS for Mngt attention (EV Management)

Prepare Latest Revised Estimates (LRE) utilising EAC, VAC, ETC & BAC for further funding / project cancellation



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