

Earned Value Management

Earned Value Management (EVM)



Earned Value Management

□ What Is It?

- Project management technique for measuring project performance and progress in an objective manner
- Has the ability to combine measurements of scope, schedule, and cost in a single integrated system

Earned Value Management ... 2

□ It help us answer these question:

- Are we ahead of or behind schedule?
- How efficiently are we using our time?
- Are we under or over budget?
- How efficiently are we using our resources?
- When is the project likely to be completed?
- What is the remaining work likely to cost?
- What is the entire project likely to cost?
- How much will we be under or over budget?

Earned Value Management ... 3

It comprises of:

- Earned Value Analysis (EVA)
 - Progress tracking
 - Forecasting
- Earned Value Technique (EVT)
 - Physical works (tangible)
 - Non-physical works (in-tangible)



Earned Value Management

Earned Value Analysis (EVA)



Earned Value Analysis

Value of
planned work

- Planned Value (PV)
- Budgeted Cost of Work Scheduled (BCWS)

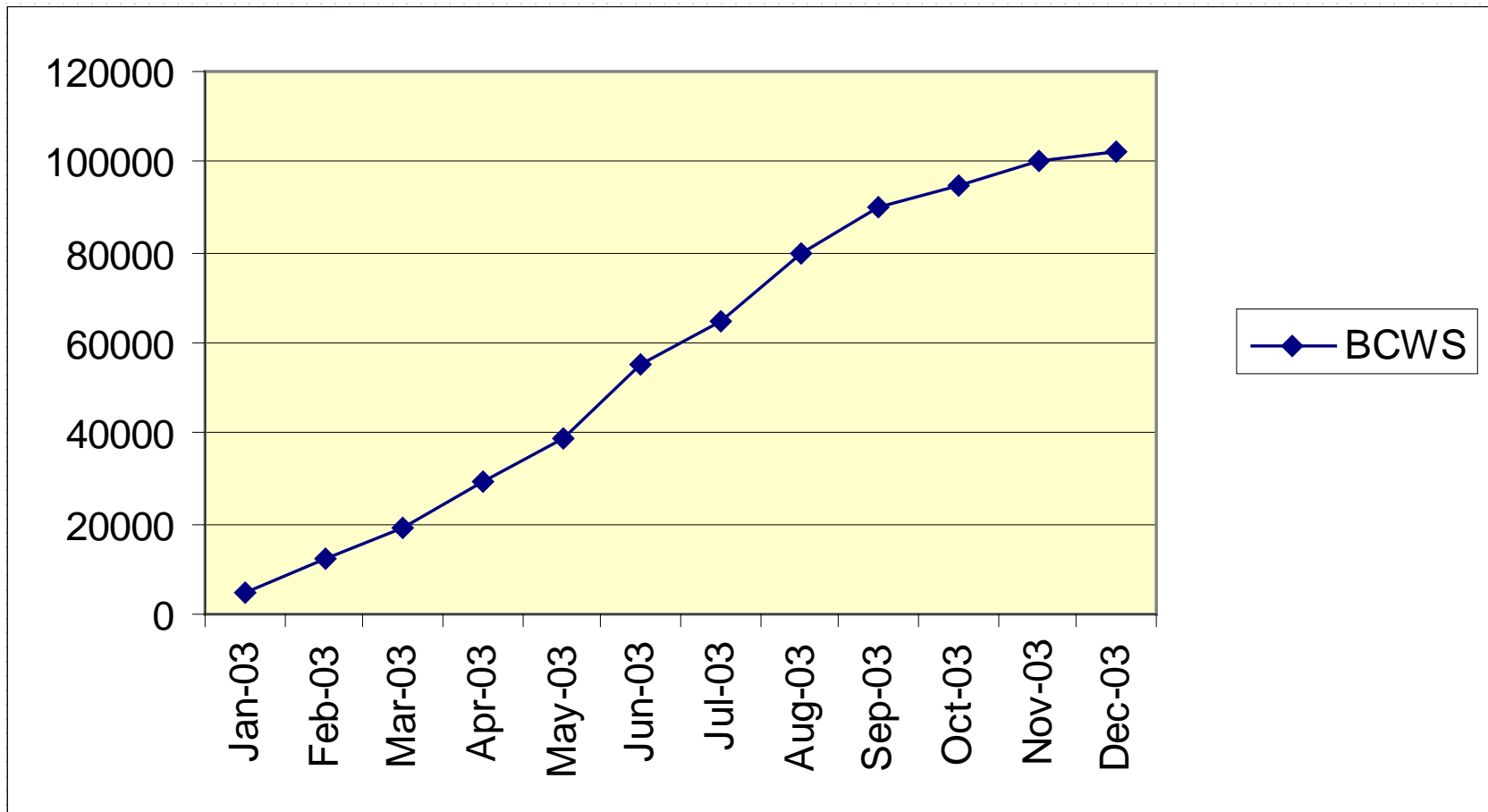
Work
accomplished

- Earned Value (EV)
- Budgeted Cost of Work Performed (BCWP)

- Actual cost incurred for the work accomplished (AC)
- Actual Cost Work Performed (ACWP)

**Earned
Value
Analysis**

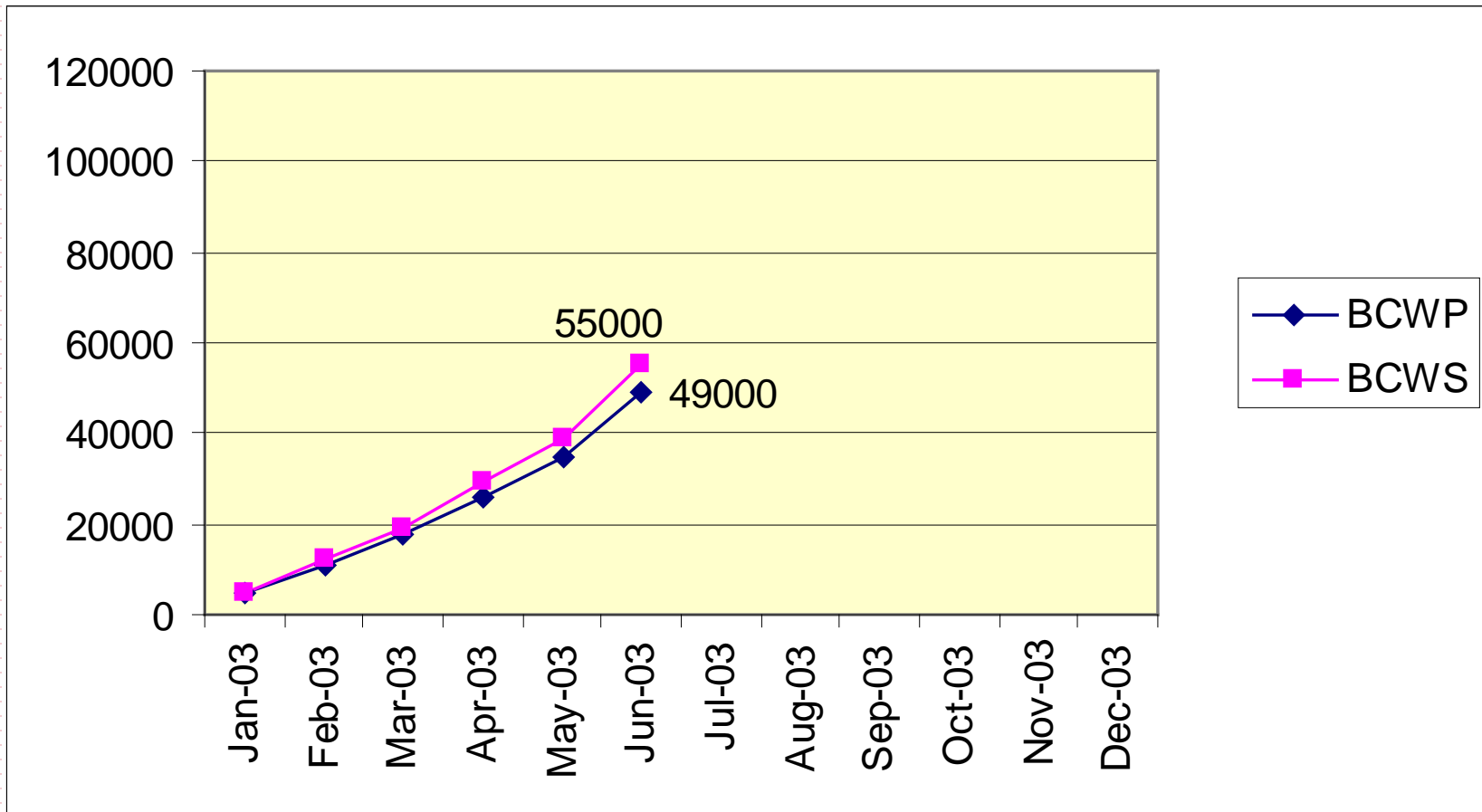
Planned Value or BCWS



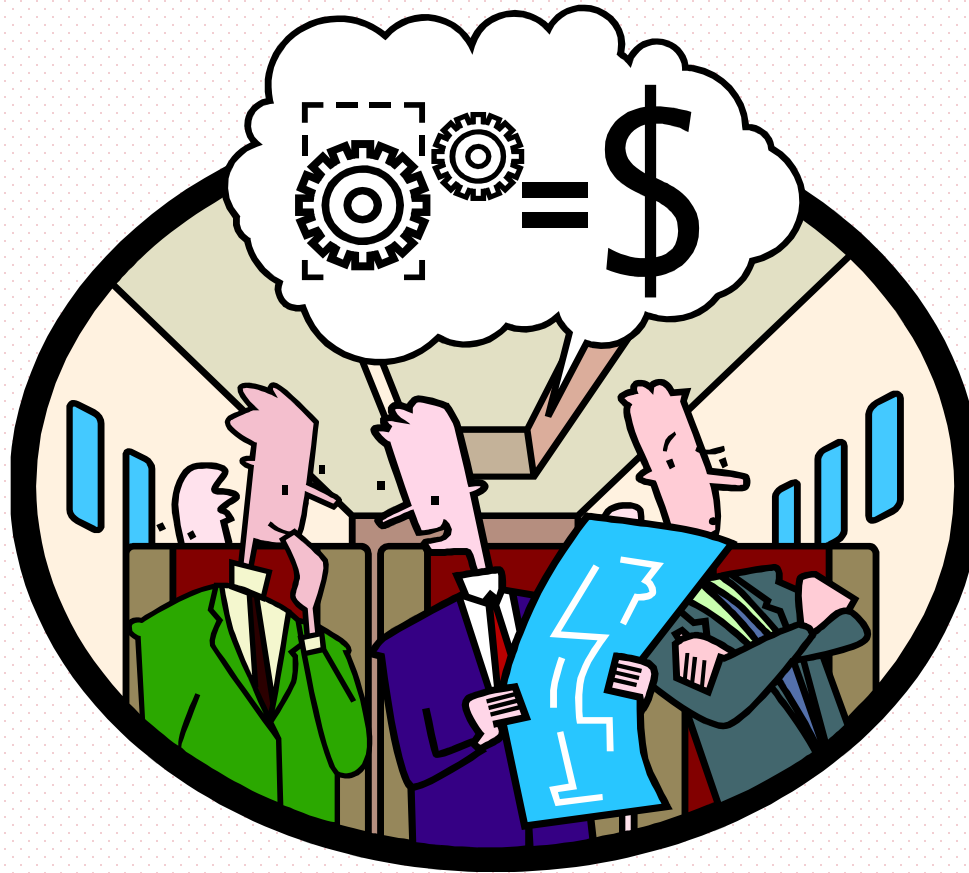
How Are We Doing?



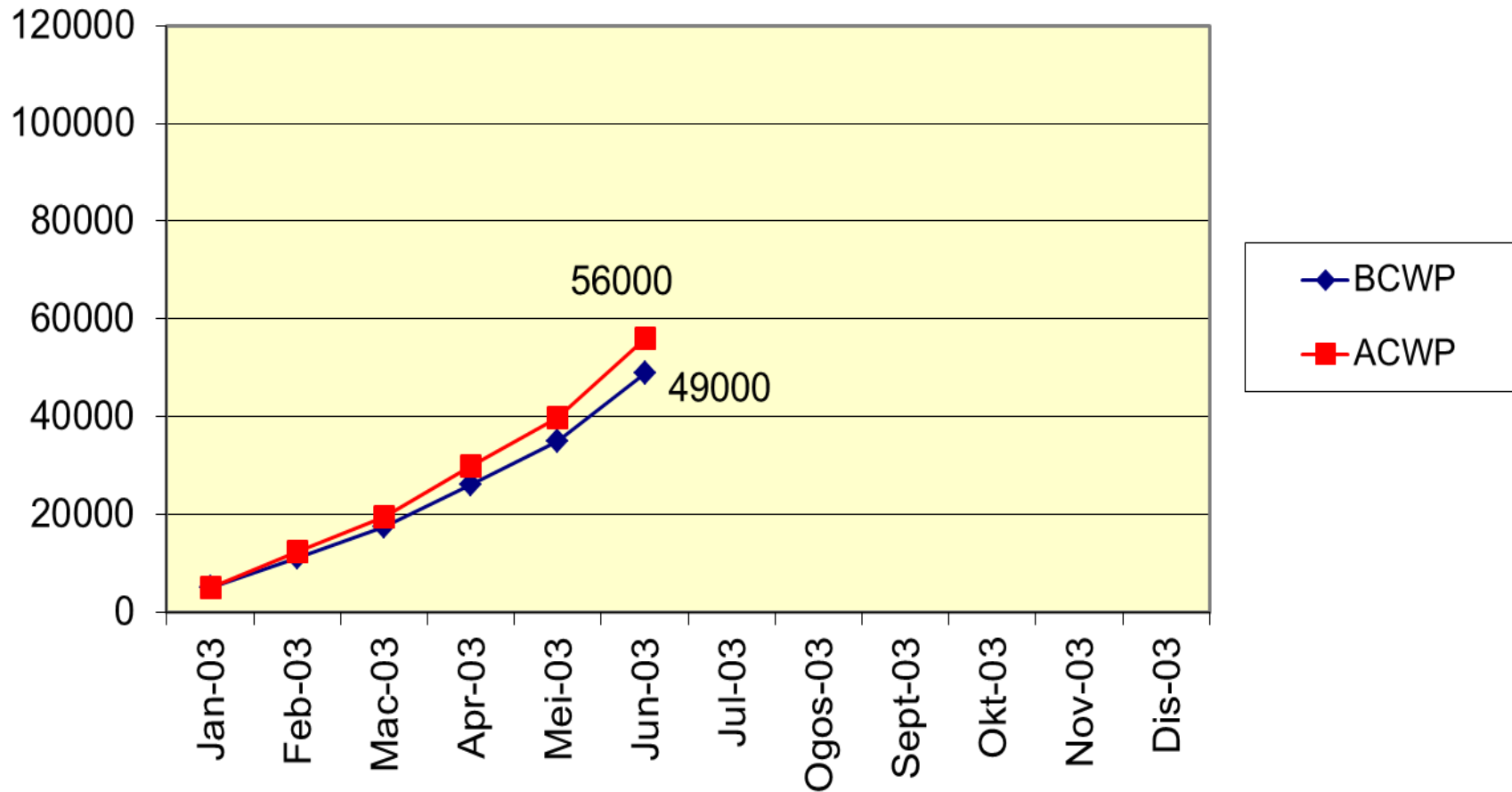
Earned Value or BCWP



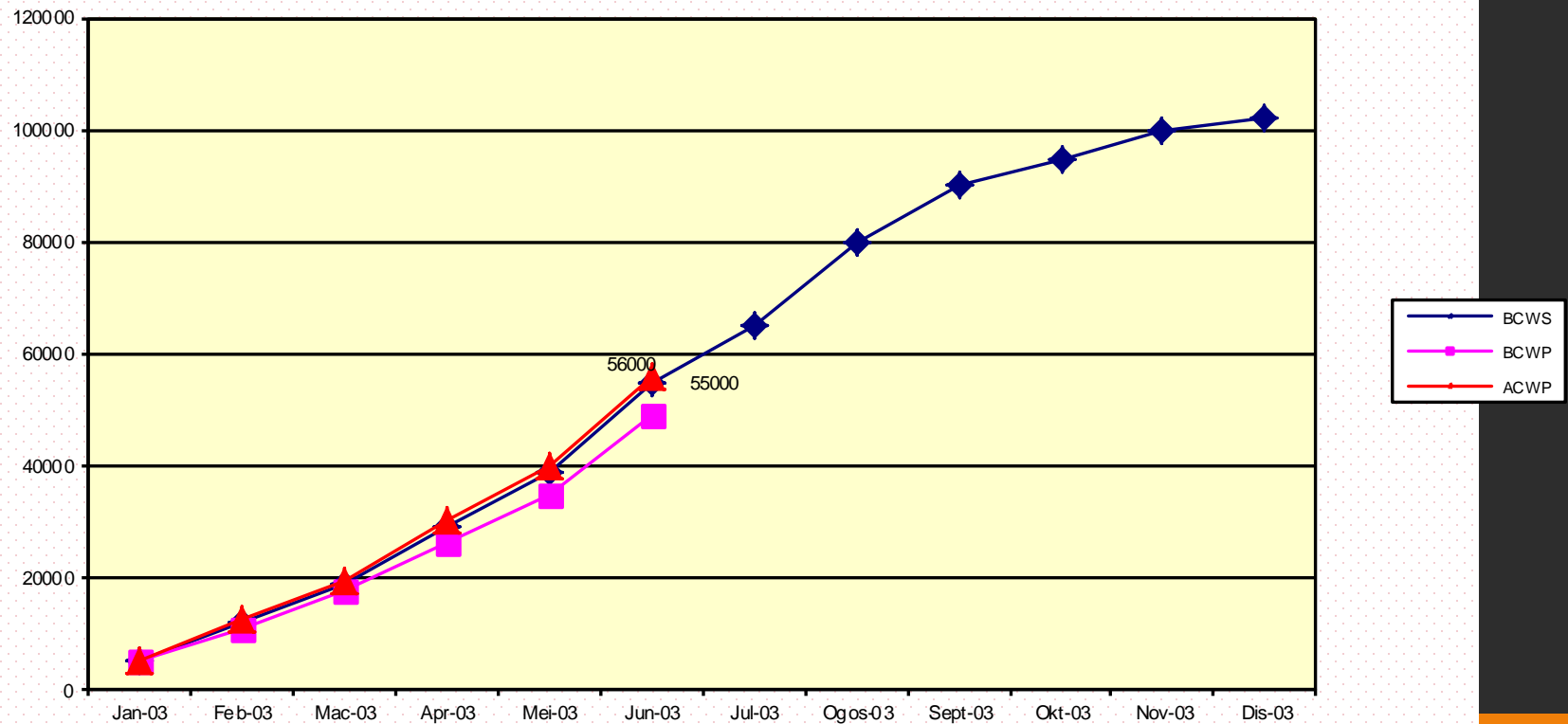
Are We Under or Over Budget ?



Actual Cost or ACWP



The Whole Story





Some Derived Metrics

➤ **SV: Schedule Variance (EV - PV)**

- A comparison of amount of work performed during a given period of time to what was scheduled to be performed.
- A negative variance means the project is behind schedule

➤ **CV: Cost Variance (EV - AC)**

- A comparison of the budgeted cost of work performed with actual cost.
- A negative variance means the project is over budget.



Schedule Variance & Cost Variance

Schedule Variance = EV - PV

$$\begin{array}{r} \$49,000 \\ - 55,000 \\ \hline SV = - \$ 6,000 \end{array}$$

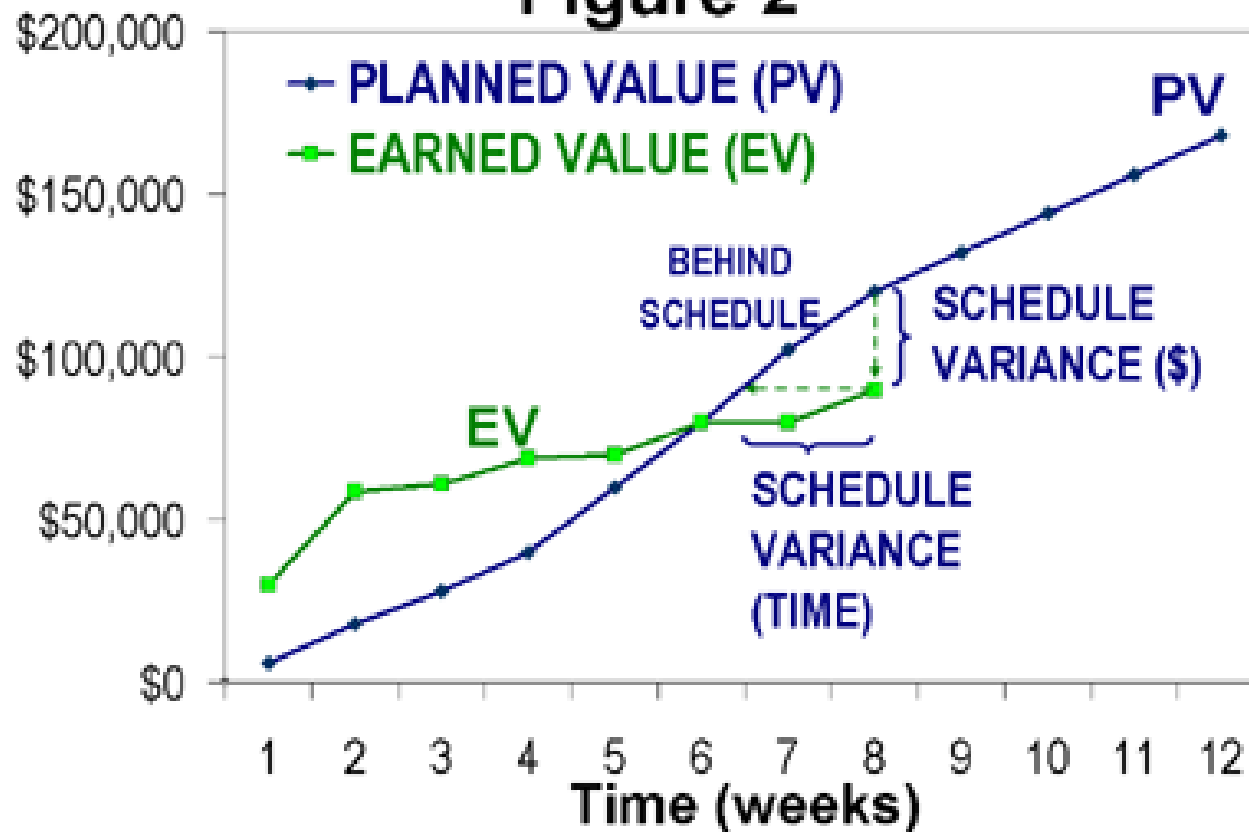


Cost Variance = EV - AC

$$\begin{array}{r} \$49,000 \\ \underline{56,000} \\ CV = - \$7,000 \end{array}$$

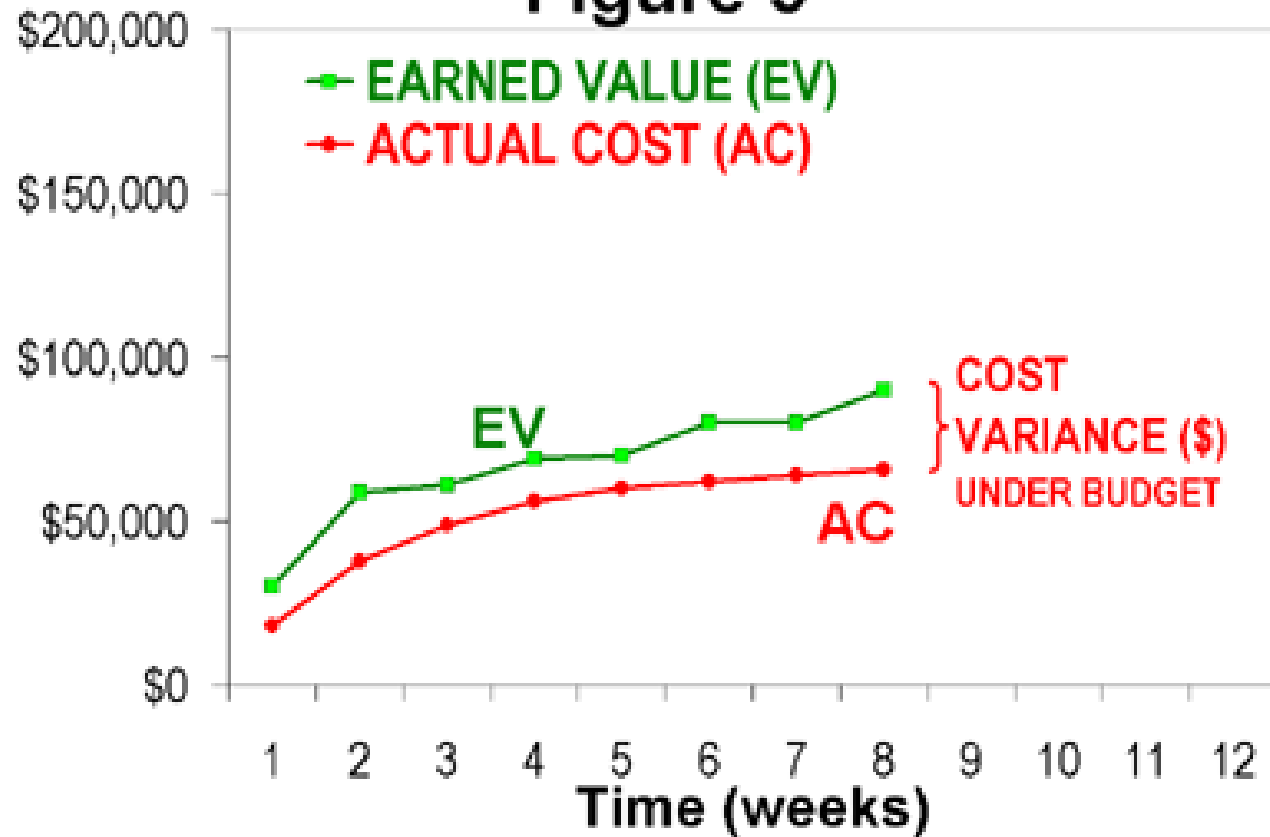
Schedule Variance

Figure 2



Cost Variance

Figure 3



Progress Tracking

- Schedule Performance Index (SPI):

EV/PV

$$49,000/55,000 = 0.891$$

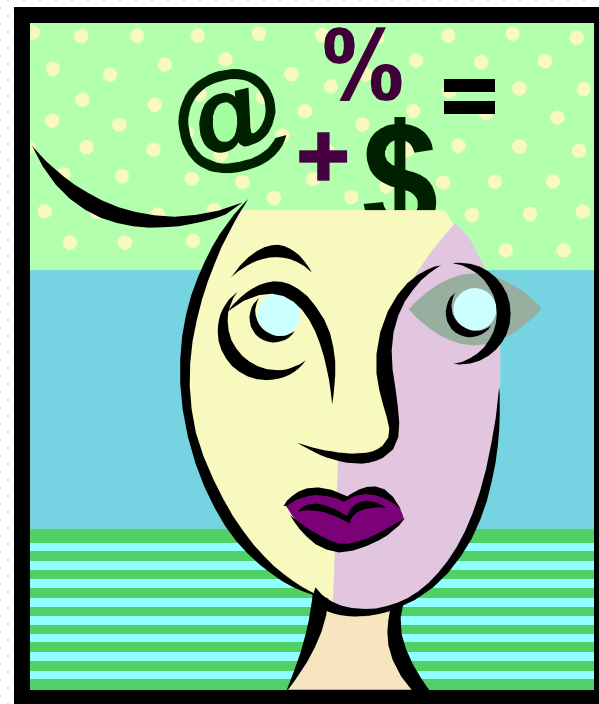
If > 1 = Ahead; < 1 = Behind

- Cost Performance Index (CPI):

EV/AC

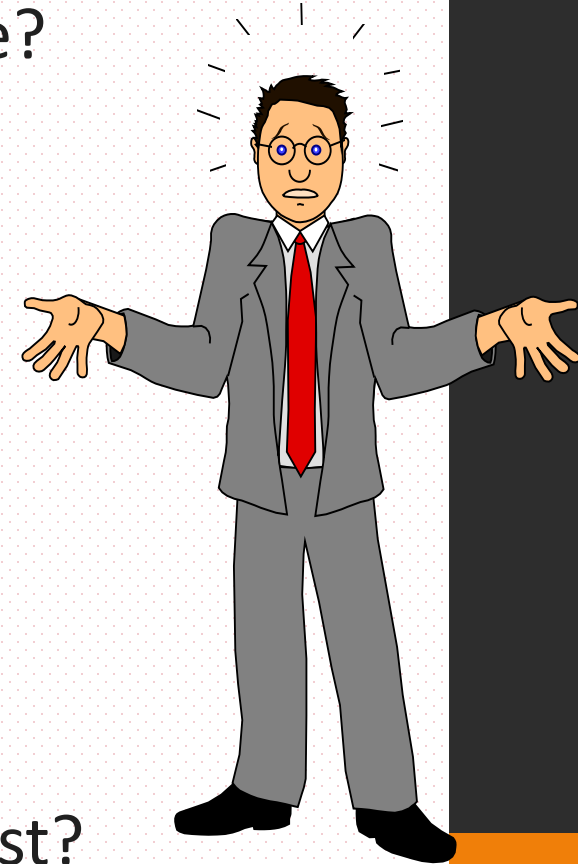
$$49,000/56000 = 0.875$$

If > 1 = Under budget;
 < 1 = Over budget



How to Answer Other Questions?

- ❑ Are we ahead of or behind schedule?
- ❑ How efficiently are we using our time?
- ❑ Are we under or over budget?
- ❑ How efficiently are we using our resources?
- ❑ When is the project likely to be completed?
- ❑ What is the remaining work likely to cost?
- ❑ What is the entire project likely to cost?
- ❑ How much will we be under or over budget?



Forecasting

- **Time Estimate at Completion (EAC_t)**

= Project duration/SPI
= 12 months/0.891
= 13.5 months

- **Time Variance at Completion (VAC_t)**

= EAC_t - Project duration
= 13.5 - 12 months
= 1.5 month



Forecasting ... 2

- **Estimate at Completion (EAC)**

= Budget at Completion/CPI

= \$102,000/0.875

= \$116,571

- **Variance at Completion (VAC)**

= EAC – Budget at Completion

= \$116,571 – \$102,000

= \$14,571

- **Estimate to Complete (ETC)**

= EAC – AC

= \$116,571 – 56,000

= \$60,571



Earned Value Management

Earned Value Techniques (EVT)



EV Technique



- EV is a measure of work performed
- Techniques for measuring are selected during project planning stage
- Techniques selected will be the basis for performance measurement during project execution and control
- Techniques should be selected based on the characteristic of the work

EV Technique

2 types of EV Techniques



PHYSICAL WORKS (TANGIBLE)	NON PHYSICAL WORKS (INTANGIBLE)
1. FIXED FORMULA	1. APPORTIONED EFFORT
2. WEIGHTED MILESTONE	2. LEVEL OF EFFORT (LOE)
3. % COMPLETE	

Physical Works (Tangible)

FIXED FORMULA	WEIGHTED MILESTONE	% COMPLETE
<ul style="list-style-type: none">• Works with short duration	<ul style="list-style-type: none">• Suitable for longer duration tasks that have intermediate products	<ul style="list-style-type: none">• Long duration works
<ul style="list-style-type: none">• A fixed % of work performance is credited at the start of work and the remaining % at the completion of work	<ul style="list-style-type: none">• Work is divided into segments with a clear milestone	<ul style="list-style-type: none">• Worker/Manager makes estimate of % of work complete
	<ul style="list-style-type: none">• Assign value to achievement of each milestone	<ul style="list-style-type: none">• Pay according to work done

Non- Physical Works (Intangible)

APPORTIONED EFFORT	LEVEL OF EFFORT
<ul style="list-style-type: none">• Work that run concurrently with physical work that has its own EV	<ul style="list-style-type: none">• Based on schedule progress
<ul style="list-style-type: none">• Work that has relationship with a physical work	<ul style="list-style-type: none">• For supporting works such as maintenance site office, work program
<ul style="list-style-type: none">• Work such as quality assurance or inspection activities	