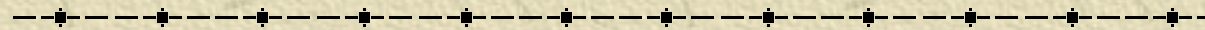
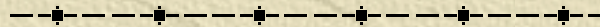


# Cost Management for Project Managers



José A. Rodríguez-Lopéz, P.E., PMP

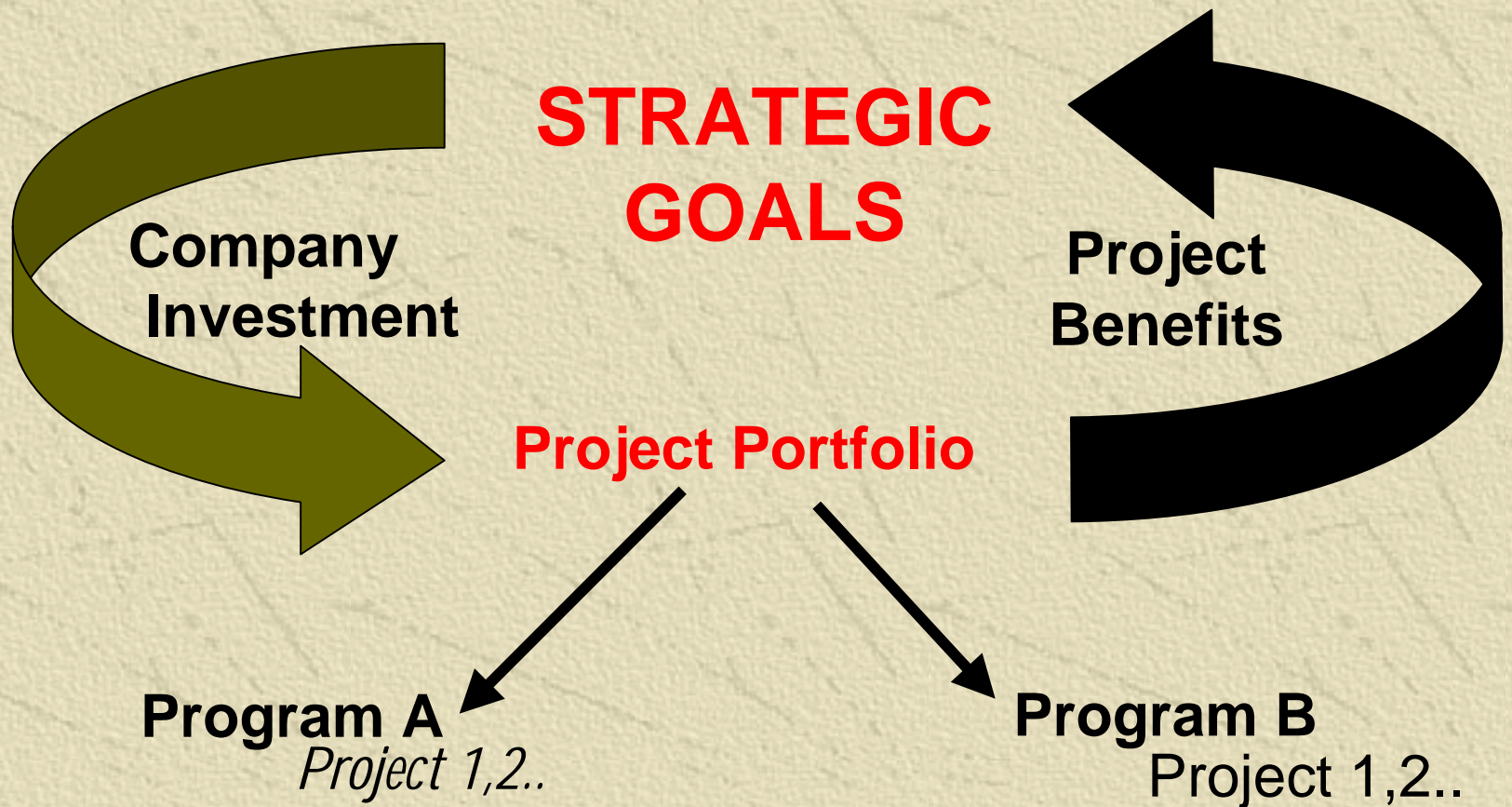


# OBJECTIVES

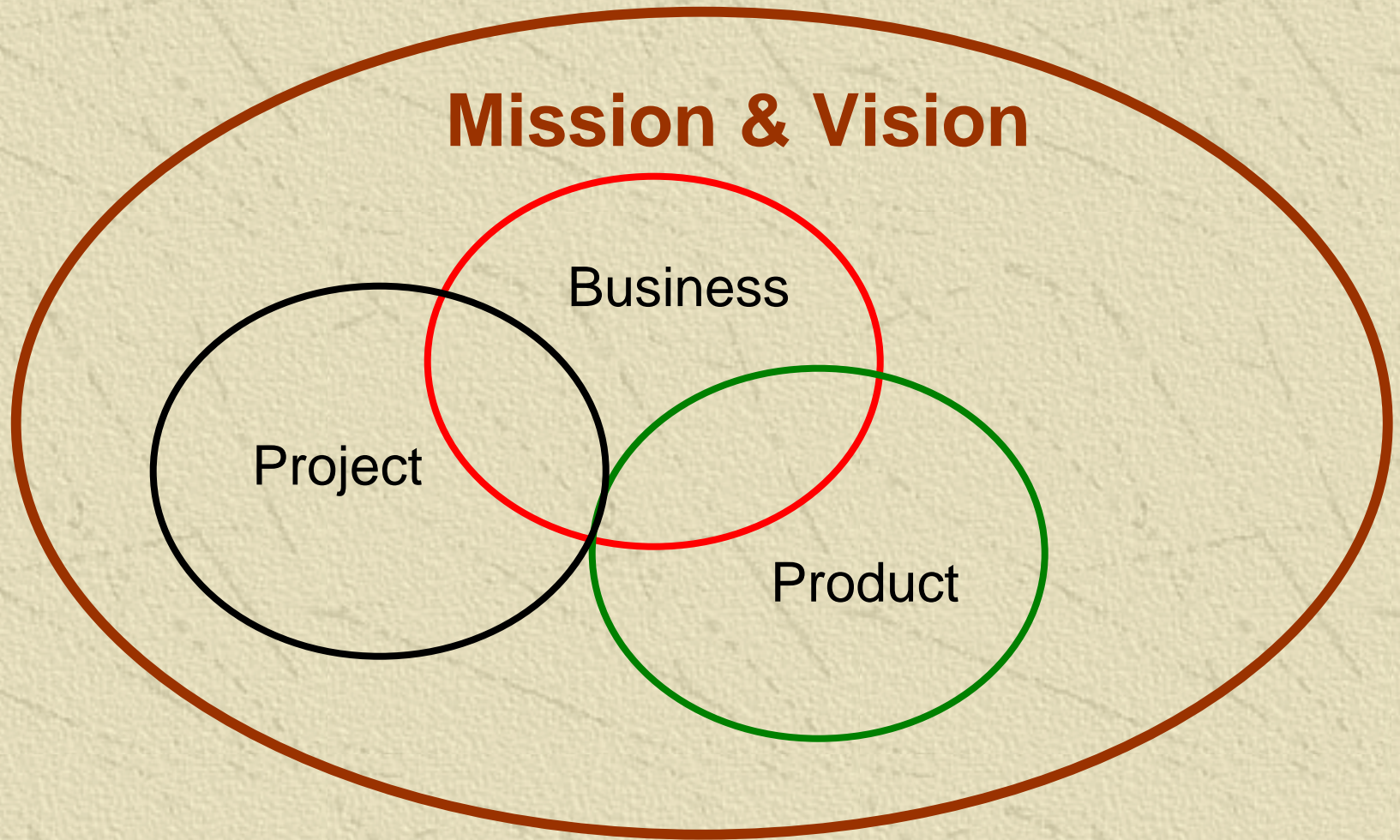
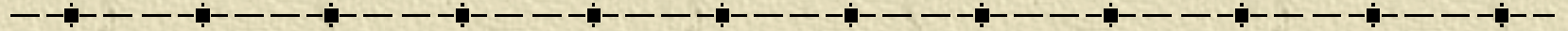
- 
- ✦ Business Needs and Project Implementation
  - ✦ Cost Management Elements
  - ✦ Performance and Control Monitoring

# Business Plan

---

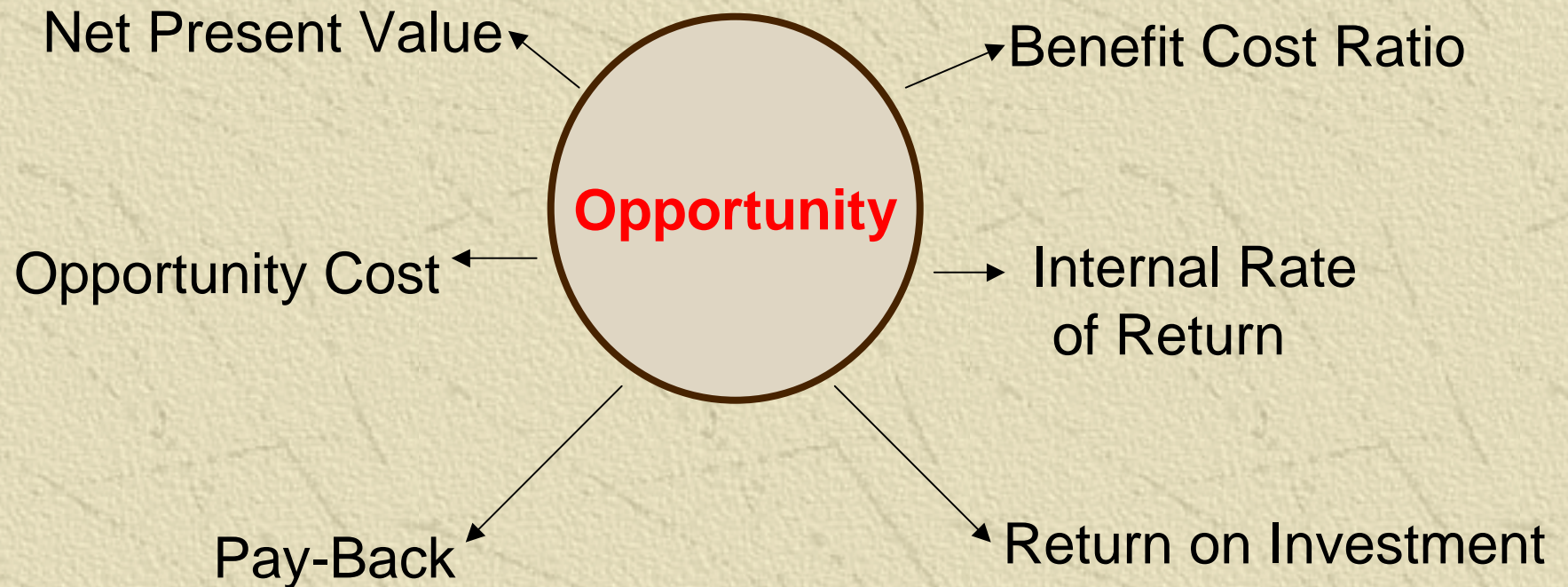


# Management Circles

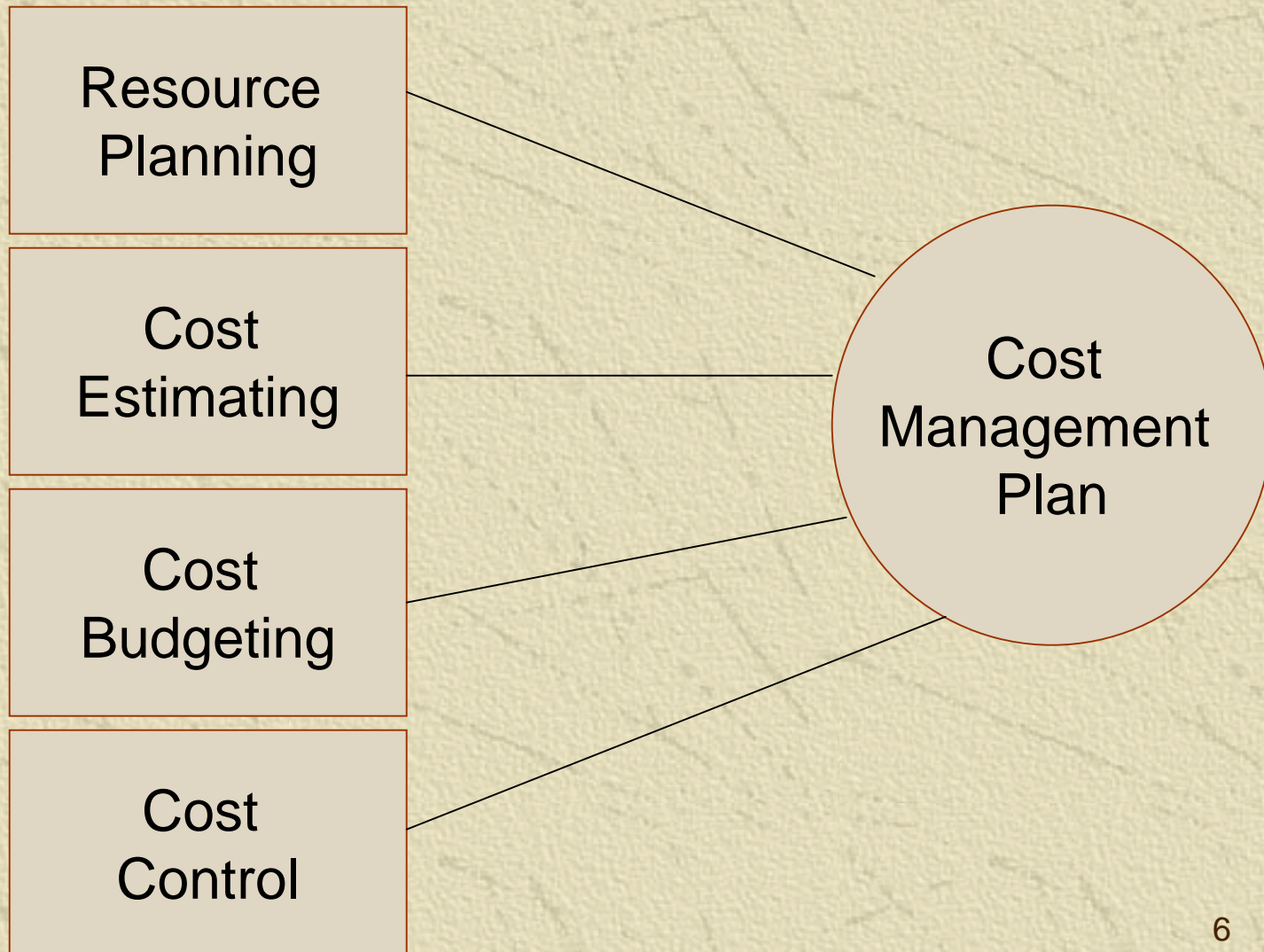


# Feasibility Analysis-Metrics

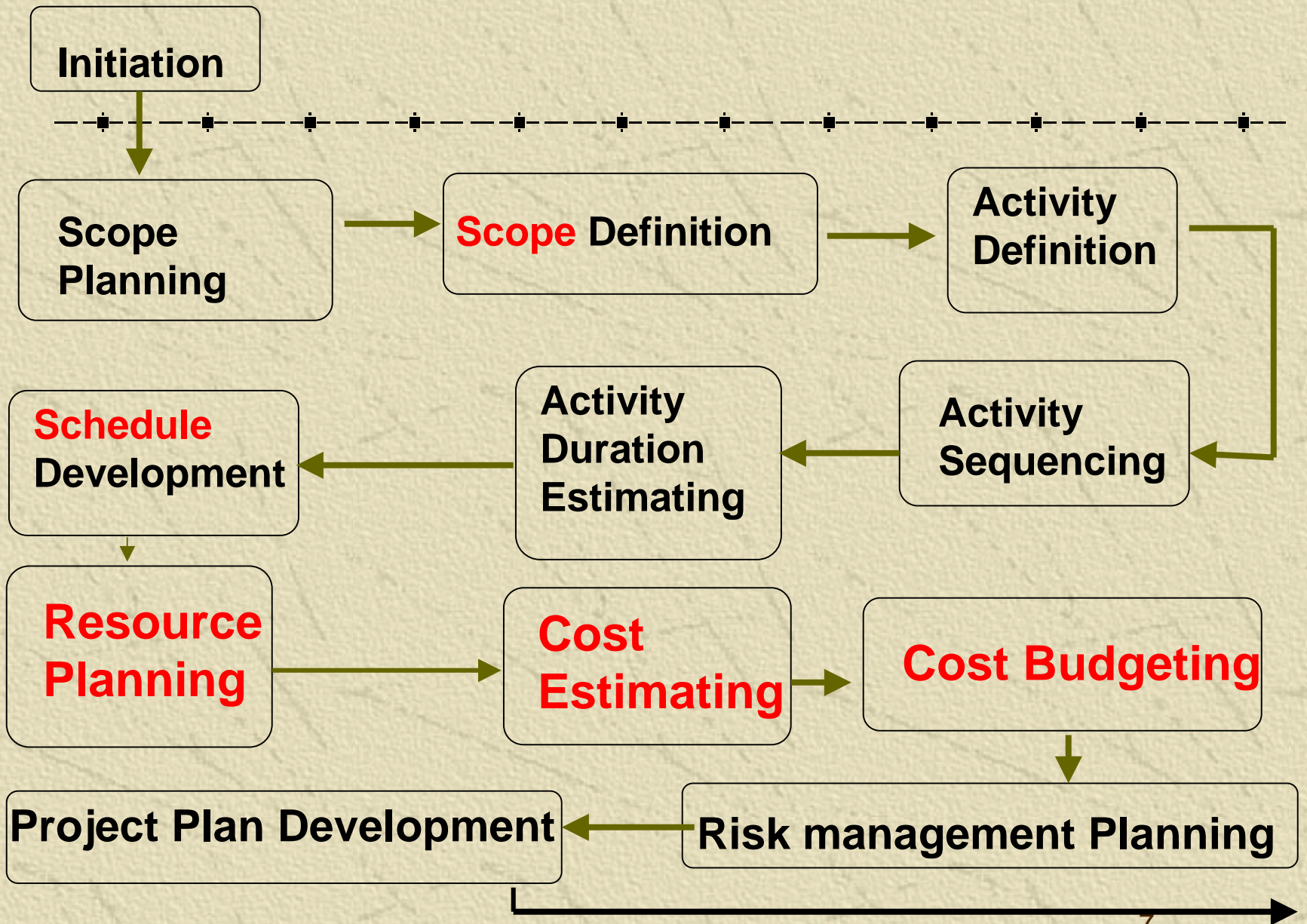
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# Project Cost Elements

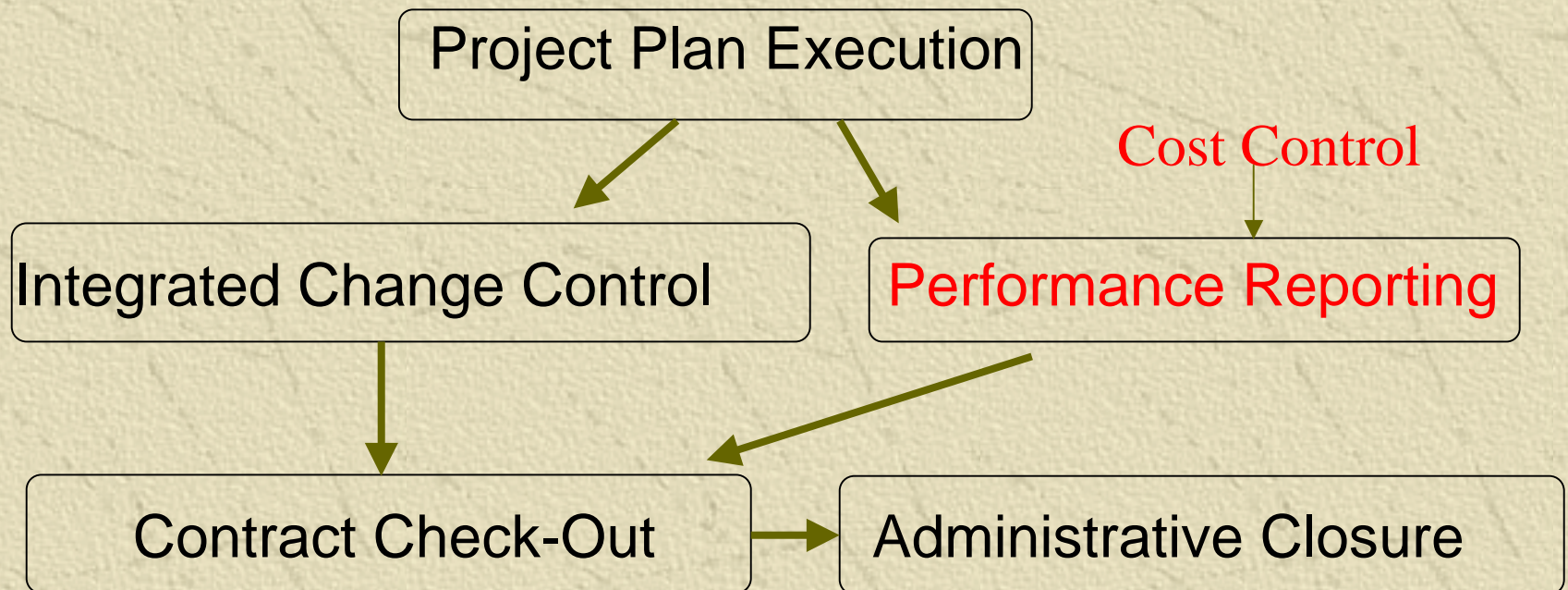


# Project Management Core Processes



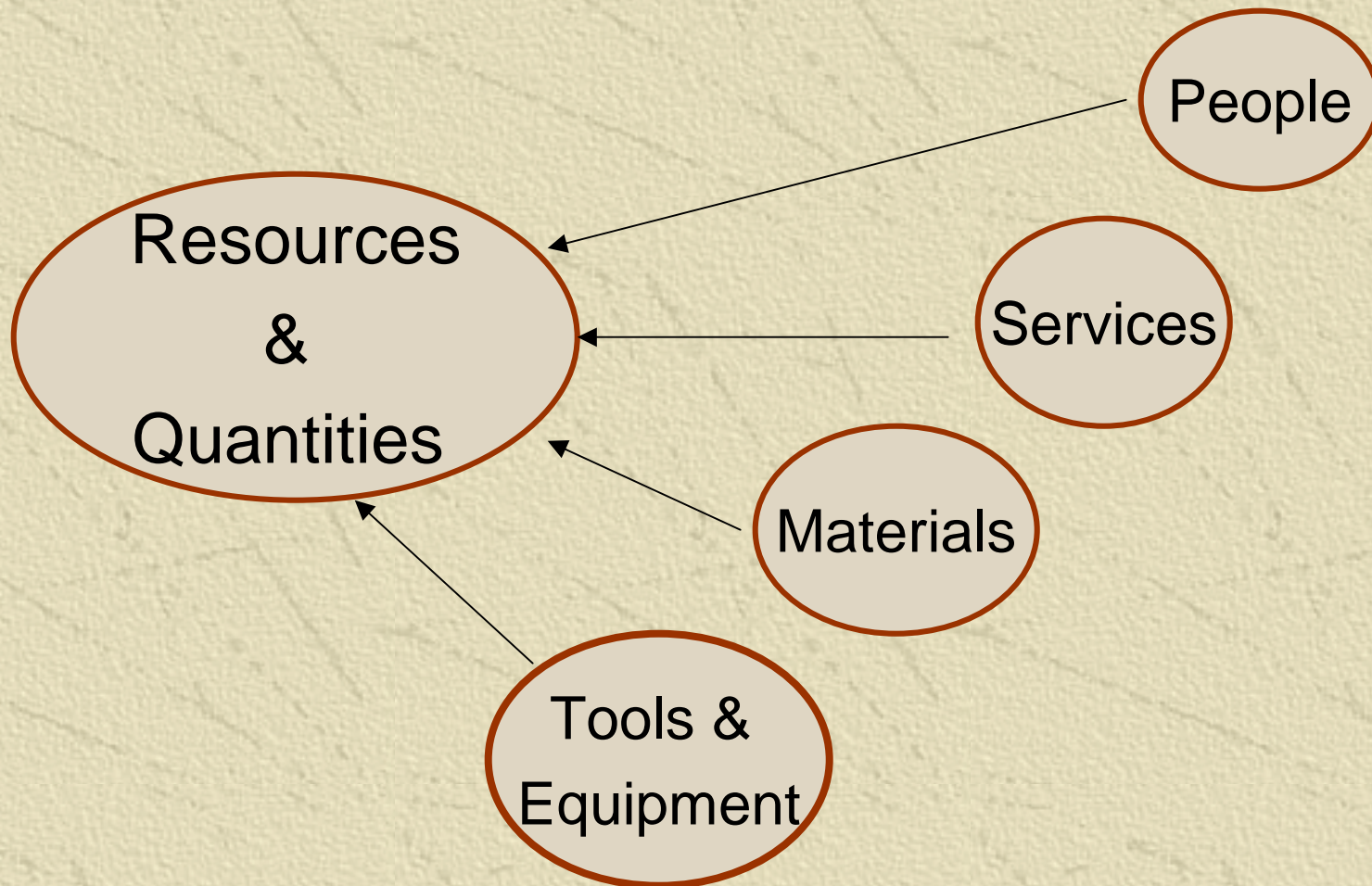
# Project Management Core Processes

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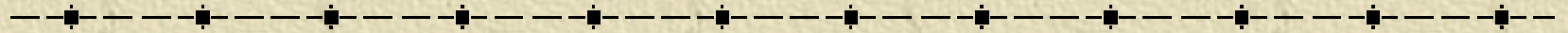


# Resource Planning

---

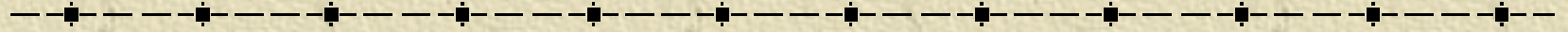


# Resource Planning Requirements



- ✦ Clear Project Objectives
- ✦ Accurate WBS
- ✦ Buy-in Project Team
- ✦ Working Knowledge of the Resource Pool
- ✦ Experience

# Cost Estimate



**How Many ?**

## Work Breakdown Structure (WBS)

**How Long ?**

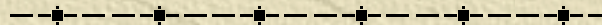
**How Much ?**



# Project Managers DO NOT ESTIMATE



Project Managers Control the  
**Estimating Process**



# Who Participates in Cost Estimating?



---

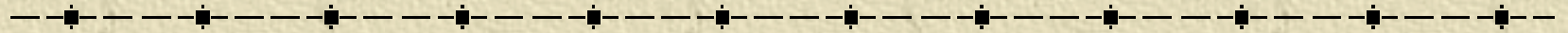
- ✦ Pre-Contract Personnel
- ✦ Project Sponsors
- ✦ Project Manager
- ✦ Project Team Members

# Estimating Rules

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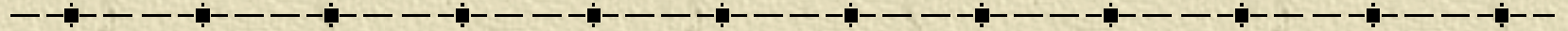
- ✦ CLARITY “level of detail”
- ✦ COOPERATION “ownership of estimates”
- ✦ COMPROMISE “time /cost resource trade-off”
- ✦ CONSIDERATION “human productivity”
- ✦ CONSISTENCY “tendencies”

# Planning and Execution Transition



*The Estimating and Budgeting Processes  
Bridges the Transition between the  
Planning and Execution Phases.*

# Budget Road Map



✦ Scope Statement

✦ Project Schedule

✦ Budget Development

# Who Participates in Cost Budgeting?



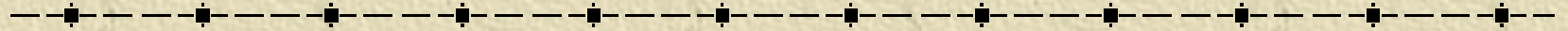
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✦ Project Managers

✦ Accounting

✦ Upper Management

# Estimating and Budgeting Methods



✦ Analogous

✦ Parametric

✦ Bottom Up

# Budgets

---

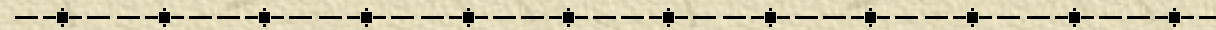
- ✦ Distributed Budgets
- ✦ Management Reserve
- ✦ Undistributed Budgets
- ✦ Contract Changes

## **WARNING:**

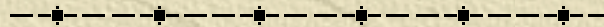
Do not prepare budget until having:

1. **PROJECT SCOPE**
2. **PRODUCT SCOPE**
3. **PROJECT SCHEDULE**

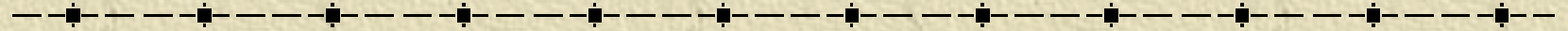
# Budget and Variance Control



*There is no need for budgets if you are not going to control it.*



# Cost Control



**Monitoring** is not the only key aspect of proper cost control.

**Data analysis** is crucial in order to take **corrective action** before it is too late.

# Cost Control Includes

- ✦ Cost Estimating
- ✦ Cost Accounting
- ✦ Project Cash Flow
- ✦ Direct Labor Costing
- ✦ Overhead Rate Costing
- ✦ Others (incentives, penalties, profit sharing)

# Earned Value Analysis

Compares baseline budget to actual expenditures and equity earned in the project.

## Components:

1. Planned Value (BCWS) - What you ***planned*** to have accomplish by now.
2. Actual Cost (ACWP) - What you have ***spent*** so far.
3. Earned Value (BCWP) - What you have actually ***accomplished*** by now.

# Productivity Index Comparison



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**Earned Value vs. Actual Cost**

**PRODUCTIVITY (CPI)**

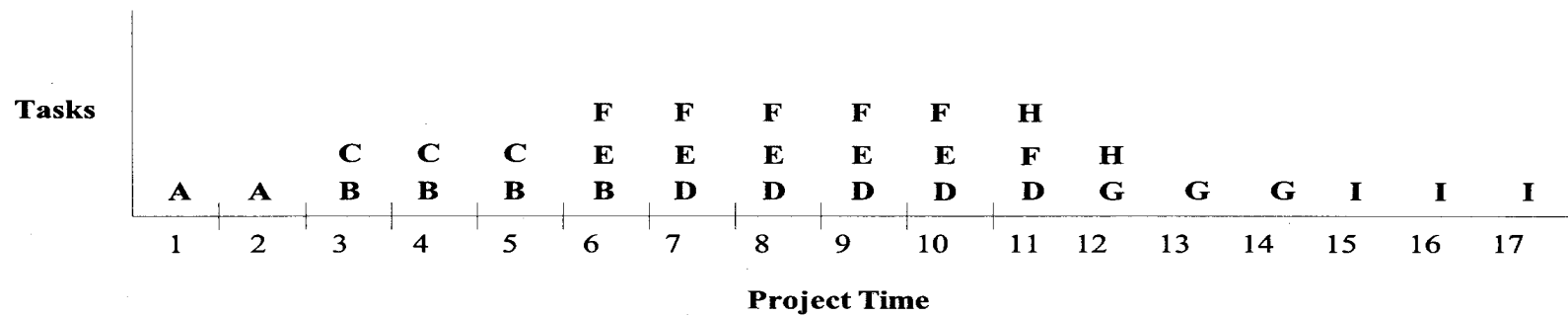
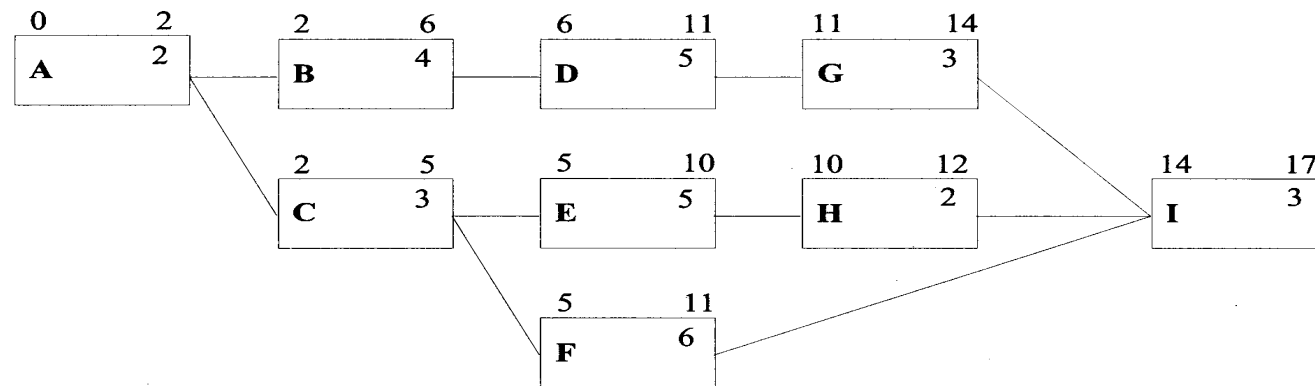
**Earned Value vs. Schedule Cost**

**PROGRESS (SPI)**

# Cost Budgeting

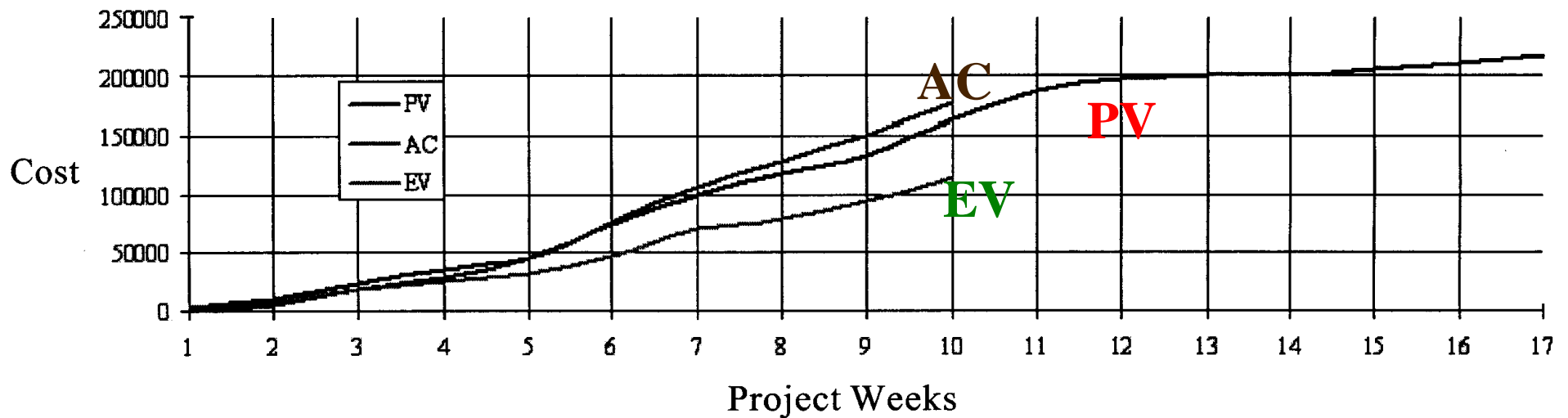
## Time-phased budget

### Example network

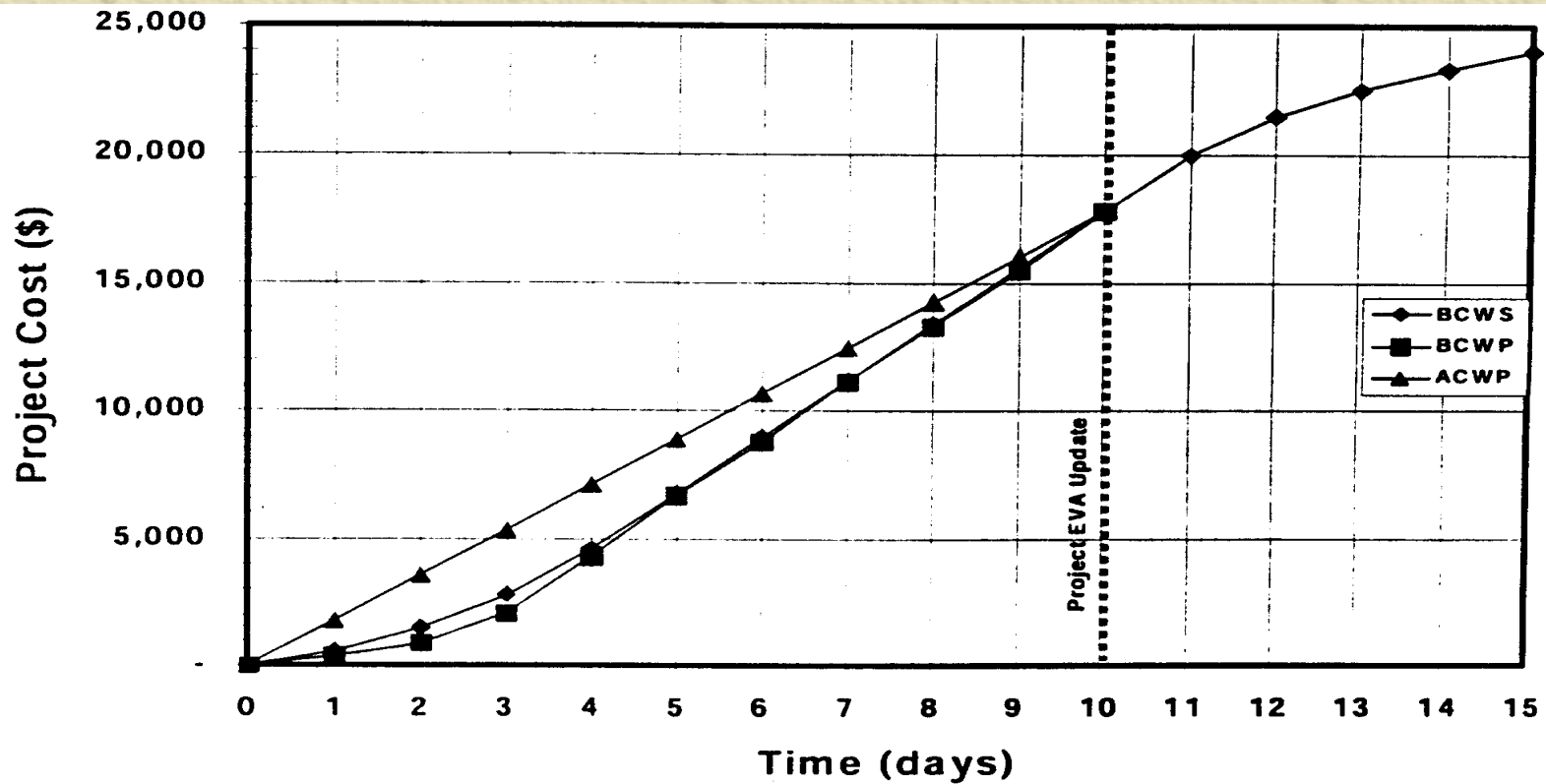


# Time-phased budget

Tasks			C	C	C	F	F	F	F	F	H						
	A	A	B	B	B	B	D	D	D	D	D	G	G	G	I	I	I
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Planned Labor Cost	2400	2400	11200	11200	11200	19200	16800	16800	16800	16800	13600	8800	2400	2400	1200	1200	1200
Planned Purchases	1000	2500	3200	0	0	7600	8500	0	0	12500	9800	0	0	0	2500	3500	5000
Indirect Cost	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Total Weekend Cost	3700	5200	14700	11900	11500	27100	25600	17100	17100	29600	23700	9100	2700	2700	4000	5000	6500
Expenditures	0	5500	12800	10400	16000	32000	30000	21000	22500	27400	25000	11200	2000	1920	3350	4190	5500
% Complete	100	88	76	72	68	65	70	68	70	70							
Planned Value (BCWS)	3700	8900	23600	35100	46600	73700	99300	116400	133500	163100	186800	195900	198600	201300	205300	210300	216800
Actual Cost (ACWP)	0	5500	18300	28700	44700	76700	106700	127700	150200	177600							
Earned Value	3700	7832	17936	25272	31688	47905	69510	79152	93450	114170							



# Project on Budget and on Schedule



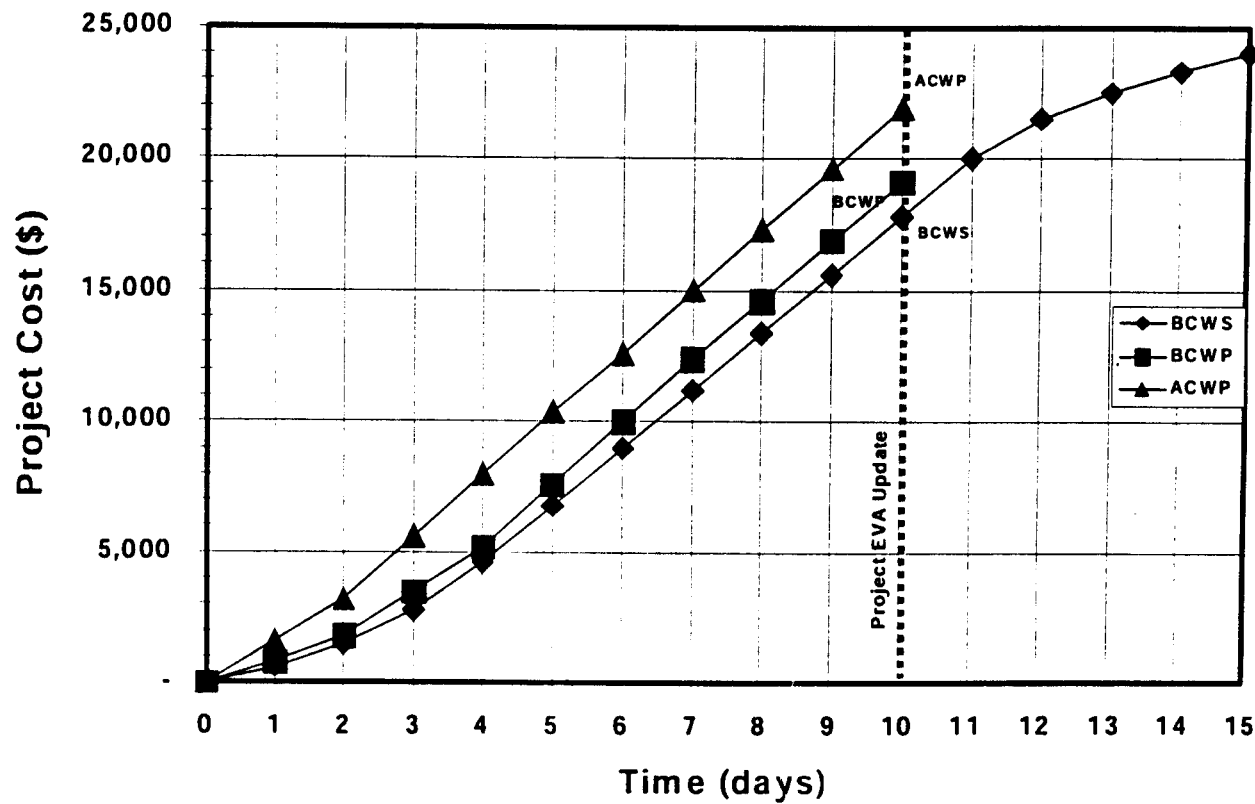
$$\text{CVAR} = 17,800 - 17,800 = 0$$

$$\text{CPI} = 17,800 / 17,800 = 1.000$$

$$\text{SVAR} = 17,100 - 17,800 = 0$$

$$\text{SPI} = 17,800 / 17,800 = 1.000$$

# Project Over Budget but Ahead of Schedule



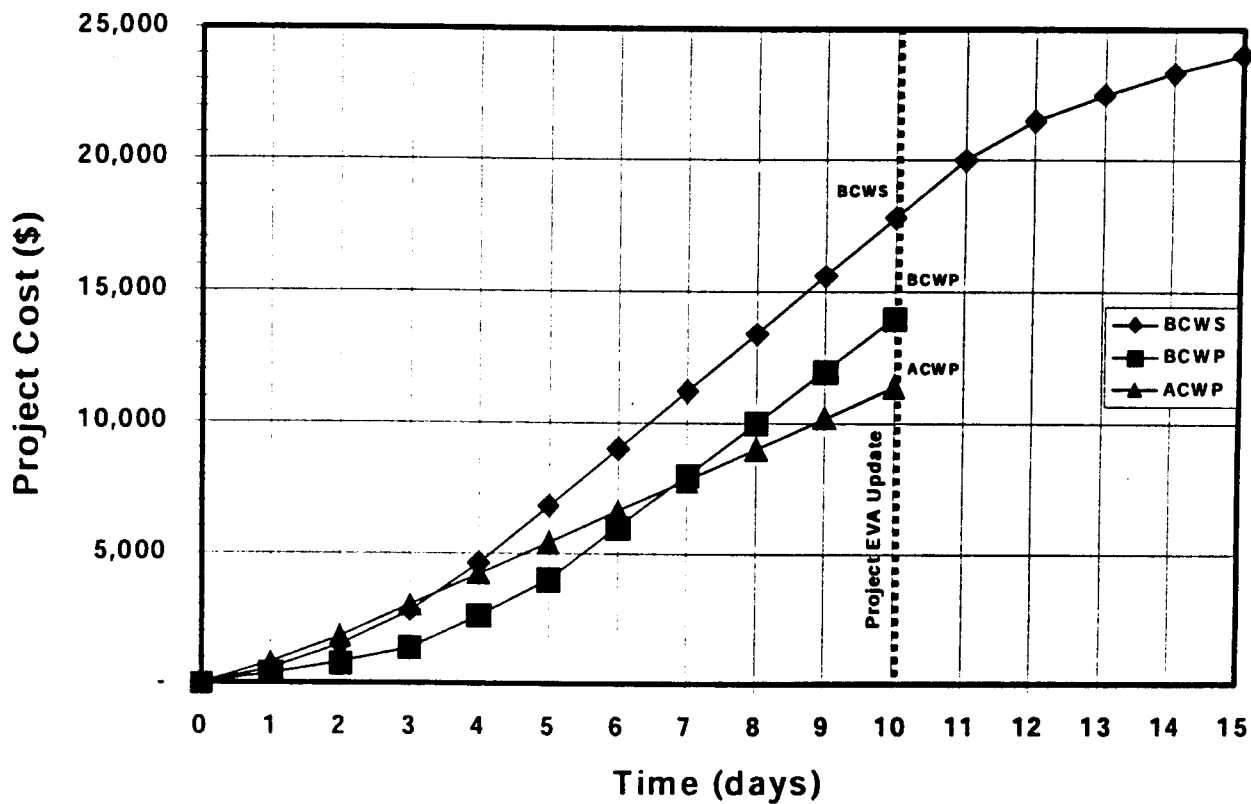
$$\text{CVAR} = 19,100 - 21,900 = -2,800$$

$$\text{CPI} = 19,100 / 21,900 = 0.872$$

$$\text{SVAR} = 19,100 - 17,800 = 1,300$$

$$\text{SPI} = 19,100 / 17,800 = 1.073$$

# Project Under Budget but Behind Schedule



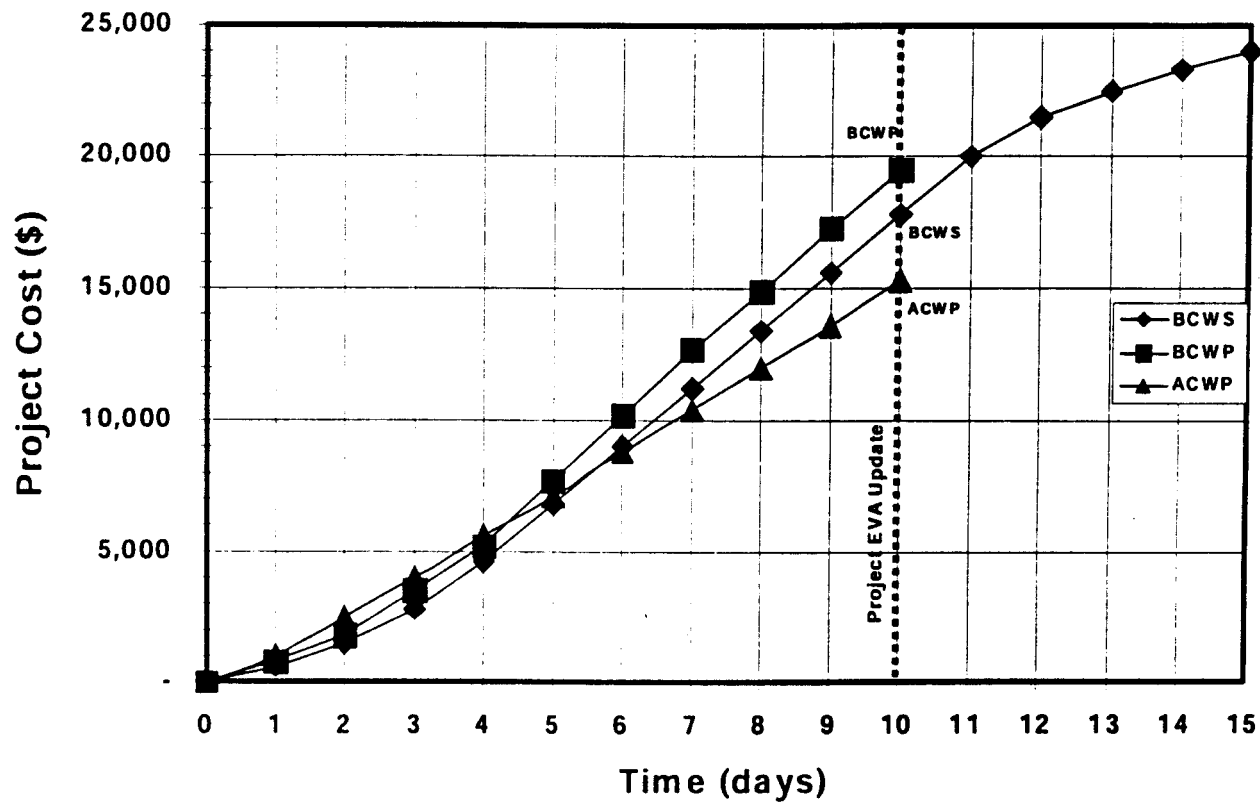
$$\text{CVAR} = 14,000 - 11,400 = 2,600$$

$$\text{CPI} = 14,000 / 11,400 = 1.228$$

$$\text{SVAR} = 14,000 - 17,800 = -3,800$$

$$\text{SPI} = 14,000 / 17,800 = 0.787$$

# Project Under Budget and Ahead of Schedule



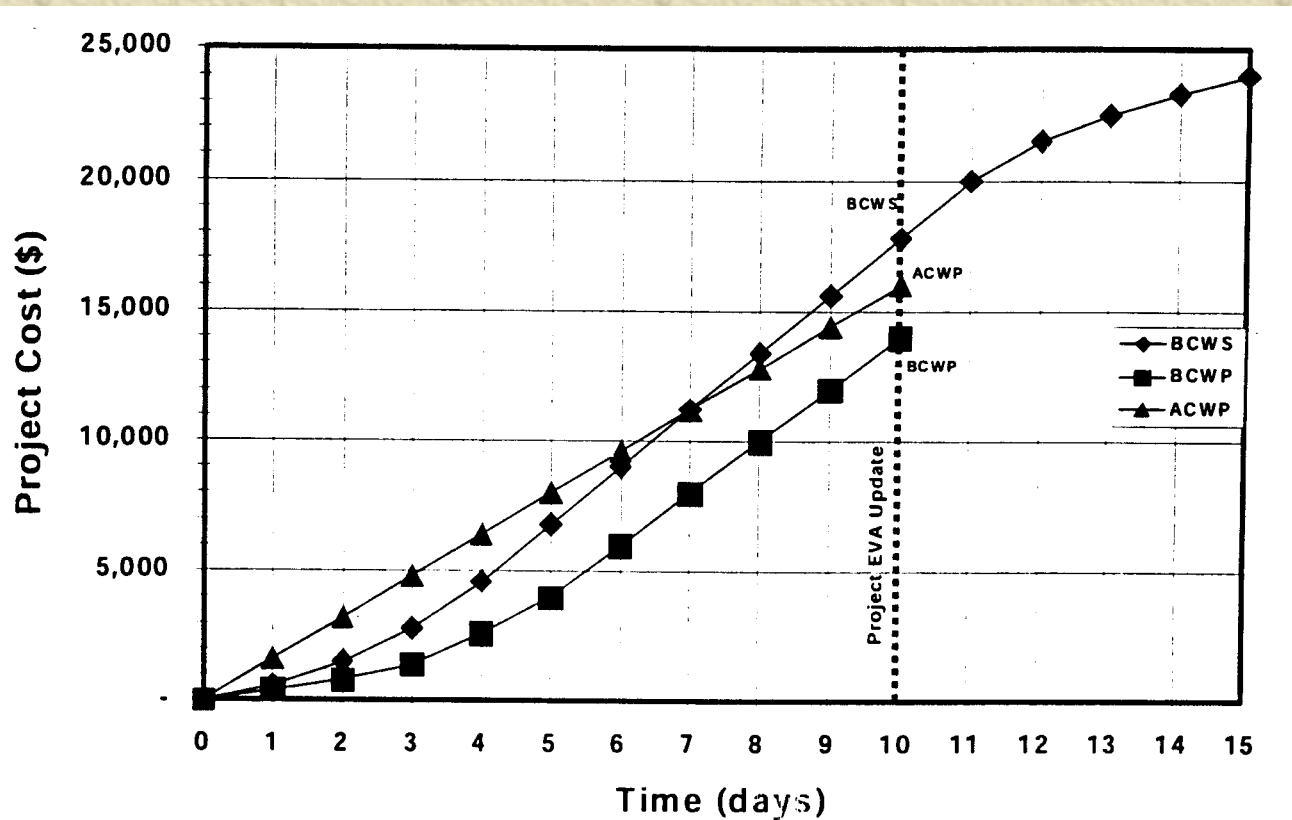
$$\text{CVAR} = 19,500 - 15,300 = 4,200$$

$$\text{CPI} = 19,500 / 15,300 = 1.275$$

$$\text{SVAR} = 19,500 - 17,800 = 1,700$$

$$\text{SPI} = 19,500 / 17,800 = 1.096$$

# Project Over Budget and Behind Schedule



$$\text{CVAR} = 14,000 - 16,000 = -2,000$$

$$\text{CPI} = 14,000 / 16,000 = 0.875$$

$$\text{SVAR} = 14,000 - 17,800 = -3,800$$

$$\text{SPI} = 14,000 / 17,800 = 0.787$$

# Project Variance Control Summary

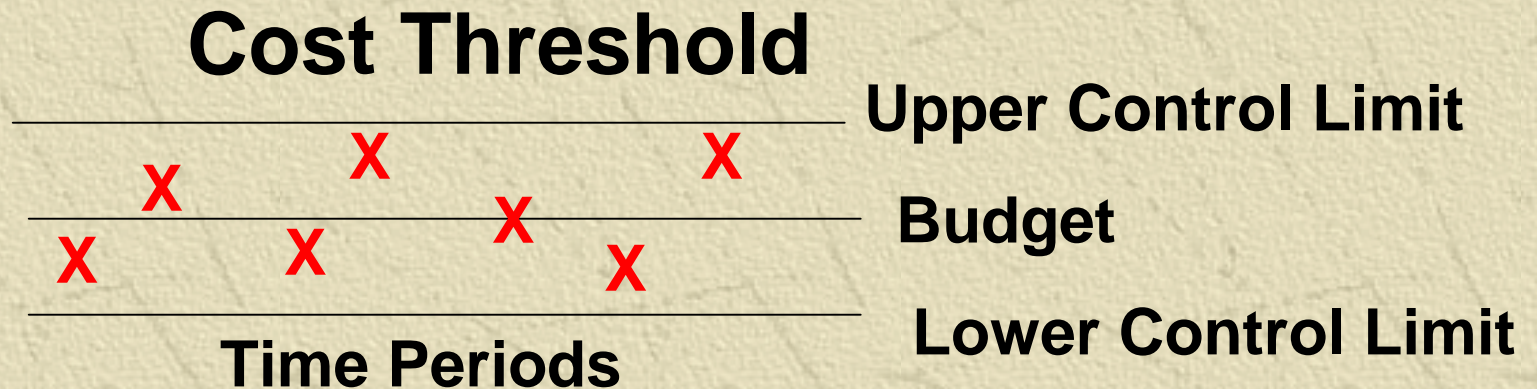
WBS	Budget (PV)	Earned Value (EV)	Actual Cost (AC)	Cost Var. EV-AC	Cost Var. %-CV/EV	Schedule Variance EV-PV	Schedule Variance % SV/PV	Cost CPI EV/AC	Schedule SPI EV/PV
1.0 Design	\$50,000	\$45,000	\$51,000	-\$6,000	-13%	-\$5,000	-10%	.88	.90
2.0 Foundation	\$110,000	\$105,000	\$90,000	\$15,000	14%	-\$5,000	-5%	1.17	.95
3.0 Framing	\$70,000	\$50,000	\$72,000	-\$22,000	-44%	-\$20,000	-29%	.69	.71
4.0 Finishing	\$35,000	\$51,000	\$38,000	\$13,000	25%	\$16,000	46%	1.34	1.46
Total	\$265,000	\$251,000	\$251,000	0	0	-\$14,000	-5%	1.00	.95

# Performance Index Matrix

	<b>CPI&lt;ONE</b>	<b>CPI=ONE</b>	<b>CPI&gt;ONE</b>
<b>SPI&lt;ONE</b>	worst case	poor	OK
<b>SPI=ONE</b>	poor	<b>Excellent</b>	good
<b>SPI&gt;ONE</b>	OK	good	suspect

# Project Cost Tolerance

## When to React?



eXpected value +/- tolerance

# Conclusion

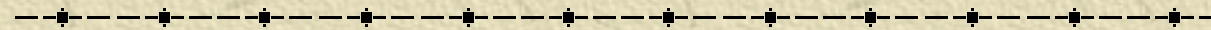
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**No procedure guarantee that you will avoid:**

- Estimating Mistakes
- Cost Overruns

*✓ To avoid estimating mistakes and cost overruns invest in a good Planning Process for Cost Estimating and Budgeting.*

# **COST MANAGEMENT FOR PROJECT MANAGERS**



By: José A. Rodríguez-López, P.E., PMP

