

# Earned Value Analysis: Lesson Plan

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## Key Variables - Example

A 1 year \$1,000,000 project is 8 months in, has completed 75% of work and spent \$800,000 to this point.

- Budgeted Cost of Work Scheduled – BCWS
  - $BCWS = \$1,000,000 * 8/12 \text{ months} = \$666,667$
- Budgeted Cost of Work Performed – BCWP
  - $BCWP = \$1,000,000 * 0.75 = \$750,000$
- Actual Cost of Work Performed – ACWP
  - $ACWP = \$800,000$

## Schedule Performance Index - SPI

- SPI Calculation:

$$SPI = BCWP / BCWS$$

- If  $SPI > 1$  Ahead of Schedule
- If  $SPI < 1$  Behind Schedule

Budgeted Cost of work performed = BCWP      Budgeted Cost of Work Scheduled = BCWS  
Actual Cost of work perform = ACWP

## Cost Performance Index - CPI

- CPI Calculation:

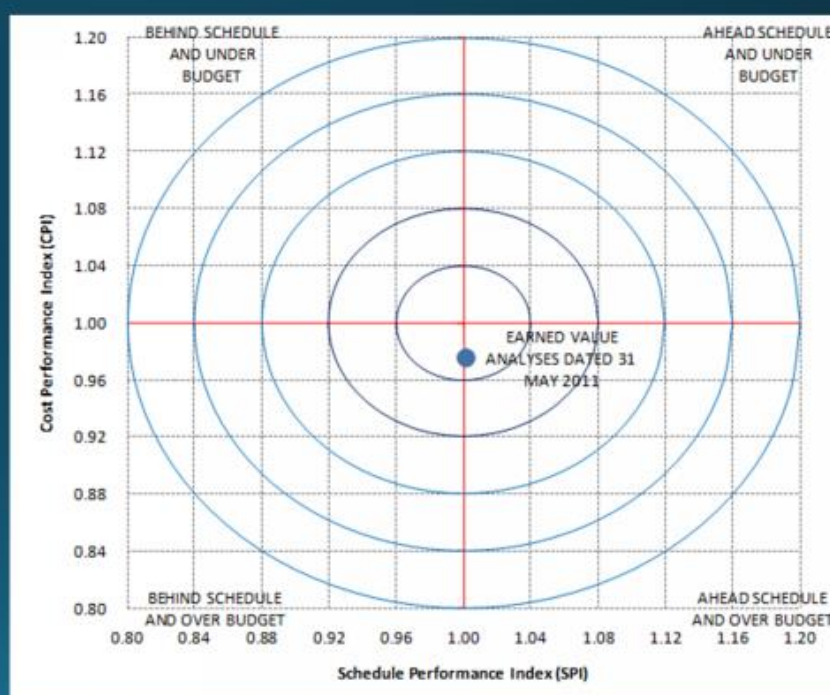
$$CPI = BCWP / ACWP$$

- If  $CPI > 1$  Under Budget
- If  $CPI < 1$  Over Budget

BUDGETED COST OF WORK PERFORMED = BCWP      BUDGETED COST OF WORK SCHEDULED = BCWS  
ACTUAL COST OF WORK PERFORM = ACWP

## Plotting CPI & SPI

- Top Right Quadrant = successful project
- Bottom Left Quadrant = Unsuccessful project

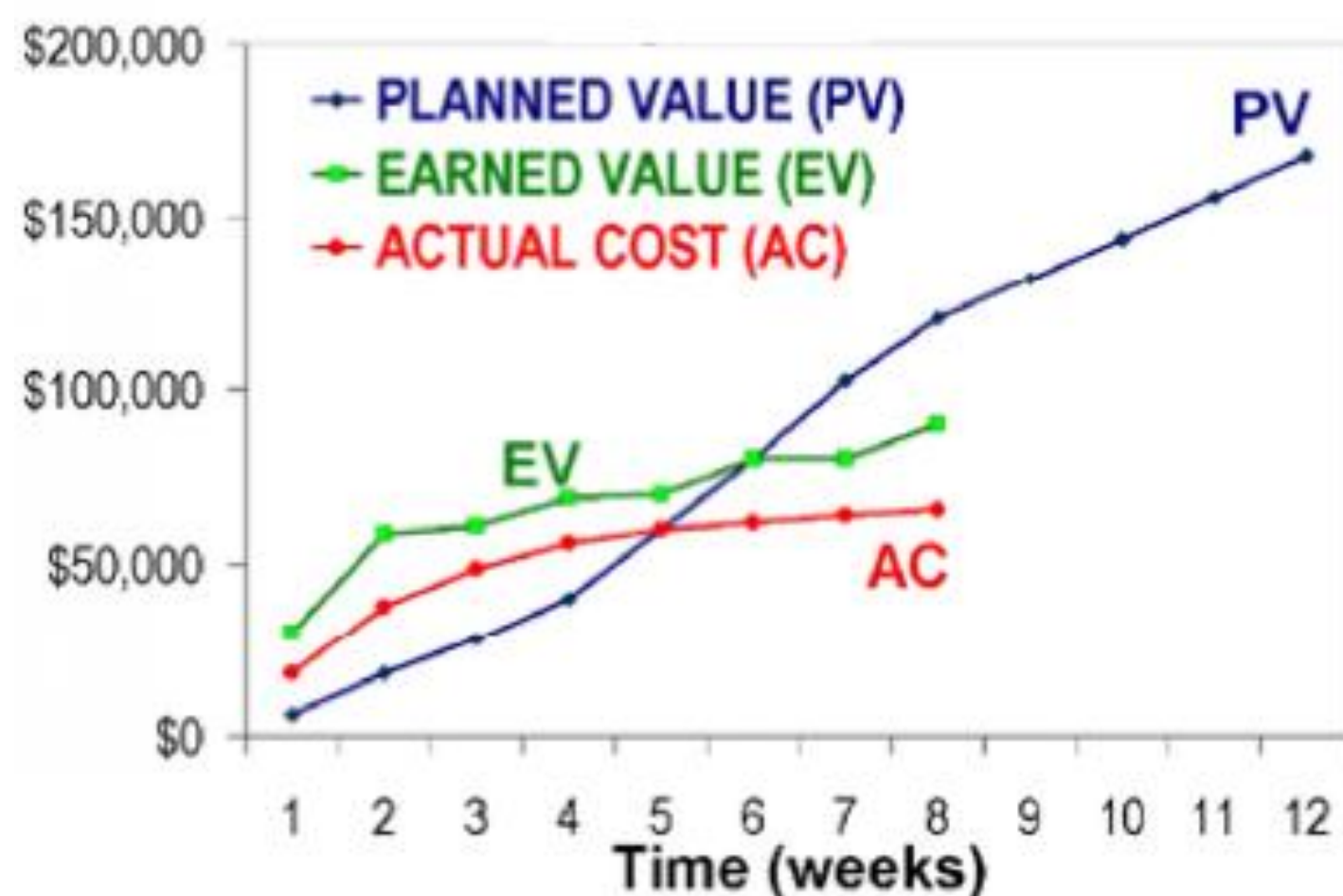


## Abstract

At California Polytechnic State University, in the Construction Management Department there is a need for a lesson plan which teaches students the concept of earned value analysis as it applies to construction projects. As many construction management students from Cal Poly go into industry and take part in complex projects, it will be beneficial to understand project management tools such as earned value. Earned value analysis focuses on two critical components, time and money, and how they compare to each other and the original estimated values throughout the duration of a project. Comparing the estimated values to actual values during construction provides variables to calculate the schedule performance index and cost performance index. These indexes give an accurate estimate as to if the project is ahead or behind schedule and over or under budget. Understanding how to apply these calculations will allow graduates to make timely decisions in the field to keep projects on schedule and on budget.

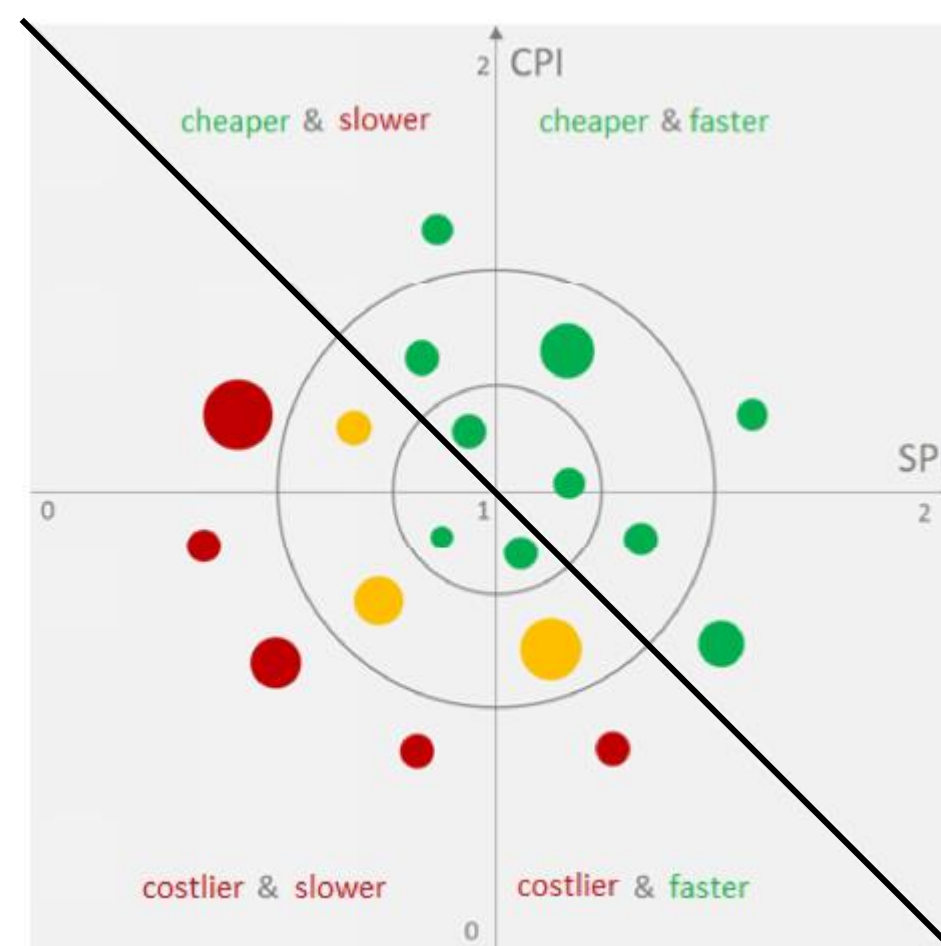
Key Words: Earned Value, Cost Performance Index, Schedule Performance Index, Forecasting, Project Management Controls

## Graph 1



Displays Variances

## Graph 2



Displays Ratios

## Planned Value (PV)

The amount budgeted to complete work scheduled by a specific date.

## Earned Value (EV)

The amount budgeted for the work actually performed, i.e., BAC multiplied by the percent complete.

## Actual Cost (AC)

The actual amount incurred for the work performed through a specific date.

## Earned Value Analysis Exercise

Individually apply Earned Value Analysis to your assigned Subcontractor for the SST Project

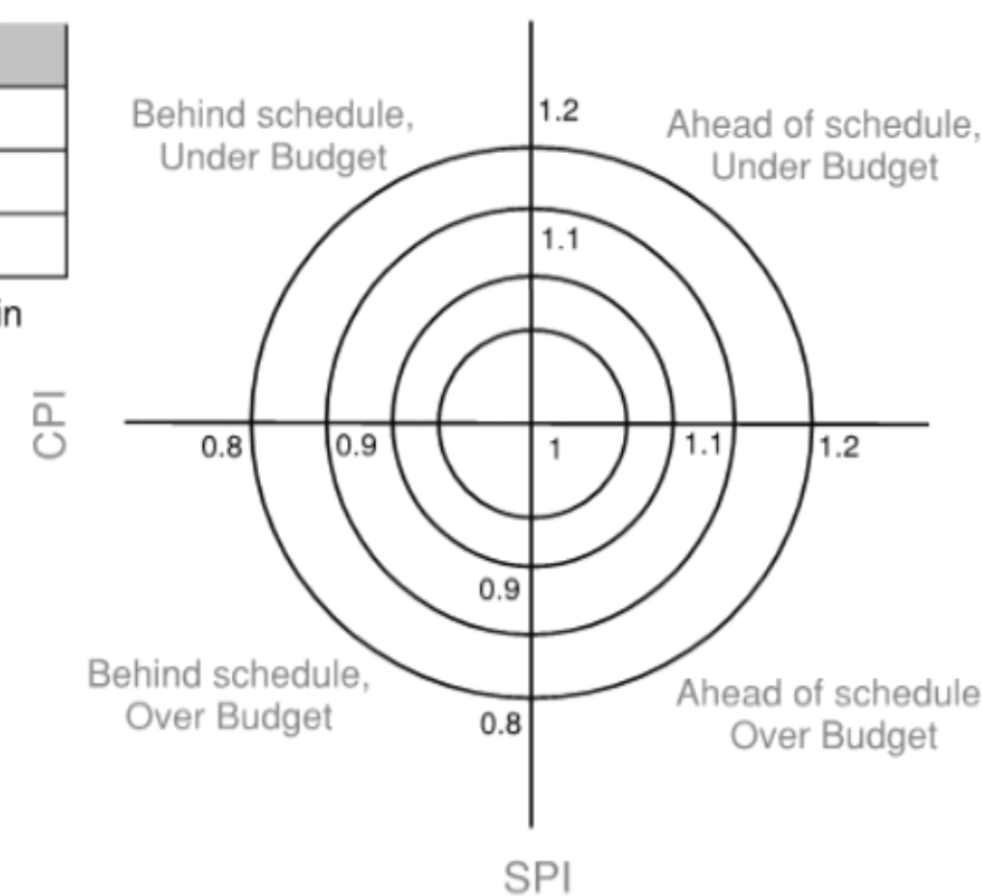
Given the following variables in Table 1, calculate the SPI & CPI values for Phases 1-3 and complete Table 2

Table 1			
Phase	BCWS	BCWP	ACWP
Phase 1	33%	36%	38%
Phase 2	53%	51%	48%
Phase 3	78%	80%	82%
Phase 4	100%	100%	

Terms  
BCWS: Budgeted Cost of Work Scheduled  
BCWP: Budgeted Cost of Work Performed  
ACWP: Actual Cost of Work Performed  
SPI: Schedule Performance Index  
CPI: Cost Performance Index

Table 2		
Phase	SPI	CPI
Phase 1		
Phase 2		
Phase 3		

Plot the SPI & CPI Values calculated in Table 2 above, on the graph the right.



Given the CPI from Phase 3, predict the amount over/under budget at project completion.

Given the SPI from Phase 3, predict the amount Ahead/behind schedule at project completion.