

### .....EMERGING PRACTICE.....

# Earned Schedule Workshop

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## **Required Legal Notices**





## Overview

• Overview of Earned Schedule

**Eleanor Haupt** 

- Validation Efforts
  Sue Cooper
- Common Questions
  Walt Lipke
- Resolution of Terminology

**Eleanor Haupt** 



## Traditional Definition Schedule Performance Index

#### **NOTIONAL DATA**



### calculated from budgeted cost



- Traditional schedule EVM metrics are good at beginning of project
  - Show schedule performance trends
- But the metrics don't reflect real schedule performance at end
  - Eventually, all "budget" will be earned as the work is completed, no matter how late you finish
    - SPI improves and ends up at 1.00 at end of project
    - SV improves and ends up at \$0 variance at end of project
  - Traditional schedule metrics lose their predictive ability over the last third of project
    - Impacts schedule predictions, EAC predictions
- Project managers don't understand schedule performance in terms of budget
  - Like most of us!



## SPI at the End of the Project





- Analogous to Earned Value
  - Based on time-phased earned value data (BCWS, BCWP)
- However, schedule performance is determined with time based metrics, not cost
  - Key concept: how much schedule did I earn on the BCWS curve?
  - Resulting metrics and variances are expressed in time units
  - Works for both conditions (ahead or behind schedule)
- Bridge between traditional EVM and integrated scheduling
  - Correlation requires certain data from integrated master schedule



### Determining Earned Schedule How Much Schedule Did I Earn?

- Earned Schedule = cumulative earned value in time units as established by the value of cumulative BCWP on the BCWS curve
  - Partial units of time are calculated
- Can be calculated graphically or with tabular data





## **Earned Schedule Metrics**

NOTIONAL DATA

### **SV<sub>t</sub> = Schedule Variance (time)**

- = Earned Schedule Actual Time
- = 6.1 months 9 months
- = -2.9 months

I should have earned 9 months, but have only earned 6.1 months

### **SPI<sub>t</sub> = Schedule Performance Index (time)**

 $= \underline{\text{Earned Schedule}} = \underline{6.1} = .68$ Actual Time 9





## Earned Schedule (tabular)

#### Earned Schedule = whole + partial months

= whole months (where BCWP  $\geq$  BCWS) + partial month = month X + (BCWP<sub>cum</sub> – BCWS<sub>x</sub>) / (BCWS<sub>y</sub> – BCWS<sub>x</sub>)

<u>Month</u>		<b>BCWP</b>	<b>BCWS</b>	
1	Feb 03	804	782	Note: ES becomes more
2	Mar 03	1,423	1,411	accurate if weekly FVM is
3	Apr 03	1,687	1,923	
4	May 03	1,886	2,510	useu
5	Jun 03	2,304	3,215	
6	Jul 03	2,751	4,127 🖣	- Earnad Sahadula - 6.2 montha
7	Aug 03	3,198	5,122	= whole months + partial month
8	Sep 03	3,801	6,229	= 6 + (4.257 - 4.127) / (5.122 - 4.127)
9	Oct 03	4,257	7,279	= 6 + .1
				= 6.1 months



## SPI<sub>t</sub> at the End of the Project





## **Benefits of Earned Schedule**

#### • Makes common sense!

#### Easier concept to grasp

Schedule variance metrics in terms of duration rather than \$

#### • More stable metric

- Retains trend until end of project
- Retains predictive utility
  - Use to predict duration
  - Can be used to improve EAC predictions
- Check of contractor's schedule realism

#### • Bridge between EVM and the integrated master schedule



### Validation Efforts



### **Common Questions**



## **Common Questions/Criticism**

Requires more data

FALSE - no new data required

Can't replace integrated schedule analysis

TRUE – this is a bridge

 Depends on good cost/schedule integration and EV measurement

TRUE – just like good EVM

• We have enough acronyms as it is!

TRUE – this is worth it!!

Straight lining of BCWS is inaccurate

TRUE – this is now minimized. See next charts.



### The Old Way – Turning SV\$ into Months



### Earned Schedule: The Concept



### Earned Schedule: The Concept



\$

### **Time Increment Interpolation**



### Interpolation Error



ES = Number of whole months (N) + increment on curve (I) = N + I

ES(calc) = N + calculated increment (F)

Error ( $\delta$ ) = F - I % error =  $\frac{|\delta|}{N+I}$ 

Example = .05 / 8.12 = .6%

As N ⇒ larger - % error ⇒ smaller - ES(calc) ⇒ more accurate

Wkly EV more accurate



## **Resolution of Terminology**

### New Terminology Parallels EVM Terminology

	EVMS	Earned Schedule
	Earned Value (EV)	Earned Schedule (ES)
Status	Actual Costs (AC)	Actual Time (AT)
	SV\$	SVt
	SPI	SPIt
Future Work	Budgeted Cost for Work Remaining (BCWR)	Planned Duration for Work Remaining (PDWR)
	Estimate to Complete (ETC)	Time Estimate to Complete (TETC)
	Variance at Completion (VAC)	Schedule Variance at Completion (SVAC)
Final Status	Estimate at Completion (EAC)	Time Estimate at Completion (TEAC) (supplier)
	Independent EAC (IEAC)	Independent Estimate at Completion (ITEAC)



## **Question for Discussion**

• TCPI-TEAC (To complete performance index – time estimate at completion)

VS.

- **TSPI** (To complete schedule performance index)
- Defined as: Planned Duration for Work Remaining (PDWR)
  Time Estimate to Complete (TETC)
- Parallels TCPI-EAC (commonly shortened to TCPI)
- Which term is more common, TCPI-EAC or TCPI?
- Which term is more descriptive, TCPI-TEAC or TSPI?



- Traditional EVM schedule metrics should now be annotated with currency units
  - Annotate with \$, yen, pounds, etc.
- SV becomes SV\$
- SPI becomes SPI\$
  - Recommend abandoning this metric