

Project Governance and Control Symposium
Canberra, Australia Capital Territory
14-16 August, 2018



Oklahoma and Earned Schedule

*** when ***

“Failure Is Not An Option”

...Many Times it Is Not A Choice



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Oklahoma



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Oklahoma City



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Alfred P. Murrah Federal Building



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Fireman and Bloody Child



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Memorial Anniversary Service



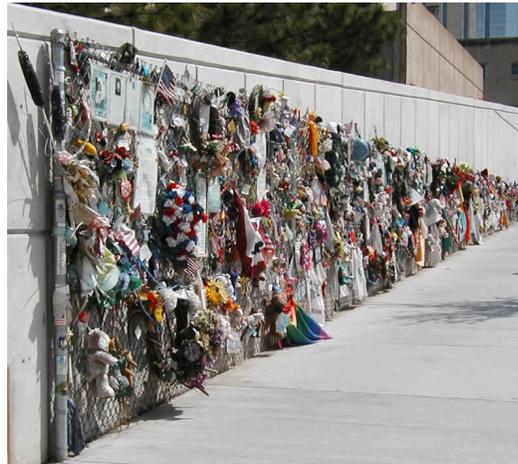
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Memorial Fence



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OKC Memorial Marathon



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OKC Marathon – Tara & Me



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Norman, Oklahoma



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University of Oklahoma



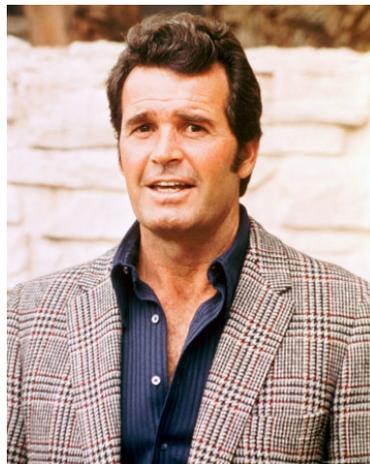
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James Garner



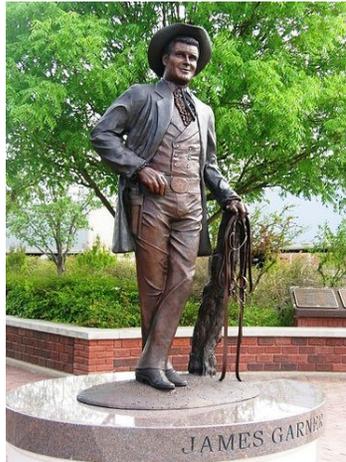
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James Garner Sculpture



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Monster Tornado



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Plaza Towers Elementary School



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Storm Chasers



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National Weather Center



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PGC Symposium

A screenshot of the PGC Symposium website. The header includes the PGC logo and the text "PROJECT AND PROGRAM MANAGEMENT SYMPOSIUM • Better Management • Better Projects" alongside the UNSW Canberra logo. A navigation menu contains links for HOME, ABOUT, ESSAY COMP, ACADEMIC RESEARCH, SUPPORTERS, LIBRARY, and CONTACT. Below the menu is a banner image showing various infrastructure and defense-related scenes. The main text reads: "2018 Project and Program Management Symposium - Plus Masterclasses - Defence Projects and National Infrastructure - Failure Is Not an Option". It includes a call to action: "Click through to the Symposium Website for more!" and the dates "14 - 16 August 2018". There are also sections for "PGCS 2017 Presentations are available for downloading:" and "Latest News" with a sub-heading "Registration open for eVa23 - London."

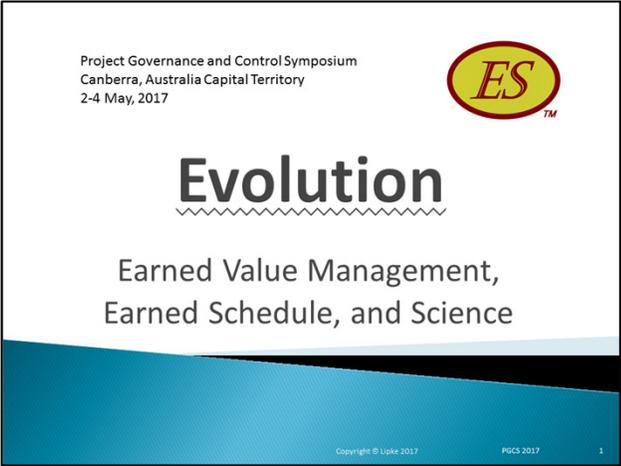
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PGCS 2017 - Keynote



Project Governance and Control Symposium
Canberra, Australia Capital Territory
2-4 May, 2017

ESTM

Evolution

Earned Value Management,
Earned Schedule, and Science

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Question 1

What was the impetus for creating Earned Schedule?

- a. Software Process Improvement
- b. Quentin Fleming
- c. Failure of EVM schedule indicators

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Quentin Fleming



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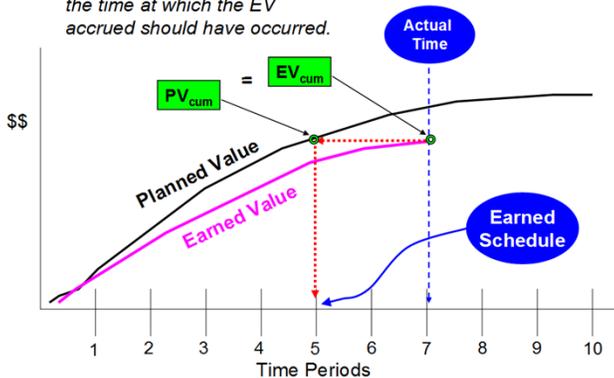
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Earned Schedule Concept

The ES idea is to determine the time at which the EV accrued should have occurred.



Time based schedule performance efficiency: $SPI(t) = ES / AT$

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EVM & ES Notation

Attribute	Earned Value Management	Earned Schedule
Accomplish	EV	ES
Plan	PV	
Actual	AC	AT
Variance	$CV = EV - AC$	$SV(t) = ES - AT$
Efficiency	$CPI = EV/AC$	$SPI(t) = ES/AT$
Forecast	$IEAC = BAC/CPI$	$IEAC(t) = PD/SPI(t)$
Prediction	$TCPI = (BAC - EV)/(EAC - AC)$	$TSPI = (PD - ES)/(ED - AT)$

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Question 2

Once the method became known, did Earned Schedule “catch on” immediately with the EVM community?

- Yes, ES was embraced and a movement began to replace the EVM schedule indicators
- There was some skepticism. Many believed more testing and prototyping was needed.
- No, ES was characterized as pseudoscience, ridiculed, and dismissed.

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The Measurable News Article

10 **THE MEASURABLE NEWS** MARCH 2005

Schedule Is Different

By Walt Lipke

Abstract

Earned Value Management (EVM) is a wonderful management system, integrating, in a very intriguing way, cost, schedule, and technical performance. It is a system, however, that causes difficulty to those just being introduced to its concepts. EVM measures schedule performance not in units of time, but rather in cost, i.e. dollars. After overcoming this mental obstacle, we later discover another quirk of EVM: at the completion of a project which is behind schedule, Schedule Variance (SV) is equal to zero, and the Schedule Performance Index (SPI) equals unity. We know the project completed late, yet the indicator values say the project has had ...perfect schedule performance! A senior executive receiving the project performance report, minimally knowledgeable of EVM, cannot understand why he has an angry customer screaming, "Your product delivery is late!" This paper discusses the dilemma with the EVM schedule indicators, SV and SPI. A method we are using to resolve the problem is presented in the paper. It is shown that the result from the method for schedule indicators having the same behavior as those for cost.

Within the Software Division at Tinker AFB we have used Earned Value Management (EVM) for several years. It has proven to be a tremendous aid to our project planning, tracking, and decision-making. And, the reporting methods of EVM serve as a good tool for communicating with management. Over the years, we have evolved our application of EVM. We now apply statistical techniques to predict project outcomes, and are using historical data for new project planning. To read the article on EVM use for software production

The Problem

To begin, reference Figure 2, Cost and Schedule Variances, and Figure 3, Cost and Schedule Performance Indexes. Note how the cost indicators (CV, CPI) behave, and then view the indicators for schedule (SV, SPI). The cost indicators behave differently from those for schedule. The cost indicators appear to establish a trend with some variation. Similarly, the schedule indicators initially appear to establish a trend, but eventu-

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PMI-CPM EVM Practice Standard

Inclusion of Emerging Practice Insert into PMI-CPM EVM Practice Standard

Dr. John Singley, VP of CPM, introduced ES in Box 3-1 of EVM Practice Standard

Describes basic principles of "Earned Schedule"

Provides foundation for acceptance as a valid extension to EVM

EVM Practice Standard released at 2004 IPMC Conference

Box 3-1: Time-Based Schedule Measures... An Emerging EVM Practice

In the current practice of EVM, schedule variance and schedule performance are both measures of work scope, not time. The work is represented by its budgeted cost as recorded in the performance measurement baseline. The EVSI schedule variance is the difference between work performed and work scheduled, and the schedule performance index is the ratio of work performed to work scheduled. For Project EZ, these measures indicate that work is not being accomplished as quickly or as efficiently as planned:

$SV = EV - PV = \$2 - \$4 = -\$2$ $SPI = EV / PV = \$2 / \$4 = 0.5$

If the work were to continue at this rate, then all of the work of Project EZ would take 18 months to accomplish instead of the 12 months planned ($12 / 0.6667 = 18$).

These SV and SPI measures are useful indicators and predictors of performance and results. But, because they are based on work and not time, they can behave in ways that are not normally expected of schedule indicators and predictors. The problem can be illustrated with Project EZ. Whether all of the work is completed as planned at 12 months or at 18 months as predicted by the four-month SPI of 0.67, it will be completed eventually and at that time the work-based schedule variance and performance index will indicate perfect performance. For when the work is completed, $EV = PV$, and so $SV = 0$ and $SPI = 1.0$. This is fine if the work is being accomplished according to plan, but problematic if it is not. If Project EZ does take 18 months, SV will nonetheless equal 0 and SPI equal 1.0, when it's clear that Project EZ is 6 months late and averaged only 67% efficiency.

There is an emerging practice in EVM, which uses time-based measures of schedule variance and schedule performance as an alternative or supplement to the traditional work-based measures. This new method avoids the problems of the work-based method illustrated above. Whereas the traditional work-based method compares work performed and work scheduled at 0 to a point in time, the time-based method compares the actual time with the planned time for the work performed. In the case of Project EZ, the work performed after four months ($AT = 4$) had a planned time of three months ($PT = 3$) (refer to Figures 2-6 and 2-7). In a manner that parallels the use of AC and EV in traditional EVM, practitioners are beginning to use actual time (AT) and planned time (PT) to compute SV and SPI:

$EVBSV = AT - PT = 4 - 3 = 1 \text{ month}$ $EVBSPI = AT / PT = 4 / 3 = 1.33$

While the work and time-based methods provide comparable results at the four-month point in Project EZ, look at the difference at project completion after 18 months:

$EVBSV = AT - PT = 18 - 12 = 6 \text{ months}$ $EVBSPI = AT / PT = 18 / 12 = 1.5$

$EVBSV = EV - PV = 160 - 160 = 0$ $SPI = EV / PV = 160 / 160 = 1.0$

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Forecasting & Prediction

- Forecasting
 - Forecast Duration \Rightarrow $IEAC(t) = PD / SPI(t)$
 - Completion Date = Start Date + Forecast Duration

- Prediction
 - Efficiency needed “To Complete” or “To Go”
 - Formula \Rightarrow $TSPI = (PD - ES) / (xD - AT)$
 where $xD = PD, ED, ND$

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Question 3

Choice	ES Forecasting	ES Prediction
	Does the structure of the schedule affect duration forecasting accuracy?	Can project failure be reliably predicted, regardless of structure?
a	No	No
b	No	Yes
c	Yes	Yes
d	Yes	No

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Schedule Management Quotes

- ▶ “Engineering problems will first manifest themselves in a schedule slip someplace. Generally, as I have learned since then, if you have a technical problem someplace, or some kind of a problem, it will manifest itself first as a schedule slip. Then, it will eventually become a cost problem. If you wait to see the cost problem, something has already happened over which you have long since lost control (emphasis added). I always believed in the old adage, ‘Time is money’; but if you could control the schedule, you could in fact control the cost ultimately in what was going on.”

Lt Gen “Whitey” Driessnack, USAF
GAO Expert Meeting Minutes, 29 Sep 2015

- ▶ “We need to maintain our attention on schedule delivery. Data tells us that since July 2003, real cost increase in projects accounted for less than 3 percent of the total cost growth. ...Therefore, our problem is not cost, it is SCHEDULE!”

Dr. Steve Gumley, CEO
Defence Materiel Organization (Australia)
DMO Bulletin, July 2006, Issue 61

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Question 4

Is managing schedule performance the best way to assure project success and avoid failure?

- Yes – Driessnack indicates when schedule is well managed, cost will fall in line.
- Yes – Gumley says lack of schedule control is the main driver of cost increases.

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Success Components

Two components play a significant role in having successful schedule execution and a successful project

1. Quality of the planning
2. Learning from past project performance

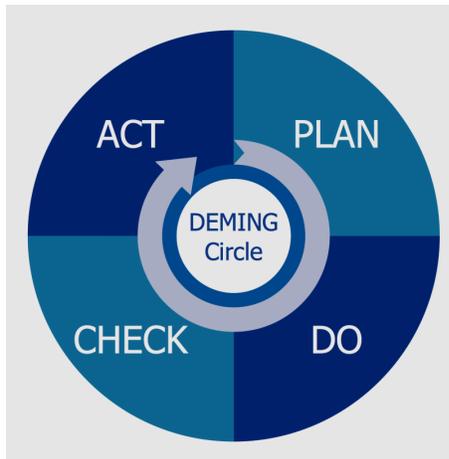
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Deming Circle



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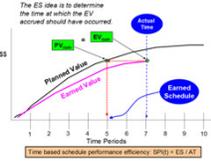
In Closing....











The ES idea is to determine the time at which the EV accrued should have occurred

Time based schedule performance efficiency (SPI) = EV / PV

- "Engineering problems will first manifest themselves in a schedule slip somewhere. Generally, as I have learned since then, if you have a technical problem somewhere, or some kind of a problem, it will manifest itself first as a schedule slip. Then, it will eventually become a cost problem. If you wait to see the cost problem, something has already happened over which you have long since lost control (emphasis added). Always believed in the old adage, 'Time is money', but if you could control the schedule, you could in fact control the cost ultimately in what was going on."
- LI Gen "Whitley" Driscoll, USAF
GAD Expert Meeting Minutes, 29 Sep 2015
- "We need to maintain our attention on schedule delivery. Data tells us that since July 2003, real cost increase in projects accounted for less than 2 percent of the total cost growth... Therefore, our problem is not cost, it is SCHEDULE!"
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Defence Materiel Organization (Australia)
DMO Bulletin, July 2006, Issue 61



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