Earned Value and Schedule Variance

My compliments to Wayne Turk for his article "EVMS for Dummies" in the September-October 2007 issue of *Defense AT&L*. His explanations and suggestions go a long way towards simplifying a valuable but often poorly understood tool.

I do take issue with Mr. Turk's example on page 25, in which he states:

The project is to lay four miles of railroad track. The schedule says it will be done in four months and the cost will be $4 million. If, after two months, only $2 million has been spent, how is the project doing? There is no way to tell. You need one more piece of data—how much work is complete. We'll say that one mile of track is complete. Here's how you calculate.

- *With the givens of the project (4 miles, 4 months and $4 million), the EV is 1 mile of track = $1 million.*
- *Planned work remaining: $3 million (3 miles of track)*
- *Schedule variance: $1 million (1 mile of track complete) minus $3 million (work remaining) = $2 million (variance)*
- *The project is 66% behind schedule.*
- *Cost of the work remaining = $2 million*
- *Cost variance: $1 million (work completed) minus $2 million (money spent so far) = $1 million (variance)*
- *100% overrun*
- *Your estimate at completion: $8 million and 4 months late.*

In other words, this project is in deep trouble. Like too many projects, it is over budget and behind schedule.

Unfortunately, there isn't enough information to determine if we're hitting our schedule goal or not. To calculate that, we would need to know how much work was supposed to be completed by the second month. While the example seems to assume (but does not explicitly state) that two miles of track should be laid by the second month, it might be equally true that only one mile of track was expected to be laid. Imagine a case in which the first two months involved grading the entire four miles before laying the first mile of track. With the pre-work done, the rate of track construction could increase in order to complete the last three miles of track in the remaining two months. Without knowing how much work was scheduled to be completed, we cannot calculate schedule variance (SV).

Even if we knew how much work was scheduled to be completed, the formula used to calculate SV is incorrect. Let's assume that we planned to complete two miles of track by the second month. In the example, the schedule variance is calculated as:

- *Schedule variance: $1 million (1 mile of track complete) minus $3 million (work remaining) = $2 million (variance)*

This indicates that by building one mile of track when I should have built two, I have fallen behind by two miles of track. My performance may not be very impressive, but it's not quite as bad as that yet!

The standard formula for SV used by government and industry (OMB Circular no. A-11, Part 7) is

- *SV = Work accomplished minus work planned*

or

- *SV = Budgeted cost of work performed (BCWP) minus budgeted cost of work scheduled (BCWS)*

Assuming I was supposed to complete two miles of track (EV = $2 million) by the second month, this formula would give me:

- *Schedule Variance = $1 million (1 mile of track complete) minus $2 million (work remaining) SV = negative $1 million (variance)*

Since negative variances are generally bad news, it appears that I'm one mile of track/one month/$1 million behind schedule.

In real life, this would be the beginning of our inquiry. When examining schedule variance, we should also look at the integrated master schedule, which will help us understand what work we're behind on and whether it will cause an overall delay in project completion.

Investing a little time in understanding EVM can add a vital tool to your program management toolbox. I appreciate Mr. Turk's article and hope this small note can contribute just a bit more.

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The author responds: *I stand corrected. Professor Lee is right. In trying to keep things simple, I used a single formula for all of the variances. While this formula was what I was taught years ago, it can give you some erroneous information when it comes to schedule, as he pointed out. My apologies for any confusion that it may have caused, and my thanks to Professor Lee for providing the correct formula.*

The PM and the Work Environment

"So You're a Program Manager" by Alexander Slate [*Defense AT&L*, September-October 2007] is a very good article. He is so correct when he says the PM is "responsible for supplying the environment." This includes the ethical environment. It is so important that the PM strive to be truthful and responsible to the citizens. I lived through the Darlene Druyun days and found the environment to be very demotivating and full of cynicism.

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