Courtesy of:
Scitor Corporation
256 Gibraltar Drive • Sunnyvale, CA • 94089
800/533-9876

Measuring the Value of Work Accomplishment

Part Two: Can I use EVA if I don't collect actual cost data?

Author's Note: This is the second in a series of articles on practical applications of the Earned Value Analysis concept. We will address common issues and misunderstandings about EVA and provide examples of very simple and practical uses of this extremely valuable tool.

Popular EVA Misconceptions

There are three popular misconceptions about the application of Earned Value Analysis. We need to shoot them down right now, as they are clearly inappropriate. These misconceptions are:

1. *EVA is meant to be used on government or aerospace/defense type of projects, only.*
2. *EVA is a cost-based performance measurement system. If I do not collect cost data then EVA is of no use to me.*
3. *EVA is a very sophisticated process, requiring a laborious implementation by dedicated project management experts.*

Each one of these common beliefs is wrong, and I can prove it from my own experiences during the past 40 years. Perhaps the best way to dispel these erroneous beliefs is to describe a successful project that I worked on in the early '80's. On this project, we had several challenges to maintaining control over the work effort. First of all, about 90% of the work was to be performed by a subcontractor. Also, we would not have a critical path schedule and there would not be any measurement of project costs (within the subcontract portion). Rather than submit to the inevitable and just hope for the best, the lack of these planning and control vehicles motivated the team to seek an alternate method of monitoring project progress.

A Project Example

The project involved the installation of a new telephone system at a plastics processing plant. The company (through their internal Telecommunications Division - my employer) was installing a main switch and redoing its 5000-line voice and data system. The company (we'll call it Plastico) had contracted with a phone system installer to do most of the work. The subcontractor (we'll call them FoneCo) agreed to a fixed-fee contract and a firm cut-over date. Plastico notified the local telephone company (telco) that the plant would be moving over to its own main switching system on the cut-over date. As the start of the contract work approached, the plant manager suddenly got nervous. Here we were, in the hands of a fixed-price subcontractor (resisting giving any information about how the job was planned or priced) and if the work was not done as scheduled the plant could end up without telephone service.

After initial resistance, we worked out a reasonable compromise with FoneCo. Together, we identified all of the work and put a weight factor on each work item. The weight factor was based on the approximate effort for each item, so that, in effect, the weight factor served as a "budget" for each work item. The sub refused to prepare a critical path schedule, and we agreed that the nature of the work was that the order of execution was too flexible to be cast in concrete. Instead, they agreed that work would be accomplished at an even pace over the twenty week project, essentially progressing at about five percent per week.

Setting Up a Simplified Work Accomplishment Monitoring System

When FoneCo showed up to start the job, we were concerned that they did not have sufficient manpower to execute the work on time. But they retorted that this was not a matter for our concern. They reminded us

that they had a firm price and that it was up to them to manage the work as they saw fit. We reminded them that they had also committed to a firm date and that it was our business to make sure that the date was met.

While each party was protective of their contractual obligations, the Plastico project manager and the subcontractor's PM had developed a cordial relationship and wished to work together to have a successful project. So they agreed to walk the plant each Friday afternoon, and to note the progress for each work item on the task list that had been prepared earlier. Some tasks were marked as complete, getting credit for 100% of the budget (weight factor). Other tasks were noted as in progress, getting credit for a percentage of their BAC (Budget at Completion - in this case, the task weight factor). After completing the tour, they added up the various BCWP's (the Budgeted Cost of Work Performed) and arrived at a project earned value. In this case, the BCWP did not involve cost (despite the nomenclature) but represented the product of the percent complete times the weight factor (Earned Value [BCWP] = %C * Weight Factor [BAC]). For example, let's look at a task, having a weight factor (BAC) of 20, and consisting of making 500 splices at a splice box. , If 200 splices had been completed that Friday, then the BCWP or earned value is 200/500 times 20 = 8.

Traditional Earned Value Computation Process

I'll pause here for a moment to describe the traditional EVA process, although what we used in the Plastico job was even simpler. For example: Let's say that there were four items on the list, which were scheduled for effort during the first week.

Task 1	BAC = 1000	BCWS = 1000	%C = 100
Task 2	BAC = 1000	BCWS = 750	%C = 50
Task 3	BAC = 1500	BCWS = 1000	%C = 50
Task 4	BAC = 500	BCWS = 250	%C = 0

The BCWS (Budgeted Cost of Work Scheduled) is the value of the effort that was scheduled to be completed as of the end of the measurement period. We can use this to compare the actual work accomplished to the planned accomplishment.

When we take the %C and multiply it by the BAC, we get the earned value (BCWP).

Task 1	BAC = 1000	BCWS = 1000	%C = 100	BCWP = 1000
Task 2	BAC = 1000	BCWS = 750	%C = 50	BCWP = 500
Task 3	BAC = 1500	BCWS = 1000	%C = 50	BCWP = 750
Task 4	BAC = 500	BCWS = 250	%C = 25	BCWP = 125

If we sum these numbers we get a BCWS (the planned accomplishment) of $3000, and a BCWP (the actual accomplishment or earned value) of $2375. In this example, you can see that work is proceeding at about 80% of the plan.

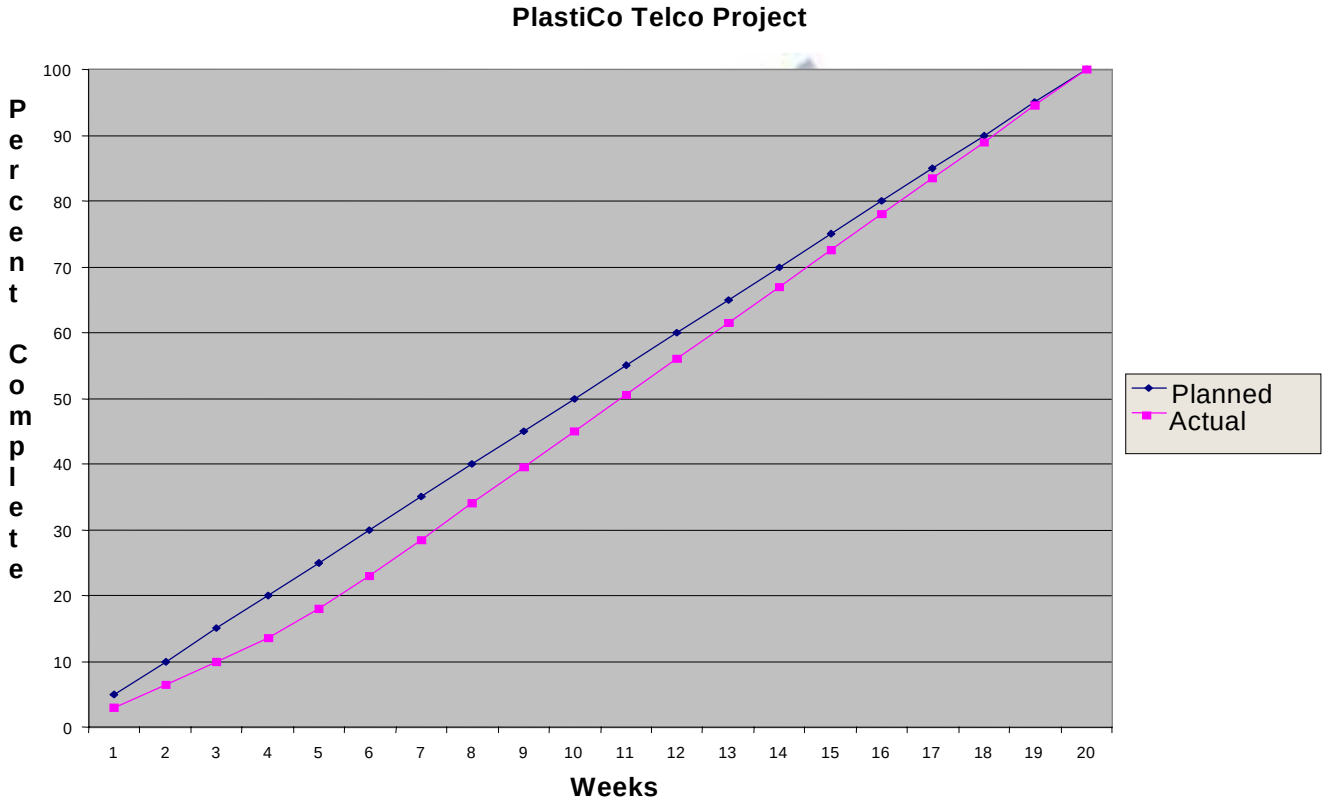
A Slow Start

Getting back to the telco project, at the end of the first week, the composite BCWP totaled 3%, as against the 5% target. When confronted with the bad news, FoneCo admitted that they were a bit slow to start , but promised that they were now up to speed. At the end of week two, the project BCWP was 6.5%, against a target of 10%. Our facilities manager suggested that the crew size be increased, but, again, the subcontractor resisted. This time he cited a problem with some tooling, that had been corrected. "Not to worry" was the reply".

But on week three, the actual accomplishment totaled only 10 % (against the target of 15%) and it was obvious that the subcontractor was losing ground. At the weekly review session, the FoneCo manager still protested the claim that he did not have sufficient manpower on the job, but agreed that he would take corrective action if the next week's measurement didn't show an upturn.

Facing Reality

At the end of week four, the earned value came to 13.5%, indicating a fairly constant rate of accomplishment that was only 70% of plan (3.5% per week vs. 5% per week). At the next weekly review, the subcontractor walked into the meeting and quickly reported that an additional crew was on the way. With the additional people on the job, the ongoing measurements showed an upturn to about 5.25% to 5.5% actual accomplishment per week, and the project was soon back on target for the cut-over date.



I am fully convinced that, without the simple planned accomplishment vs. actual accomplishment routine that was worked out by the two parties, that the project would gone into panic mode toward the end and would have missed the end date. This was a most rudimentary use of the earned value concept. It did not even require any use of cost measurements, and in no way compromised the subcontractor's wish to maintain control over the effort and silence over detailed costs.

A Simplified, Value-based Accomplishment Index

All that was required was a list of the work to be done and a weight factor for each item. If a task schedule has been prepared, the system will compute the planned effort (BCWS). But, as you can see from the above example, we were able to use the EVA practice without an item by item schedule, substituting a planned

rate of overall accomplishment. With the weighted task list, all that was needed was a periodic status of percent complete. Computers will do the rest. A traditional CPM program will have all of the EVA capabilities built in. But if you don't use one, any spreadsheet program can easily be set up to do the job. Of interest to visitors to this website are the new capabilities available in Scitor's PS8 and PC-Objectives. They have added a unique **Value Performance Index** method, which provides a means of entering weight factors for EVA (instead of using costs or hours). The VPI can also be applied to selected work items or milestones (rather than to every line item).

Basing Progress Payments on Actual Accomplishment

There is another advantage to what was done on the telco job that is worth mentioning. Making a weekly earned value measurement provided the data for an accurate and equitable progress payment. Rather than paying the subcontractor a fixed periodic payment, we were able to pay only for what was actually accomplished, based on the weekly BCWP, and the sub couldn't argue with the amount because they participated in the measurement. Many companies have actually started writing contracts that call for progress payments based on measured earned value.

Debunking EVA Misconceptions

This experience should serve to support my hypothesis that:

1. EVA can be used effectively on other than government or aerospace/defense type of projects.
2. EVA can be used effectively even if you do not collect cost data.
3. EVA applications can be ridiculously simple and do not require the employment of dedicated project management experts.

The benefits of EVA are available to a wide population for a broad spectrum of applications. Such benefits include monitoring project progress toward key completion dates, and more accurate progress payments.

Next month, we'll look at managing changes to the project workscope. Do such changes invalidate the EVA?

Harvey A. Levine, with 38 years of service to the project management industry, is founder of **The Project Knowledge Group**, a consulting firm specializing in PM training, PM software selection, evaluation & implementation, and PM using microcomputers.

He has implemented or enhanced the project management capabilities of numerous firms, often combined with the selection or implementation of computerized project management tools. Mr. Levine is considered the leading consultant to the project management software industry and is recognized as the leading expert in tools for project management.

He has been an Adjunct Professor of Project Management at Rensselaer Polytechnic Institute and Boston University. And has conducted numerous project management public seminars for ASCE, AMA, IBM, and PMI.

Mr. Levine is the author of the book "Project Management using Microcomputers", and has been published extensively in other books, periodicals and videos.

Mr. Levine is a past president of the Project Management Institute and the recipient of *PMI's 1989 Distinguished Contribution to Project Management* award. Recently, he was recently elected as a *Fellow of PMI*.

Mr. Levine has offices in Saratoga Springs, NY and San Diego, CA and can be contacted via e-mail at: LevineHarv@cs.com