



Measuring Work in Progress



The key to EVM is the objective assessment of [Work in Process](#). Work is either completed, in process or not yet started. Completed work represents work packages that have been closed, the budget has been earned and progress has been reported. Future work will not be measured until the work begins. The only work packages that require performance measurements are those in process at the end of the reporting period. Short work packages can minimize the work process measurement problem. The longer the work packages, the more difficult it is to determine the actual status of the work and more work packages will be in process at any given point in time.

There is essentially no work process measurement problem associated with a work package that is less than one month in duration and which is planned to be finished before the end of the accounting period. The job is either finished or it isn't. If it is finished, its value is earned. If it is not finished, a schedule variance will occur because the budgeted value for that work will be reported, but that value will not have been earned. In addition, a cost variance will show up if costs have been recorded for the work.

At the conclusion of this lesson, you will be able to identify [methods](#) to measure project performance consistent with EVM Guidelines (EIA-748) and common practice.

Work in Process

A unique characteristic of an EVMS-certified management system is the requirement to objectively assess progress for work in process.

Methods

In this lesson you will read about the following methods or techniques to measure work in progress

1. The 0 - 100 Method
2. The 50/50 Method
3. The Value (or Budgeted) Milestone Method
4. The Completed or Equivalent Unit Method
5. The Level of Effort (LOE) Method
6. The Apportioned Effort Method



Measuring Work in Progress, Cont.

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0 - 100 method

Used for short duration work packages that plan to start and finish within a single reporting period. If work is completed as planned within the period 100% of the budgeted value is "earned", if work is not completed within the period 0% of the budgeted value is earned in that period.



50-50 and Value Milestones

Obviously, all work tasks do not fall out so neatly. Tasks frequently span several reporting periods and may begin and end at various times during the month. In such cases, more sophisticated measurement techniques are necessary. A work package, for example, that spans two reporting periods might employ another technique, such as the **50-50 approach**. This technique simply means, "plan 50% of the budget when the task is scheduled to start and the other 50% when it is scheduled to be completed, and earn value on that same basis when the job is actually started and is actually completed." This technique will provide both an indication of whether or not the job started on schedule and whether or not it was completed on schedule.

For work packages that extend over several months, an approach that involves the use of [Value Milestones](#) is commonly used. For example, a work package spans five months in duration and it does not make sense to break it down into two separate work packages. Two or three milestones could be identified within the task to serve as progress indicators, and values, either in terms of individual budgets or percentages of the total work package budget, can be assigned. When a milestone is achieved, the budget associated with that milestone is earned. At least one milestone per reporting period is desirable. However, the milestone events must be clear, objective indicators of physical progress to be effective. In essence, each milestone takes on the characteristics of a work package, but separate work authorization documents are not needed, thus reducing paperwork in the system.

Value Milestones

An objective indicator within a work package that can be used for measuring progress of work and determining earned value. It has a described scope of work, accomplishment criteria, assigned budget and schedule.



Equivalent Unit

Where a series of units or products is being fabricated, counting completed items and earning the budget associated with each completed unit is a simple approach. An equivalent unit technique can also be used. For example, if it takes 100 operations to fabricate an individual unit, and a total of 300 operations have been accomplished, three equivalent units have been earned, even though no complete units may have been produced.

These examples could go on and on ad infinitum. The important point to be made is that earned value measurement techniques should be adopted that will provide the most objective indicators of work performed and the more they can be based on physical accomplishment, such as completed products, the better. The methods used will vary depending on the types of work involved, time durations, output products and other factors. The control account manager (CAM) should determine which technique is most appropriate for each individual work package.



Figure 8-1: Control Account Plan

TASK	BUDGET	EARNED VALUE TECHNIQUE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	200	50-50		100		100									
2	300	BUDGETED MILESTONES		50	75	100	75								
3	100	0-100					100								
4	450	UNITS COMPLETE				150	150	150							
5	45	APPORTIONED EFFORT				15	15	15							
6	205	LEVEL OF EFFORT		10	20	20	30	30	20	20	20	20	10	5	
7	675	PLANNING PACKAGE							125	125	125	125	125	50	
8	525	PLANNING PACKAGE							100	100	100	100	100	25	
CONTROL ACCOUNT BUDGET - 2500			MONTH	0	160	195	285	370	195	245	245	245	245	235	80
			CUMULATIVE	0	160	355	640	1010	1205	1450	1695	1940	2185	2420	2500



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Figure 8-1 illustrates a control account plan that employs a variety of planning and measurement techniques.



Rolling Wave

Measuring performance is relatively straightforward for production and construction activities because there are so many discrete indicators of accomplishment. Examples include, available units completed, feet of cable pulled, manufacturing operations performed, etc. In large scale design and engineering development, the problem is more difficult and both detailed planning and performance measurement are harder to accomplish. It is not surprising that engineers want as much flexibility as possible to permit exploration of different concepts and approaches and a requirement to lay out a detailed plan may be resisted. Consequently, a [rolling wave](#) planning process is often used; i.e., planning the overall effort to a certain level, such as the control account, and progressively planning to the detail level as the work proceeds, trying to stay several months ahead with the detail planning.

Because it is more difficult to get an objective indicator of work accomplished for development work, the work package concept takes on more importance. In fact, the original concept of work packaging was advanced as a means of getting a reasonably objective measurement of development activity. Previous measurement techniques were either based on managers' estimates of percent complete or were the result of trying to estimate how much work was left to do. Neither technique worked satisfactorily as both produced subjective, overstated, optimistic pictures of program performance most of the time.

Rolling Wave

The term rolling wave is used to describe how managers make very detailed plans for the work packages that will be executed within the next few months, and use less detailed (sometimes referred to as Planning Packages) plans to describe the work that will be accomplished several (maybe 6 or more) months in advance. As the program progresses, and time marches on, the planning packages "mature" into detailed work packages. This rolling wave planning suggests the cycle of establishing planning packages for far term work, then maturing the plans in these packages as the packages approach the time they are to be executed.



Measuring Performance Knowledge Review

A unique characteristic of an EVMS-certified management system is the requirement to objectively assess progress for this phase of work.

- Work not started
- Work in process
- Work completed
- Work cancelled

Correct. A unique characteristic of an EVMS-certified management system is the requirement to objectively assess progress for work in process.



End of Lesson

You must click the **Next** button in order to receive credit for this lesson.