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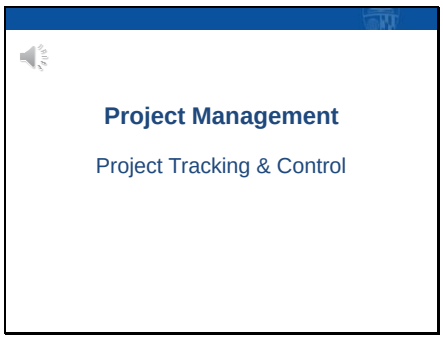

In this lecture we'll discuss project tracking & control.

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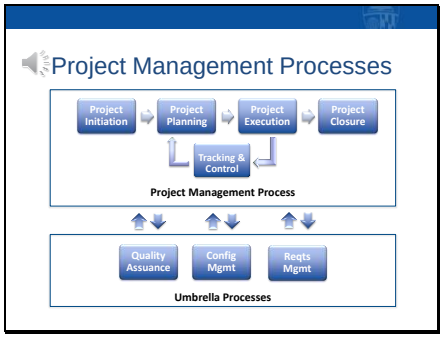

In this lecture we're going to talk a bit about project tracking and control. As you can see from the diagram, project tracking and control is one of the fundamental project management processes.

So what exactly is project tracking and control? It's the process of tracking actual project progress against planned progress and enables management to take corrective actions, if necessary. It also provides project stakeholders visibility into the project's progress.

Let's take a look inside the tracking and control process.

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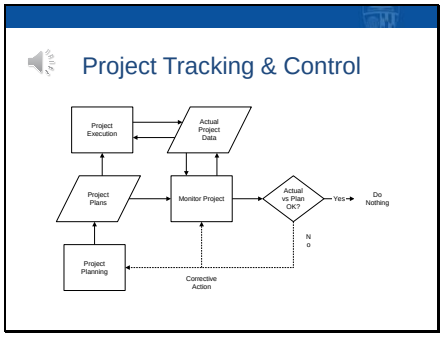

Here's a diagram that illustrates what goes on in the project tracking and control process.

As a project takes place over time…the project execution process…project data is periodically collected and analyzed. By project data I mean things like time charged to the project by the project team, whether project tasks and milestones have been completed, and so forth.

If the actual data shows that the project is progressing according to plan, nothing needs to be done by management except perhaps to report the results to stakeholders. If things aren't progressing according to plan, then management needs to take some corrective action. Corrective action usually results in making

changes to the project plan…like adding additional staff, re-estimating costs and schedules, executing change control mechanisms, or mitigating any risk items that need attention.

The key to being able to track actual progress relies on having the appropriate time collection and reporting mechanisms in place and being able to compare actuals against the plan…and most project management tools will have the functionality to permit inputting of actual data and then calculating and displaying various measures of progress.

This process continues across the entire duration of the project.

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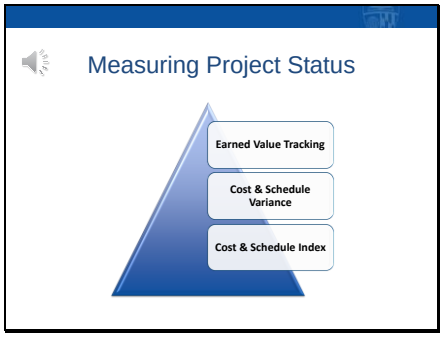

So…how is project progress actually measured?

There are a number of ways to measure project status. Many professional project managers will use something called earned value tracking, cost and schedule variances, and cost and schedule indices.

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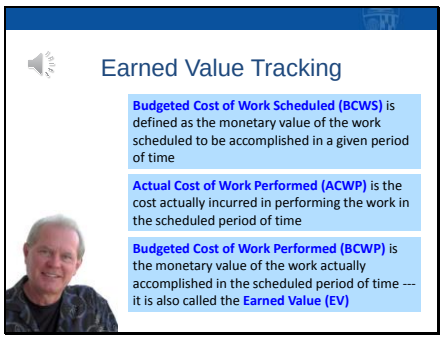

Some organizations report progress simply by comparing actual data for tasks and comparing it to the planned data. For example, if 50 percent of the planned effort for a task has been incurred at the end of a reporting period, it is not uncommon to report that the task is half finished. In reality, this may be misleading, because it's just a measure of charged time to planned time. The reality might be that the task effort was underestimated and it might actually take 150 percent of the planned effort to complete the task. The earned value technique is designed to provide more meaningful measures of true progress.

In software engineering, a task is given earned value credit only when the entire task is completed or a milestone associated with the task is completed…regardless of how much effort has been incurred on the task.

Earned value tracking uses three variables: the budgeted cost of work scheduled, the actual cost of work performed, and the budgeted cost of work performed…which is the earned value.

The budgeted cost of work scheduled is the monetary value of the work scheduled to be accomplished in a given period of time. In other words, it's what is scheduled to happen.

The actual cost of work performed is the cost actually incurred in performing the work in that time period.

The budgeted cost of work performed…or earned value…is the monetary value of the work that is actually accomplished in that time period.

Please note that incurred and accomplished mean different things.

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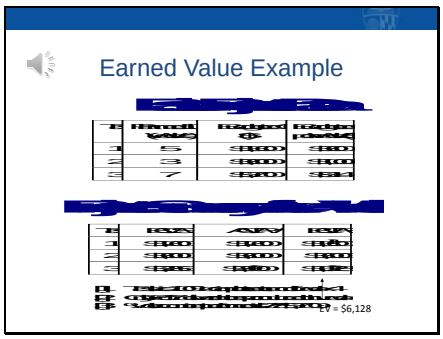

Let's take an example to see how earned value tracking works.

The first table illustrates part of our project plan. It contains the planned duration of three project tasks, their budgeted costs, and the budgeted costs per week.

The second table contains actual project data four weeks into the project. The budgeted cost of work scheduled is computed from the project plan data and appears in the first column of the table. For example, task one is scheduled at a cost of $300 per week, so its budgeted value after four weeks is $1200. Similar computations are made for tasks two and three.

The second column in the table contains the actual costs incurred during the four week period. Let's assume that task one was completed by the end of week four…it was completed ahead of schedule. At $300 per week, the actual cost of work performed is $1,200. The earned value, however, is the full amount of the planned cost for this task…$1,500. Task two was completed on schedule, at the end of week three, so its earned value at the end of week 4 is the original budgeted cost of $3,000.

Task three had 7 deliverables associated with it. Only 2 of those deliverables were actually produced by the end of week four, but a cost of $2,900 was incurred through the end of week four, so the actual cost of work performed is $2,900. Since only 2 milestones were delivered, the earned value for task 3 is 2/7 of the budgeted cost of $5,700…or $1,628.

So…what does this tell us? It tells us that task 1 was completed ahead of schedule, task 2 was completed on schedule, and task 3 is running behind schedule…and will likely result in a cost overrun as well.

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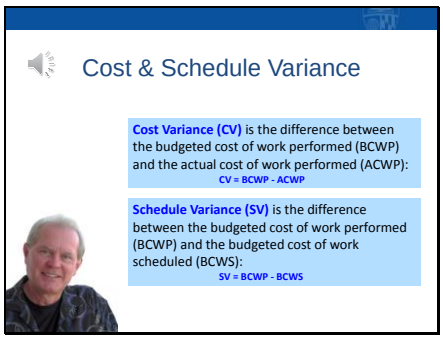

Cost and schedule variance are absolute measures that indicate the deviations between planned performance and actual progress, in monetary units.

Cost variance is the difference between the budgeted cost of work performed (the earned value) and the actual cost of work performed. A positive cost variance indicates that a task or project is ahead of plan. A zero cost variance indicates things are on plan, and a negative cost variance indicates things are over budget.

Schedule variance is the difference between the budgeted cost of work performed (earned value) and the budgeted cost of work scheduled. A positive schedule variance indicates that things are ahead of schedule, a zero value indicates on schedule, and a negative value indicates things are behind schedule.

Let's take a look at an example.

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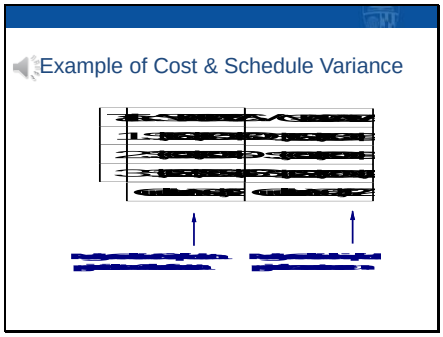

For the project data we looked at earlier, this table shows the computation of cost and schedule variance four weeks into the project.

When looked at task by task, we can see that task one is finished ahead of schedule, task two was right on schedule, and task three is behind schedule.

The variances can be summed to get variance measures for the entire project. The project is behind schedule and over budget, earned-value-wise. Now…in terms of schedule, does this mean that the project will actually finish behind schedule? It depends. If task three is on the critical path then yes. If it is not on the critical path then it will depend on whether it falls behind schedule enough to change the project's critical path.

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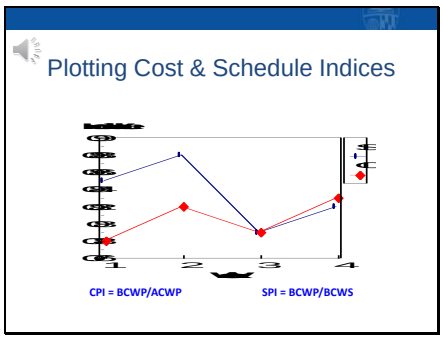

Additional measures that are sometimes used in tracking project progress include plotting the cost performance index and schedule performance index values over time.

The cost performance index is the ratio of earned value to the actual cost of work performed. The schedule performance index is the ratio of the earned value to the budgeted cost of work scheduled. This chart shows the two indices plotted over the first four weeks of our sample project…using values for the entire project.

Performance index values greater than one indicate that things are ahead of plan, a value of one indicates things are going according to plan, and a value less than one indicates over budget or behind schedule.

In this lecture I provided a quick summary of project tracking and control, and a simple overview of the earned value technique. There can be many more moving parts associated with earned value tracking. In the federal contracting arena, for example, government agencies often require that extensive earned value tracking and reporting be implemented on many projects.