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How to Use Earned Schedule

Earned Schedule is a variant of Earned Value which we believe to be very applicable in schedule forecasting. As a relatively new method it is not yet fully approved by all practitioners and Bodies of Knowledge. However because the approach is simple and sound, as well as easily understandable by team members, we do recommend to use it to challenge schedule forecasts rather than Earned Value.

Earned Schedule has been formalized in 2004 by Walter Lipke and further developed in his book '*Earned Schedule*'. It is still not accepted as a mainstream tool, but does make some inroads into codes of practice. Conceptually it is a simple development of Earned Value Management and appears to produce much more stable indicators, in particular when Projects are subject to substantial delays compared to the baseline. We promote Earned Schedule as a reference because if its practicality.

Warning: Earned Schedule must be applied on a set of activities that is consistent in terms of drivers and resources. The application at a low level such as the Work Package level or some consistent subset of the Work Breakdown Structure is thus the most relevant. Application to more aggregated data sets needs to be accompanied with far more caution.

Objectives of Earned Schedule

At any point during the Project, Project Managers must have access to the information that allows them to answer two basic questions:

- Is the Work Package currently ahead or behind schedule and, if so, by how much? (we will refer to this as determining the Project schedule variance.)
- If the project continues according to the current trends, when will it be completed (determining the schedule completion date forecast)?

Why Using Earned Schedule

Contrary to Earned Value, Earned Schedule does not require alignment between cost breakdown structure and schedule breakdown structure. It is sufficient to have a properly weighted schedule. However, if Earned Value management is expected to be used for cost analysis and forecast at the same time, such alignment is required – refer to our Cost Control Handbook.

While Earned Value Management works very well in the case of cost, it is more difficult to apply in the field of schedule, for the following reasons:

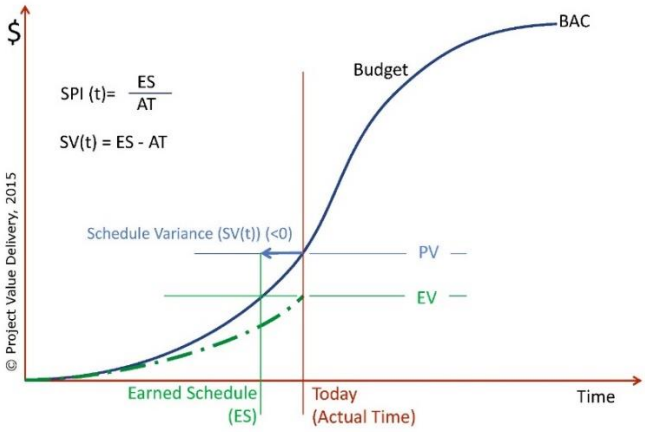
- The schedule variance SV is measured in the same units as the cost variance, monetary units such as dollars. This is not easy to translate into actual tangible time delays,
- The schedule productivity ratio SPI is proven to be unstable in particular for projects that get significantly delayed – after the initial completion date is passed, SPI will converge back to 1 and will not really measure the actual schedule productivity. It must thus be used with care.

Usage of conventional SV and SPI is thus not recommended.

Earned Schedule provides a more tangible and stable schedule productivity measurement compared to Earned Value.

Earned Schedule Basics

Earned Schedule intends to remedy these drawbacks by introducing a more straightforward approach. A new measurement is introduced, which is called the 'Earned Schedule' (ES). The Earned Schedule is what the time in the project should have been as per the initial plan to reach the current progress (or Earned Value). The concept is shown on the following figure.



New schedule variance and productivity measurements can then be introduced. The Schedule Variance SV(t) is the difference between the Earned Schedule and the Actual Time: SV(t)=ES-AT, expressed in time units, while a new schedule productivity ratio is

$$SPI(t)=ES/AT$$

For example, in practical terms, let us suppose that the Actual Time is 6 months into the project. We have earned a value of 10,000$; and we were supposed to have earned such an amount only 4 months into the project as per the initial plan, ES=4 months, and SV(t)=-2 months, SPI(t)=4/6=0.67.

We have presented Earned Schedule under the same format as Earned Value to show familiar graphs and compare the two methods. In reality we do not need to measure the Earned Value in monetary terms to apply Earned Schedule. Properly weighted percentage progress is sufficient and adequate. To use the same example (supposing the initial budget is 40,000$), we can write the same sentence as: Actual Time

is 6 months into the project. We have earned 25% progress and we were supposed to have earned such an amount only 4 months into the project as per the initial plan, ES=4 months, and SV(t)=-2 months, SPI(t)=4/6=0.67. Hence, the Earned Schedule method does not require any monetary valuation of Earned Value – as long as the progress measurement framework is consistent and properly weighted.

Studies have shown that these measures SV(t) and SPI(t) are more representative of actual schedule productivity, and they are also more stable during project execution than the conventional Earned Value Management measures. They should be preferred when it comes to measure schedule productivity.

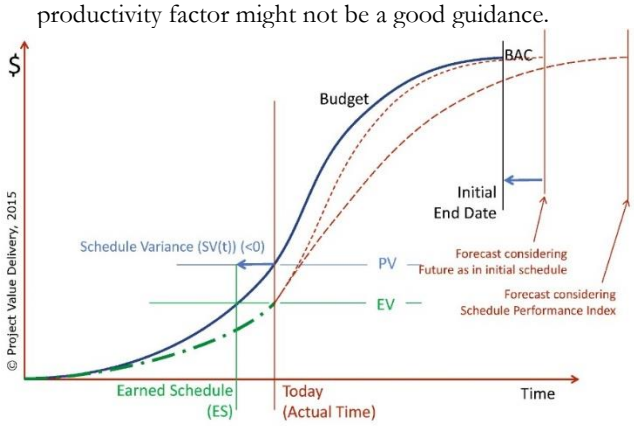
Using Earned Schedule for Forecasting

Once you have evaluated the Schedule Variance of the Work Package to determine its status, the next question is "what will be the final duration of my Work Package?" As in cost Earned Value, there are different ways to forecast.

- The optimistic way is to consider that anything that hampered progress in the past is resolved and that the future activities will be as per the initially planned productivity. The final delay of the project will be the current delay.
- The pessimistic way is to apply the current measured schedule productivity SPI(t) to future activities as well, forecasting the completion date accordingly.

Studies of hundreds of Projects have shown that Project performance rarely tends to improve. In fact, once a Project passes the 15%-20% completion point, performance almost never surpasses the average performance to date, and often gets worse. Exceptions concern cases where specific issues impeded the start of the project, which have safely been removed.

As a minimum, the observed productivity factor, which is in fact the Schedule Performance Index SPI(t), should thus be applied to the future work to build a forecast of the completion of the Work Package. However, this view is generally only valid for the portion of the progress between 20 and 80%. The duration of the final progress beyond 80% must be considered separately, as the productivity factor might not be a good guidance.



For the complete Project, the activities on the Critical Path have more importance than others. Hence Earned Schedule must be applied on the Critical Path activities; as well as on sub-Critical Path activities to check that they won't become critical. Usage of Earned Schedule is thus more difficult and needs to be considered with care.

These Earned-Value based forecasts provide a broad guidance and a rough forecasting model that can give useful orders of magnitude, in particular to challenge Budget Owners with observed productivity factors compared to the initial plan. However, whenever possible, reference to the actual root causes and issues faced by the Work Package will give a better insight into the mechanisms for performance and will result in a more reliable forecast. In all cases, it is from the observation of the actual issues faced that the Budget Owner will be able to revise its forecast.

Conclusion

Earned Schedule provides a more tangible and stable schedule productivity measurement compared to Earned Value. As such it is a very useful tool to use by the practitioner to measure schedule productivity and challenge completion dates accordingly.