

FinanceWeek

Schedule risk analysis Part 3: The cumulative probability distribution curve

In the third and final part of his series on schedule risk analysis, George Sifri shows how a decision maker can assess when a project will finish.

The cumulative probability distribution curve enables the decision maker to assess the probability of completing a project within a specific duration (forward curve). In the scenario shown in figure 6, the base case duration (100 working days) has about 26% probability. In other words, there is a 26% probability of completing the project within duration of 100 working days.

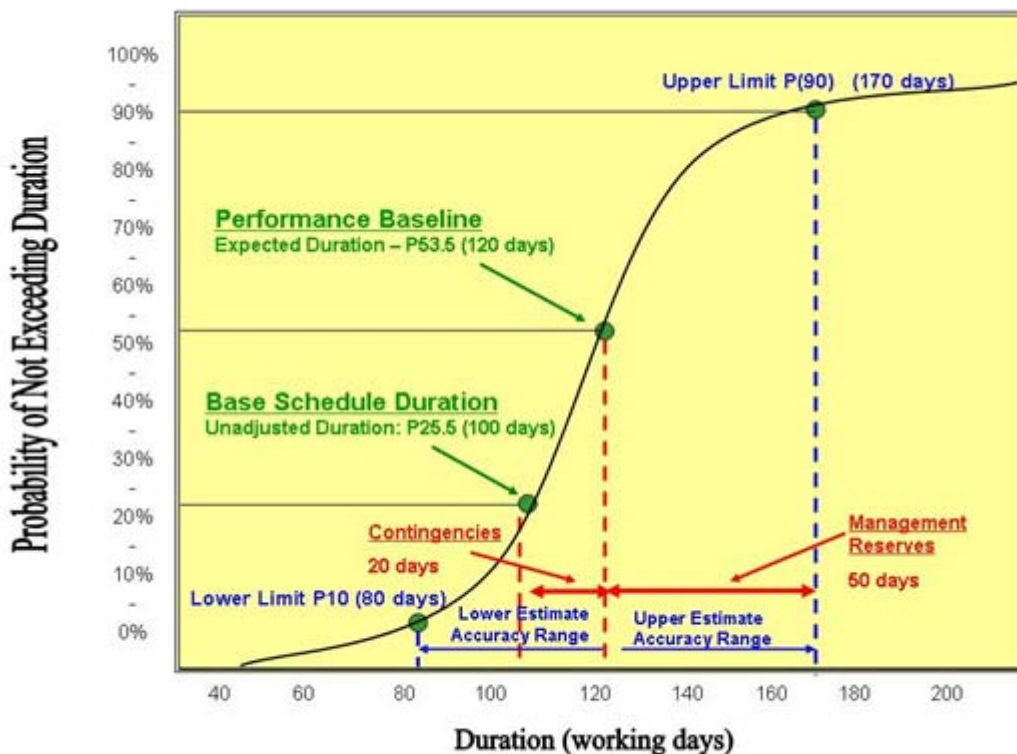


Figure 6: Cumulative Probability Distribution Curve – Project Duration

In many organisations, the project performance baseline is set at the expected value. In figure 6 this is 120 working days and has probability of approximately 54% of being achieved. The difference between the expected value and the unadjusted base case is called "contingencies" or "unallocated provisions". These are under the control of the project manager and are designed to accommodate for the inherent uncertainties that we have in the estimates. We know from experience that we will use them, but we do not know at this point in time in which activities. They are not designed to deal with changes in scope. The project manager needs to make sure that the scope of the contingencies – what is included and what is excluded – is clearly defined and agreed upon between the key stakeholders.

You may have to re-evaluate the project itself

Management reserves, sometimes referred to as additional unallocated provisions, are under the control of upper management. If the project manager requires more time beyond the contingencies, he/she needs to raise a request for more time and gets the approval of upper management before having access to management reserves. Under no circumstances should the total duration of the project go beyond the P90 duration without re-evaluation of the business case of the project to check if it is still attractive. In figure 6, the project has a 90% probability of being achieved within duration of 170 working days. In many organisations, they refer to this point as the "Not to Exceed" duration.

As for the accuracy of this estimate, we can say that there is an 80% probability of completing the project within

duration 80 and 170 working days. If the decision maker is not satisfied with this range, then he may request more work to be done in the areas of technical definition and project execution planning in order to lower the uncertainty.

The schedule risk analysis process and the cost risk analysis process are highly interdependent. To ensure that your schedule and cost performance baselines are consistent:

1. Perform the schedule risk analysis process
2. Identify the resources that are needed to bring the probability to the expected duration
3. Add these resources to the base case of the cost estimate
4. Conduct the cost risk analysis process as described in the previous series

Good practices

The following are good practices that are used in constructing the schedule model:

- The risk is the risk to the plan, so spend time getting the plan right.
- Make sure that you go through a proper risk management process as discussed in the previous series.
- Keep networks as small as possible. Fifty to two hundred activities is usual the target depending on the size of the project.
- No detail for detail sake. Make sure that you have the appropriate level of detail for managing and controlling the project.
- Think about the critical and near-critical path(s). The critical path may change. We need to keep an eye on the near-critical path (within -10% of critical path(s) duration).
- No imposed constraints. The start and the end dates should be based on duration and network logic, not imposed. You are doing this to find out what's possible.
- Finish to start relationships. Hard {FS} is better than soft {SS, FF}
- Watch out for really long tasks.
- Model significant lags and leads as activities. This will allow you to incorporate uncertainties associated with lags and leads. For example, waiting time for getting a working permission from the government.
- Make sure that the people involved in doing the work are providing input. This helps visibility, understanding and buying-in.
- Make sure that you always have one start node (milestone) and one finish node. This will help with checking network integrity.
- Do not use "in progress". This just adds confusion; instead, enter the estimate to complete duration.
- Model the start of the project as an activity so that you can incorporate uncertainty in the starting date and assess its impact on the project duration.

Summary

Schedule and cost risk analysis are two highly-linked processes. The schedule and the cost are based on a specific scope of work. The schedule is based on a specific set of assumptions concerning scope, productivity, project calendars, availability of resources, data sources, etc. These assumptions should be documented in the schedule basis document. The integrity of the base case schedule should be ensured through a comprehensive schedule review. The schedule risk analysis process is not designed to compensate for a low quality schedule.

About the author

A certified Project Management Professional, Dr. George Sifri delivers project management courses on five continents for some of the largest corporations in the world. He is also an instructor for ESI International (www.esi-emea.com), a global training consultancy.

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