

An Oracle White Paper
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More Realistic Estimating: Separating Risks and Opportunities from Uncertainty

Executive Overview

In this white paper, an example is used to illustrate the benefits of using the risk register in Oracle's Primavera Risk Analysis. These benefits include improved understanding, planning, communication, negotiation, and risk mitigation and management. This document also shows how using a risk register can eliminate undue pessimism in scheduling estimates.

Introduction

To make the most realistic estimates, companies use Primavera Risk Analysis—a full lifecycle risk analytics solution integrating cost and schedule risk management. Using the risk register feature in Primavera Risk Analysis allows you to make more-detailed risk assessments of activities in your projects.

If you do not use a risk register in your risk assessments, you are limited to describing risk using simple three-point estimates. Although this is better than using single-point estimates, it still does not allow you to separate the reasons for the different outcomes in the three-point estimates. With the risk register feature, you can analyze risk levels within events to create the most accurate estimates.

More Realistic Estimating Without Separating Risks and Opportunities from Uncertainty

Suppose, for example, your team is assessing the risk to the duration of task A. You have nominally baselined the task to take 10 days and you believe that duration is the most likely outcome. You estimate the best-possible outcome to be 8 days. In trying to understand the uncertainty surrounding the task, you have identified the possibility that it could be severely delayed. At worst, the delay could stretch to 45 days. So you use this as the maximum in your three-point estimate, as shown in Figure 1.

ID	Description	Rem Duration	Jan '09				Feb '09				Minimum Duration	Most Likely	Maximum Duration		
			9	5	12	19	26	2	9	16				23	
0010	Task A	10											8	10	45

Figure 1. The minimum, most likely, and maximum durations are entered in a three-point estimate.

Although it is purely a worst-case estimate, your team might have been reluctant to give this outside estimate of 45 days because it could reflect badly on them. They might also have seen examples of such extreme worst-case estimates resulting in zero chance of meeting the target finish date. However, without a risk register, this worst-case estimate of 45 days could negatively impact the schedule.

Separating Risks and Opportunities from Uncertainty

With the Primavera Risk Analysis risk register, you can be more specific about the uncertainty surrounding task A. Your team knows that the worst case of 45 days would result only if a specific event occurred. You can put this event in the risk register and

- Assess it separately
- Understand it, communicate it, and mitigate it
- Better manage it by delegating specific responsibility

With the Primavera Risk Analysis risk register, you can be more specific about the uncertainty surrounding any given task.

As your team thinks about this risk event, they estimate there is a 5 percent chance that it will happen. The specific delay it causes is estimated at between 20 and 30 days. So this data goes into the risk register, as shown in Figure 2.

ID	T/O	Title	Quantified	Probability
1	T	Risk 1	<input checked="" type="checkbox"/>	5%

Figure 2. The risk register is used to better understand the probability of extreme delays.

Then you give the risk an impact value on task A, as shown in Figure 3.

Impacts for Risk 1		Schedule			
Task ID	Description	Shape	Min	Likely	Max
0010	Task A	Triangle	20	25	30

Figure 3. The risk's impact value is assigned in the risk register.

You know that this risk event is not the only reason that task A could be delayed. Even without the risk event, your team still feels that the task could be delayed by up to 5 days. As a result, you adjust your original three-point estimate accordingly, knowing that the extra delay is safely in the risk register.

ID	Description	Rem Duration	Jan '09				Feb '09				Minimum Duration	Most Likely	Maximum Duration	
			9	5	12	19	26	2	9	16				23
0010	Task A	10										8	10	15

Figure 4. The three-point estimate is updated with the more-probable delay of just 5 days.

The project team is happier with this less-extreme estimate of delay reflected in Figure 4. They have not ignored the real worst-case estimate of 45 days, but they have had a chance to think carefully about its likelihood and put it in a real context.

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There are further advantages to building and maintaining a risk register in this way. A separate risk register can enhance your contract negotiations because you can include or exclude specific risks from the contract and negotiate which party bears each risk. In addition, you can improve your project reporting and reviewing functions. Many people even set project contingency based on the results of the risk analysis.

This enables the contingency to be freely drawn down to cover risks that were identified up front in the risk register.

How Risks, Opportunities, and Uncertainty Are Combined

When you are ready to run the risk analysis in Primavera Risk Analysis, it will automatically embed the risk event into the task itself.



Figure 5. The project bar chart in Primavera Risk Analysis illustrates how the risk event delays the task.

The project bar chart—or Gantt chart shown in Figure 5—shows how the risk event delays the task. It shows the risk event as having zero duration because you are planning for it not to happen. This simple example does not cover Primavera Risk Analysis' ability to allow both risks and opportunities. It also does not cover the cases of a risk (or opportunity) affecting more than one task or of having many risks (or opportunities) impacting a task. Yet whatever combinations of risk and opportunity affect multiple tasks in the project, the product automatically combines all those risks and opportunities and merges them with each task's uncertainty to create a realistic estimate.

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Avoid Unnecessary Pessimism

Aside from the benefits stated earlier, using the risk register to specify the individual risk events gives you a much more realistic assessment of risk. The difference can be dramatic. When you fail to separate your risks, your estimates will exhibit far too much pessimism. In the example given, not separating the risk event gives task A triangular distribution on its duration, as shown in Figure 6.

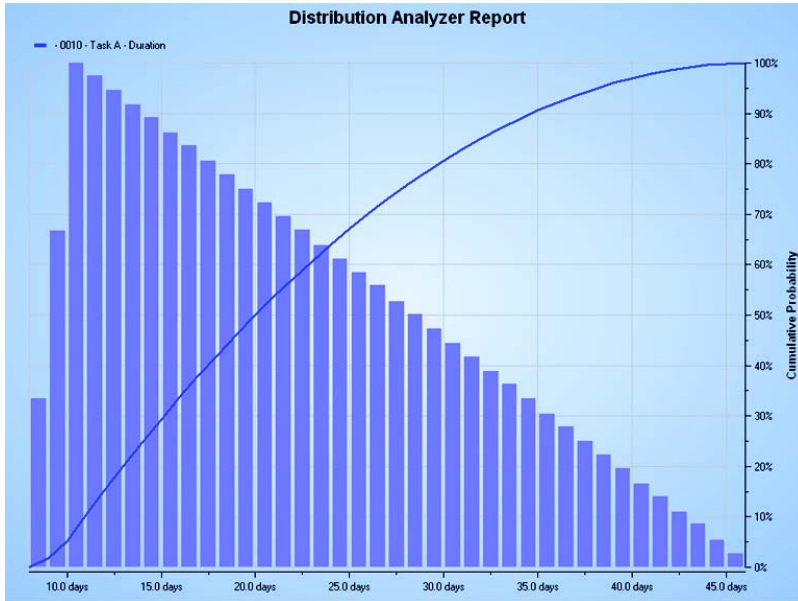


Figure 6. When the risk event is not separated from the task, the duration distribution is triangular.

When you separate the risk event and put it in the risk register, task A’s duration distribution looks very different. The bars to the far left in Figure 6 represent cases of the risk event not occurring; whereas, the far right of the graph represents cases of the risk event occurring.

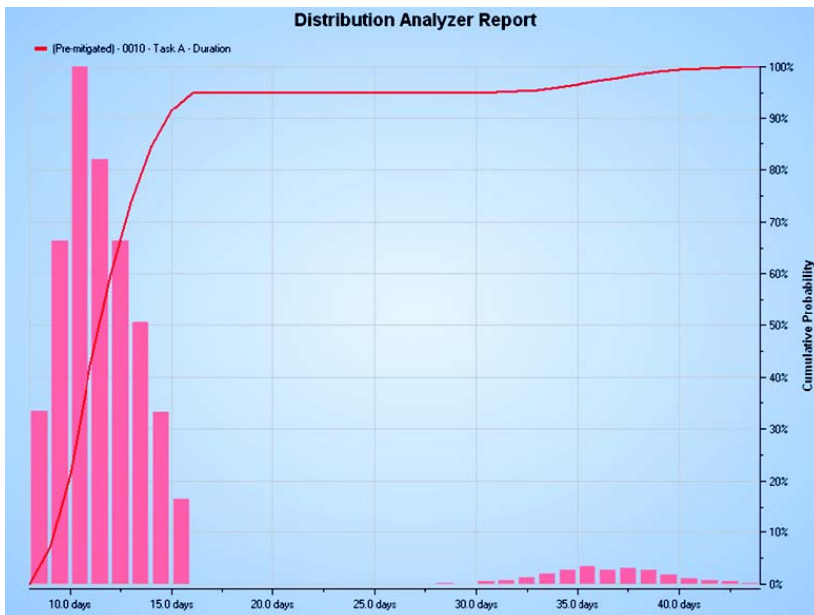


Figure 7. When the risk event is separated from the task via a risk register, the duration distribution accounts more accurately for the probability of the risk event occurring.

As the comparison in Figure 8 shows, the difference between the duration distributions is dramatic. When you do not separate the risk, you are assuming the unnecessary pessimism represented by the dark blue bars in the chart.

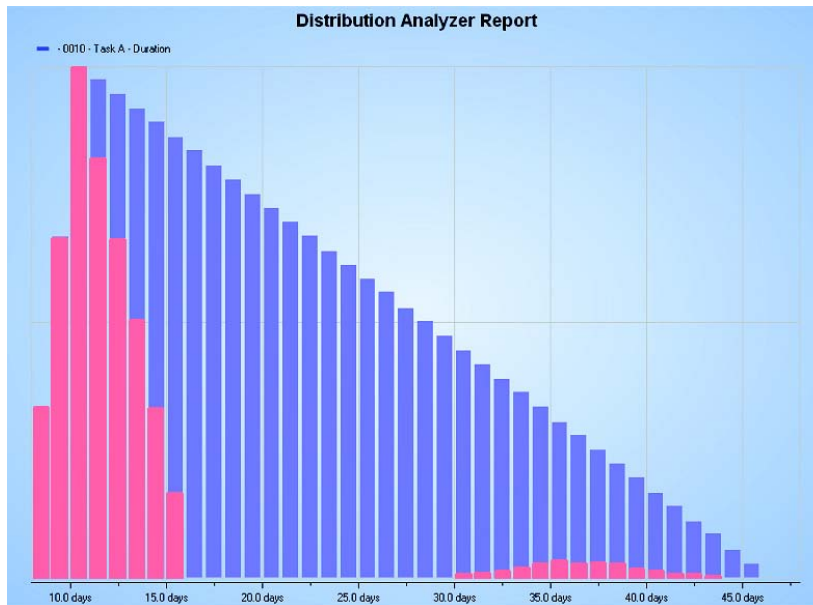


Figure 8. The dark blue bars show the unnecessary pessimism predicted by a three-point estimate when a risk register is not used.

Conclusion

Although using three-point estimates is a step forward from single-point estimating, you can make even more reliable, detailed estimates when using a risk register. By identifying and recording separate risks and opportunities in a risk register, you can

- Assess risks and opportunities separately
- Gain additional understanding of the risk events, such as what causes them and what their effects are
- Understand the risk, communicate it to management, and develop a plan to mitigate it
- Manage the risks better by assigning specific responsibility
- Improve contract negotiations
- Set and make available well-defined project contingency plans
- Eliminate overly pessimistic risk analysis results

Oracle's Primavera Risk Analysis is a complete risk analytics solution that integrates cost with schedule risk management. It provides a comprehensive means of determining confidence levels

for project success together with quick and easy techniques for determining contingency and risk response plans. Moreover, it provides an objective view of required contingency to account for cost and schedule uncertainty and analyzes the cost effectiveness of risk response plans. These combined outputs form the basis of a risk-adjusted schedule—the norm within today’s planning and scheduling process.



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