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Schedule Risk Analysis; Are You Ready For It?

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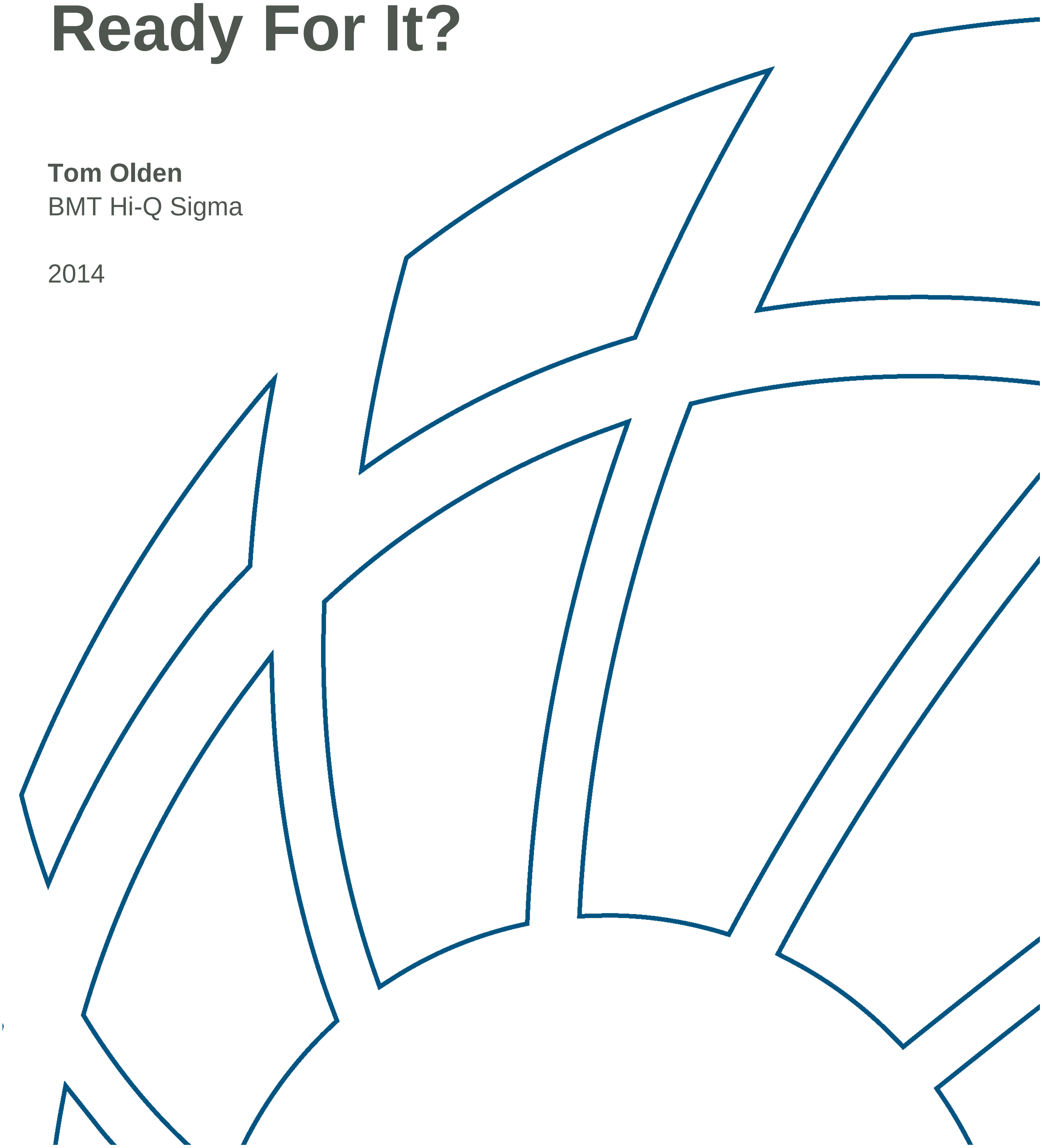

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About the author

The author is a project and programme controls consultant with BMT Hi-Q Sigma. He is currently working with clients to introduce and maintain a robust and appropriate project control system within a complex defence programme. His experience in schedule and risk management allows him to assure clients of how to deliver the best inputs to the SRA modelling process so that outputs are well founded and credible. His background is firmly within the defence sector, and has worked on some of the UK's largest and most complex defence projects.

Paper subject: *Project Risk Management and Forensic Schedule Analysis*

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Abstract

This paper raises concerns that the application of schedule risk analysis (SRA) may sometimes be merely a means to an end rather than as an aid to allow projects to make well founded decisions. The paper is not looking to describe the SRA process, or to detail the benefits of SRA. Instead the paper seeks to outline key questions a project manager should ask themselves about their project and organisation before undertaking an SRA.

The objective is to ensure that the benefits of SRA are fully realised and that its potential weaknesses are understood. The key themes highlighted through the paper are the need for project managers to assure themselves that the process is impartial, that it has been applied to an appropriate degree and that they are confident the outcomes can be used to take decisive action for the good of the organisation.

The key message is that without a solid foundation an SRA is unstable and its value cannot be fully exploited.

Schedule Risk Analysis; Are You Ready For It?

Introduction

Take your schedule, drop it into a Monte Carlo engine, apply some risks, press the button and in a couple of turns of the egg timer you have a set of confidence dates, some distribution curves and even a tornado chart or two. If you don't get quite the answer you were looking for you can alter a maximum duration here, a risk likelihood percentage there and press the button again. Eventually you'll get a result that supports your business case and doesn't attract too many difficult questions. That's the aim of SRA right? It's a means to an end.

It's pretty obvious that the previous paragraph was designed to provoke the response "No! Of course that's not right". But be honest, how often is schedule risk analysis (SRA) completely unconstrained and unbiased, based on credible and technically accurate inputs and analysed by an experienced risk practitioner? Moreover when have you used the results to inform decisions on budgets, resource allocations and even the viability of the project?

Regardless of the reason for undertaking SRA, every project manager must consider whether they and their project are ready to go through the unbiased process required to produce a beneficial SRA output and to accept the results.

This paper doesn't intend to discuss the benefits and process involved in undertaking an SRA, as these are already well documented. Instead the paper seeks to ask the question 'are you REALLY ready for SRA?' by examining the true components of a robust analysis and the potential impact of compromising any one of them.

However, before you read on it must be stressed that this paper isn't designed to turn you away from the idea of utilising SRA, as it's a useful part of a project manager's arsenal. The paper aims to give you a greater appreciation of how to plan for and conduct a quality SRA in order to gain the most benefit from it.

Components of SRA

It's a common misconception that if you have a schedule and you have a risk register then you have all the components required to undertake an SRA. The fact of the matter is that there are a number other components that must be in place before an SRA will be close to meaningful. These components can be broadly grouped into three perspectives;

Inputs	Appropriate unbiased and credible data required for a realistic SRA to be run.
Enablers	Attitude of the organisation, governance, required skills, knowledge and time to undertake an SRA.
Outputs	Transforming the accepted outputs of the SRA into meaningful action.

It is the sum of all of these components that make up the SRA. The analogy of a house of cards is quite apt, if any one of these components is absent or has been compromised then the hard work involved in putting the individual cards together will be in vain. You will be left with a pile of cards with nothing meaningful to show for all your effort, or even worse, your house of cards will just about stand up, but on extremely weak foundations that may lead to key decisions being taken based on misleading analysis.

The following sections explore each of the perspectives above and provide the real questions you should be asking yourself to ensure you are ready to run an SRA.

Inputs

The inputs to an SRA are its foundations, if these aren't solid then the outputs, analysis and decisions that come from the SRA will be baseless. I'm sure you've all heard of the phrase "Rubbish in; Rubbish Out", or more specifically in the case of SRA, it will probably be "Bias in; Bias out".

Before considering whether to undertake an SRA you as the project manager not only need to be assured that the inputs are well founded, but also, that you understand what it is you want to achieve by undertaking an SRA.

The following four questions hope to prompt that thought process.

1) *Do you fully understand the purpose of running this SRA?*

Reasons such as; "to get the senior management off my back", "because we have to convince the scrutiny department or client that we know what we're doing" or "we need to show that we are going to meet out deadline" are not good reasons for undertaking an SRA and indicate that the benefits of SRA are perhaps not fully understood.

Understanding the context, stakeholder expectations and having a clear understanding of the decisions your SRA is intended to support, will make it easier to gather the necessary inputs and "sell" the results to the stakeholders. There is no point going through the SRA process only to provide an analysis that fails to answer the questions you and your stakeholders wanting answers for.

Understanding the purpose also allows you to focus the SRA on particular areas of the project that are of interest. For instance, if the project is 20 years in duration, but stakeholders are only interested in the likelihood of achieving the first deliverable after two years there is no point in developing a risk network for the entire project.

If you can't answer the question "what is the purpose of running this SRA?" with a valid, focused and unambiguous reason, such as; "we are trying to identify the phase in our project that is most likely to affect the likelihood of meeting our contract deadline" or "the penalty clauses in our contract mean that missing our deadlines could prove very costly – how much money should we be spending up front to mitigate risk and protect our profit", then there is no foundation to run an SRA.

2) *Do you have estimates free of bias, obtained from multiple sources and which are considered credible?*

The answer to the questions; "how do you know whether your estimates are free from bias and are credible" is that you can't, but you can take action to reduce bias and increase the credibility of your estimates.

Only if you have consulted as many people as is practical, with the expertise and experience required, on an individual basis (to avoid 'groupthink'), can you say for certain that your estimates are as free of bias as possible and therefore, as credible as possible.

As tempting as it is to believe, putting poor estimates through a modelling tool does not make them any more accurate and certainly does not validate them. Referring back to the 'House of Cards' analogy, if the foundations are weak, you cannot be sure that the structure they are supporting will not collapse under even the lightest challenge.

3) *Does your risk network contain sound and tested logic?*

If the risk network is constructed using any scheduling technique other than left to right with complete and free flowing logic, the answer to the above question is 'no' and the SRA will fail to accurately portray the impacts of estimating uncertainty and event risk.

The risk network forms the backbone of the SRA. Regardless of the level of the risk network and the tasks it includes, it must allow delays to honestly and fully propagate through without interference (i.e. constraints, lags) to provide a meaningful output.

4) *Have all assumptions upon which the risk model is based been clearly articulated and documented?*

Any analysis is only as good as the assumptions with which it is presented. It's highly likely that some information needed to undertake an accurate SRA is either not available or is unstable at the time required. In these cases planning assumptions should be made in order to complete the SRA.

These need to be documented to allow you to understand the results of the SRA when revisiting it at a future date. If the answer to the above question is "no" then revisit it to understand what factors may invalidate the SRA if they were to change in the future.

Remember that an SRA will never provide 'the answer'. Even the best quality SRA will never end with a statement saying, "the answer is X". Project management, as with life, is never that cut and dry; and it is part of the responsibility of the analyst to ensure that the results they present are not divorced from the assumptions and context with which the analysis was carried out.

It is clear that to ensure the results of the SRA are credible and provide value, time must be taken upfront to ensure that the inputs are meaningful and well thought out. Without credible inputs to the SRA, the results should not be trusted.

Enablers

Enablers are the things that allow a successful SRA to take place, free of interference, at the appropriate level and with the right analysis to answer the required questions.

This paper is focusing on organisational enablers such as; knowledge, availability of resources, appropriate governance and organisational maturity.

The following questions are intended to challenge whether you are in the position to make the most of the SRA and its outcomes. If you're not, you must ask "why am I doing it?"

1) *Do you have the right level of knowledge, experience and impartiality within the organisation to properly analyse the SRA results?*

It's not too difficult to throw a few risks together with a high level schedule and click a button. Similarly it's not hard to read results from a graph. However, would you or any of your team be comfortable explaining to senior management the detailed results of an SRA, the context and assumptions that underpin them, how they were achieved and what they do (and importantly, don't) tell you about the project?

If you want to get valid and impartial results that provide a meaningful insight to the project then you need people with specialist competence, training and experience. If you expect to run a meaningful SRA without the specialist skills, you run the risk of making decisions about your project based on un-informed analysis.

2) *Have you allowed enough time to fully engage with the SRA process, analyse the results and put actions in place?*

Running an SRA is not a simple process; from experience an SRA invariably takes longer than you initially expect. Rushing it can result in poor quality analysis and can invalidate the whole outcome.

An important point to remember is that SRA needs to be done to an appropriate level of granularity and should be iterative. SRA takes time and depending on the reasons for undertaking an SRA it may not be necessary to undertake it on the entire project. Consider what is appropriate to you and weigh the costs, time and effort against the potential benefits.

3) *Are you opened minded about the outcome and unconstrained by pre-conception?*

This question speaks for itself; if you already know the answer you want the SRA to provide, aren't open to alternatives and are willing to manipulate the model to get the answer you want, then it's a fairly futile exercise. SRA is not flawless; referring back to the second sentence of the paper;

> *"If you don't get quite the answer you were looking for you can alter a maximum duration here, a risk likelihood percentage there and press the button again"*

Doing this defeats the object of the SRA and invalidates the process, analysis and any decisions made based on the outputs.

It's strongly recommended that an impartial third party is utilised to assure that the process is undertaken correctly, regardless of the result. If you are the project manager or senior stakeholder commissioning an SRA then it is your responsibility to ensure that the analyst is not unduly influenced by yourself or other stakeholders. If you think you know what you want the 'answer' to be, then don't tell your analyst!

It is clear that enablers are a key aspect of running an SRA. Without aspects such as the knowledge, time and right intention of running an SRA, results of worth and value are impossible.

Outputs

Outputs in the context of this paper are not referring to the technical analysis or various graphs that an SRA produces, these are produced regardless of whether the SRA is based on solid foundations or not. Instead, this paper is looking at the actions of the organisation and project team as a result of the SRA outputs.

The three simple questions that you should ask yourself with regard to outputs may be difficult to answer. However, they need to be considered.

1) *Is your SRA analyst independent and free of un-due influence from the project team or senior management?*

If the answer is no, how can you trust the results and base decisions on them?

To ensure credible, valid and impartial outputs the operator needs to be independent of the project team or senior management. Without this you cannot assure yourself or your stakeholders that the outputs have been free of any influence that could have altered the results.

2) *Is the governance and culture in your organisation prepared to understand and act upon the outcomes of the SRA?*

"Prepared to understand", what does this mean? Fundamentally, will you or your senior management accept the results of the SRA and try not to influence them to make a political point, or to ensure the continuation of the project. What other information will you be taking into account when considering the results?

As for "acting"; is the organisation ready to make the decisions that a SRA may highlight? For instance; "where shall we spend the £100K budget for risk mitigation?" or more contentiously, "should we cancel this project?"

It's also important to remember that SRA is just one of many tools used to inform decisions. There is nothing inherently wrong with basing decisions on the project manager's experience, or 'gut instinct', but SRA can provide the evidence based analysis and perspective to support your gut instinct or indeed challenge it. SRA is another tool for the armoury, and should be used as such – not the magic bullet, but extra ammunition!

If the organisation is not mature enough to accept an outcome or ready to take action then ask why are you doing an SRA, what is the benefit to the organisation and the project?

3) *Do you have the time and resources to act on the outputs of the SRA?*

This question goes hand in hand with its predecessor. Whilst you may have the intention to act, depending on what may be required, do you have the time or resource to actually do it.

Identifying the reasons for undertaking the SRA, and conducting the analysis at an appropriate level, is key. If resources are not available, expectations must be managed at the outset of the SRA process so that the reasons for undertaking the SRA are not undermined.

The actions of an organisation following the SRA are fundamental to success. If no action will be taken following the SRA, what value has it added? The effort put into the SRA must be matched by the effort put into the results to ensure that the right direction is taken by the organisation or project following the results.

Finally

Looking back at the question the paper is trying to answer, 'are you REALLY ready for SRA?', put simply; if you can't answer 'yes' to all of the questions asked through the paper, and compiled in table 1, then realistically you're not ready to get the best from an SRA.

However, before you think, "well I just won't bother then, as it all seems a bit too hard to do properly", everything discussed can be overcome or managed. The key is to understand the weaknesses of the SRA to ensure you get the most benefit, or tailor the process to an appropriate level.

The key points to remember are that in order to get the best from SRA you must:

- Understand the reasons for undertaking an SRA
- Assure yourself that the process is impartial and unbiased
- Apply it an appropriate level
- Be confident that the outcomes can be used to take decisive action for the good of the organisation.

SRA is an extremely powerful tool that can provide huge benefit to projects and organisations when 'done right'. So now, ask yourself, are you REALLY ready for SRA?

	Desired answer
Do you fully understand the purpose of running this SRA?	Yes
Do you have estimates free of bias, obtained from multiple sources and which are considered credible?	Yes
Does your risk network contain sound and tested logic?	Yes
Have all assumptions upon which the risk model is based been clearly articulated and documented?	Yes
Do you have the right level of knowledge, experience and impartiality within the organisation to properly analyse the SRA results?	Yes
Have you allowed enough time to fully engage with the SRA process, analyse the results and put actions in place?	Yes
Are your opened minded about the outcome and unconstrained by pre-conception?	Yes
Is your SRA analyst independent and free of un-due influence from the project team or senior management?	Yes
Is the governance and culture in your organisation prepared to understand and act upon the outcomes of the SRA?	Yes
Do you have the time and resources to act on the outputs of the SRA?	Yes, to an appropriate degree

Table 1: "The Complete SRA Readiness Quiz"

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