Project Controls EXPO

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Cost Modelling: Integrated Cost and Schedule

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About the Speaker

Dr Paul Wood

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BMT Hi-Q Sigma

Paul is a Chartered Engineer who holds a PhD in Defence Economics (Risk Management and Cost Forecasting).

Paul spent 20 years working in the Ministry of Defence before joining BMT Hi-Q Sigma 5 years ago.

BMT Group

- An international network of subsidiaries providing engineering, design and risk management consultancy
- Wholly independent partner providing customers with access to expertise around the globe
- Heritage of research and technology which drives significant ongoing investment in R&D and development of future talent
- Formed in 1985 through Government privatisation of maritime research and technology organisations
- Held in beneficial ownership for the staff
- 2011 turnover £140 million
- 1300 staff in 22 subsidiary companies (60 Offices) in 23 countries in Europe, North America and Asia

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BMT Hi-Q Sigma Overview

- A professional services company compromising of 120 consultants across offices in Bath, Basingstoke and London.
- Operating across the Defence, Energy and Transportation sectors.
- Achieved a turnover in 2011 of ~ £12M.
- As an employee benefit trust with no manufacturing or supply chain interests, we provide truly impartial advice, assistance.
- In the complex world which we know you face every day, our goal is simple and steadfast:

to bring clarity

BMT Hi Q Sigma Services and Capabilities

- We help to deliver complex programmes through the integration of programme management and systems engineering.

We help you achieve clarity through:

- Strategic guidance to organisations in the establishment and management of programmes
- Interventions to optimise existing programmes/projects
- Provision of quality people as interim support

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Aim

This presentation will discuss the Confidence Limits that are used to aid decision making in projects. It will also explore some of the options for combining schedule and cost models to give a project the best chance of success.

Agenda

1. Differences between Cost and Schedule Models
2. Top 10 v most significant risks
3. What actually happens
4. Options for modelling Cost and Schedule
5. Which Option to choose?
6. Questions

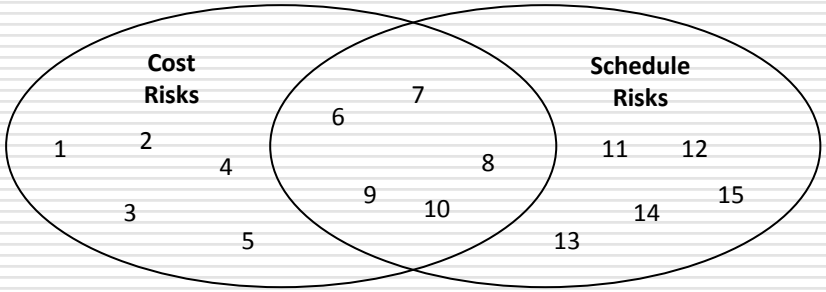
Differences between Cost and Schedule Modelling

Uncertainty – described using a 3 point estimate (3PE) and has 100% probability; you know there will be a cost, but it will fall within the 3PE.
Risk/Opportunity – described using a 3PE for impact and has a chance that it may or may not happen; the probability is less than 100%.

	Cost	Schedule
Typical MicroSoft office tools used	Excel; Access	Project
Addition of Uncertainty and Risk	Simulation – Add uncertainty and risk as two separate groups	Simulation – Add risks to individual uncertainty tasks (as appropriate)
Magnitude of Risks	Combination of probability and Impact	Criticality and/or Cruciality

Top 10 v most significant

Terminology has changed in recent years:
Previously – we spoke about "modelling the top 10 risks"
Now – we speak about "modelling the most significant risks"
This change is due to the use of Schedule Risk Analysis and the difference between measuring the magnitude for cost risks and the use of criticality and cruciality for a schedule risk



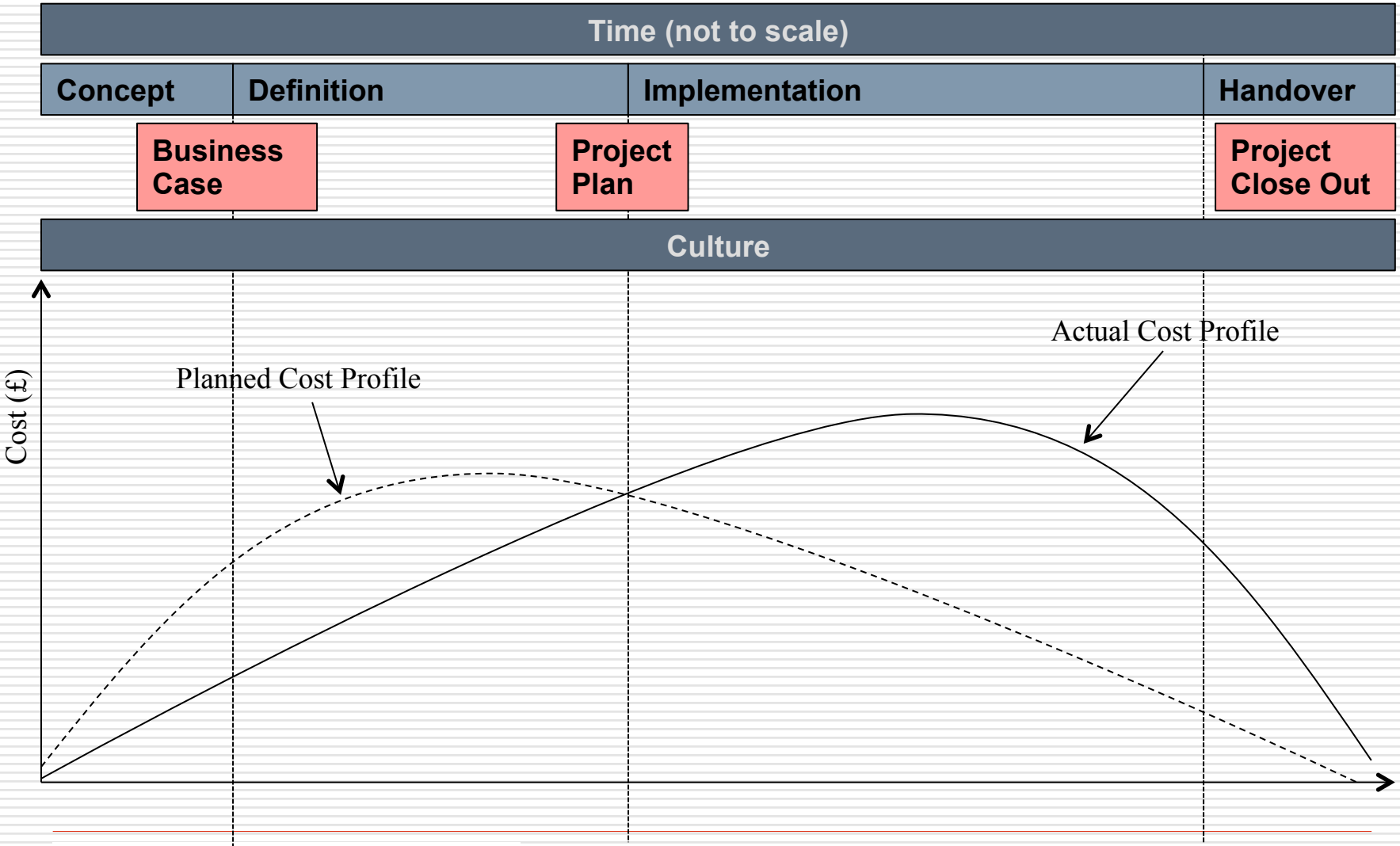
Most significant project risks

Do you recognise this?

- A Work Breakdown Structure is developed
- Costs estimates are assigned to the various elements
- To ensure funding is available at the correct time, questions are asked about when the activities will take place
- A schedule is developed and the timescales are taken from that schedule and put in the cost model
- Therefore the cost model is developed using schedule dates (50%?)
- Schedule updated
- Schedule Updated again
- Schedule Updated again
- All this time the cost model remains unchanged and it no longer reflects the latest schedule

The results look like ….

Project Activities



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Why does this happen?

- Poor project/programme management? Perhaps
- Bad luck? In some cases
- Poor estimating? In some cases
- Capital rationing – not enough budget available (on time)? Could be
- Lack of realism? More than likely
- Lack of understanding of what is actually being modelled? In most cases
  - By PM? Some of the time
  - By Policy Makers? Most of the time

Why? …

Confidence Limits

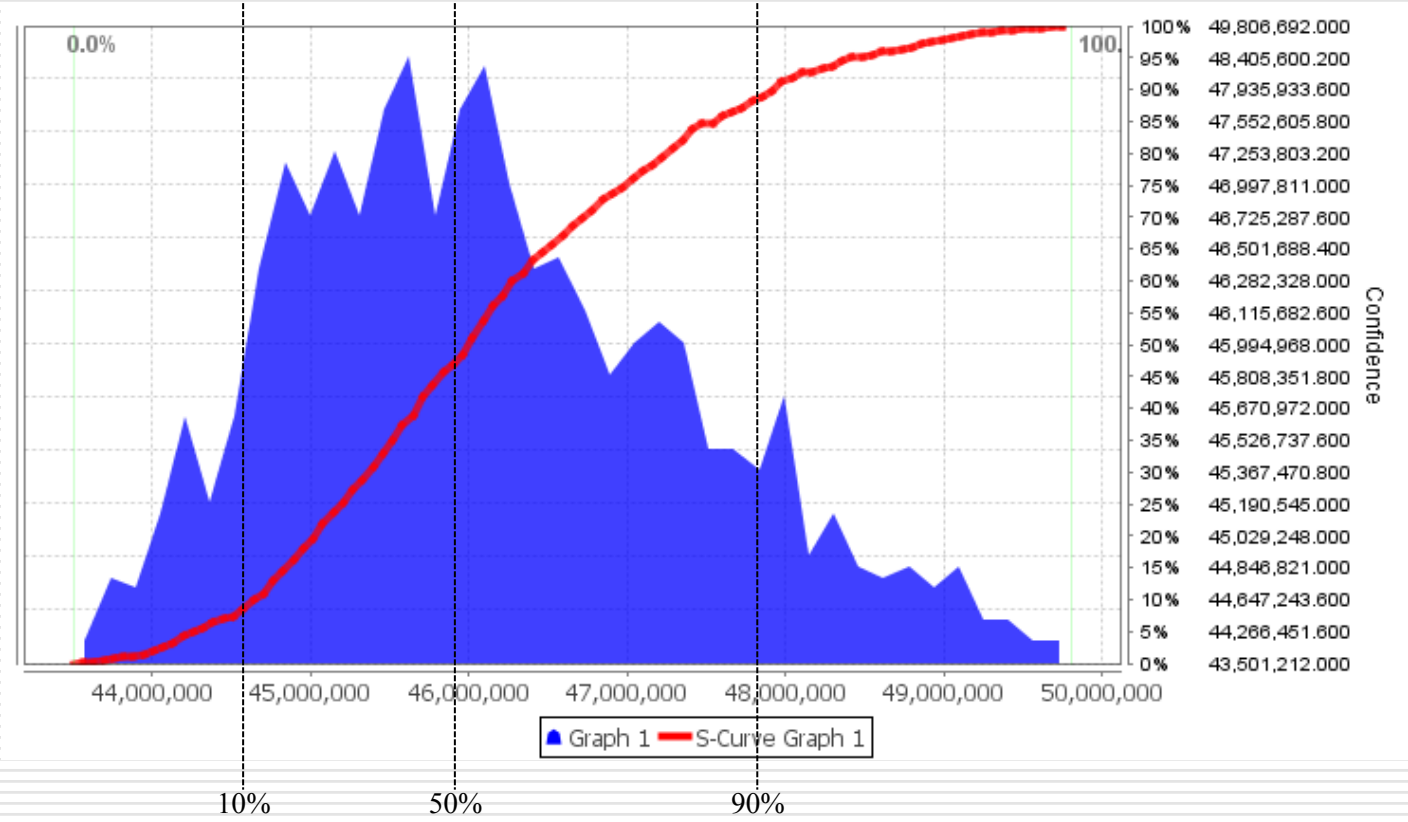
The Confidence Limit is the output from the Simulation, for example:

10% Confidence Limit means that 10% of the costs/time were less that that figure.

50% Confidence Limit means that 50% of the costs/time were less that that figure.

90% Confidence Limit means that 90% of the costs/time were less that that figure.

Confidence Limits



Do you recognise this?

- A Work Breakdown Structure is developed
- Costs estimates are assigned to the various elements
- To ensure funding is available at the correct time, questions are asked about when the activities will take place
- A schedule is developed and the timescales are taken from that schedule and put in the cost model
- Therefore the cost model is developed using schedule dates (50%?)

What confidence limit does your company use from the Schedule?

50%?

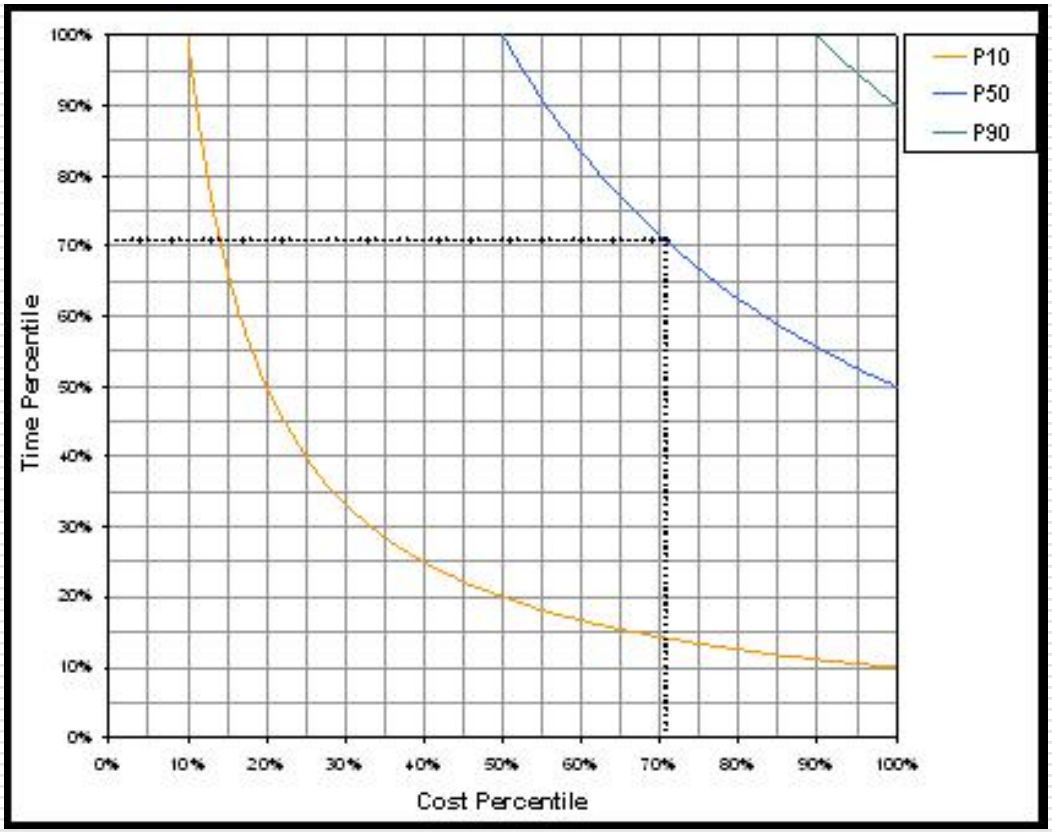
What confidence limit does your company use from the Cost?

50%?

Does this sound sensible?

50% Confidence Limit?

- 50% Cost Confidence Limit at 50% Schedule Confidence Limit
  - In the uncorrelated case, there is only a 25% Confidence Limit of meeting both (i.e. 0.5*0.5=0.25)
- To achieve the overall 50% confidence limit of 2 independent variables will require the 71% confidence limits for both time and cost to be used



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Possible Options?

- Depends on the cost model and schedule that you have already, i.e. what you have to start with.
  - Do you have a Cost Model?
  - Do you have a Schedule?
  - Do you do Timescale Risk Analysis?
- Options:
  - 1 – Continue with the information you already have.
  - 2 – Build a cost model for each of the schedule confidence limits you want to use.
  - 3 – Develop a cost model and schedule in a dedicated tool.
  - 4 – Develop a cost model and schedule in a tool such as MS Excel.

Options

- Option 1 – Continue with the information you already have
  - You may not be optimising the information you are using?
- Option 2 – Build a cost model for each of the schedule confidence limits you want to use
  - If you run a TRA and cost model already, then this will require minimum change.
  - For example, produce three cost models based on 10%, 50% and 90% dates from the TRA results.
  - May be adequate for what is required.
- Option 3 – Develop a cost model and schedule in a tool dedicated to this purpose
  - May require licences to be bought (high cost?)..
  - Cannot be read by stakeholders who do not have a licence (additional cost?).
  - May require extra training (additional cost?).
- Option 4 – Develop a cost model and schedule in a tool such as MS Excel
  - Can be read by many stakeholders.
  - Transparent.
  - Low cost, due to licences.

Which Option to choose?

- Depends on:
  - Project
  - Organisation/Company
  - Project Manager
  - Data available
  - Skills available
- What would you use?
- What would your Organisation/Company allow you to use?

Thank you

Any Questions?

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