# Improving Cost and Schedule Risk Analysis Maturity using Modern Quantitative Risk Analysis tools

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# About the Speaker

**Santosh Bhat**

- Civil Engineer, AACE PSP with 19+ years' experience in project planning and controls in the infrastructure and construction industry

- Independent consultant, based in Sydney, Australia offering specialist planning and scheduling services such as
    - Schedule Risk Analysis
    - Time Location/Linear Schedule Reporting and
    - Graphical Path Planning

# Outcomes

- What is integrated cost and schedule risk analysis and why is it important

- What are the benefits of an integrated approach

- How can your organisation get started

- What sets Safran Risk apart from legacy risk applications

# Background

**Who is Safran?**

- Safran provide world-class enterprise project & risk management software, with over 20 years of successful project delivery experience in some of the most demanding markets

- Safran's solutions are proven & trusted by thousands of project management professionals around the world

# Safran Solutions



Safran Project brings together project scheduling, planning, risk analysis and execution to ensure complete capital project management. Gain visibility into status, resource conflicts and demands across your projects, and see value added at every stage.

Safran Project is the ideal solution for complex project and portfolio management. Elevate project delivery confidence through Safran's integrated project reporting, risk and change management capabilities.



Designed by the project risk experts that brought Pertmaster™ to market, Safran Risk seamlessly combines advanced project schedule risk, duration risk, and cost risk analysis for ultimate analysis integrity.

All delivered in an intuitive user interface, interoperable with Primavera P6, Microsoft Project and Safran Project.

# Why Project Risk Analysis?

- Produce more realistic forecasts of when the project will really finish and with what cost

- Identify risks that are important in driving their project to later and more costly results so those risks can be addressed in advance

- Used to set expectations and actions with stakeholders regarding assumptions made on estimates and forecasts for cost, schedule and risks

- Facilitate focused contingency or mitigation measures



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# Project Risk Analysis Maturity

- Risk analysis maturity levels that characterize different organisations

## Risk Analysis Maturity Journeymap[11]

Level 5: Advanced Integrated Cost-Schedule Risk Analysis

Level 4: Modern Quantitative Schedule Risk Analysis

Level 3: Basic Quantitative Risk Analysis

Level 2: Qualitative Risk Analysis

Level 1: Basic Risk Awarness

Level 0: Unware of Cost or Schedule Risk

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# Level 0

**Unaware of Cost or Schedule Risk**

- These organizations accept the estimates and schedule results without question, even defending these

- They are ill prepared for threats and will play fire-fighter whenever project risks occur

"This project is different"
or
"It won't happen on my project"
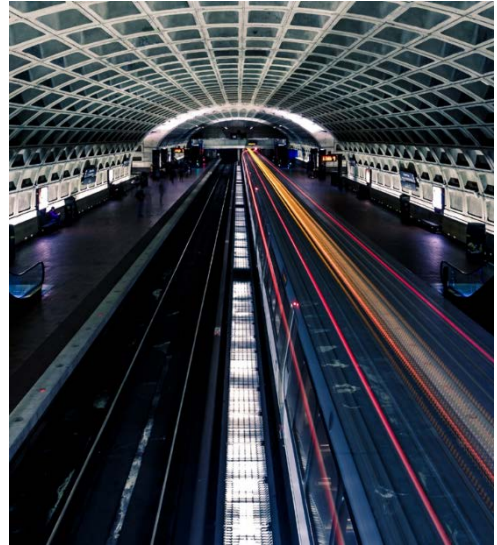
# Level 1

**Basic Risk Awareness**

- Approach is not organised or repeatable, the influence of risk is not analysed or formally required before decisions are made

- Awareness about estimate uncertainty and a willingness to examine these assumptions but lacking the tools or systems to do so

- There may be a 'risk champion' who is called upon to identify, analyse or respond to risks



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# Level 2

**Qualitative Risk Analysis**

- Risks are identified and sorted by their perceived (ranges of) probability and impact on finish dates, costs, and scope

- This method cannot provide a viable estimate of total project finish date or project cost.

- What is produced is, typically, a Risk Register



Probability and Impact Risk Scores: Time Objective

Risk = P x I

| Probability | Threats | | | | | Opportunities | | | | | Probability |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Very High | | | | | | | | | | | Very High |
| High | | | | | | | | | | | High |
| Moderate | | | | | | | | | | | Moderate |
| Low | | | | | | | | | | | Low |
| Very Low | | | | | | | | | | | Very Low |
| | VL | L | M | H | VH | VH | H | M | L | VL | |

# Level 3

**Basic Quantitative Risk Analysis**

- Uses a project schedule for Monte-Carlo analysis using specialised tools.

- Typically using 3-point estimates to model uncertainty of activity durations driven by interviews or workshops.

- Results are shown by a histogram and cumulative distribution of possible finish date, allows confidence level of reporting not available previous levels

# Modern Risk Analysis



**Schedule/Cost Estimate**

Model representing project methodologies and outcomes

**Risks**

Quantified Risks that will affect the project schedule and/or costs

**Risk Impacts**

The distribution of risks across the project schedule and costs

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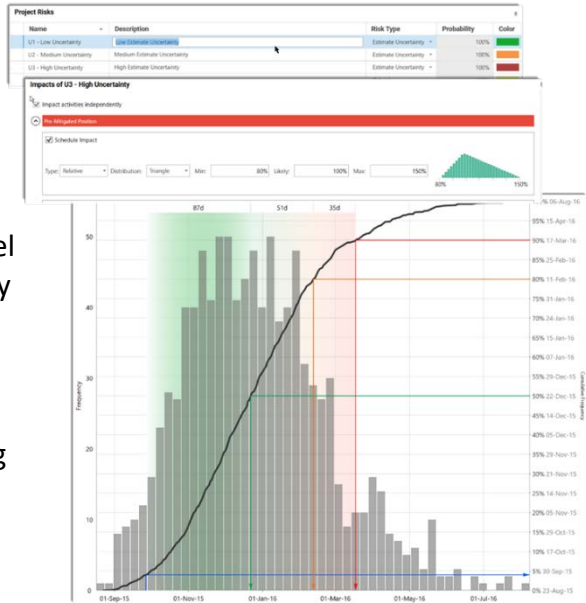
# Level 4

**Modern Quantitative Schedule Risk Analysis**

- Root cause project-specific risks are modelled against the project schedule, uncertainty is modelled as 100% likely

- Activities may be affected by multiple risks, and risks may affect multiple activities.

- May apply to summary level schedule for risk analysis, or to detailed schedule.

- Risk Driver method allows ranking and prioritisation of all risks

# Level 4

## Assigning Risks to Schedule Tasks
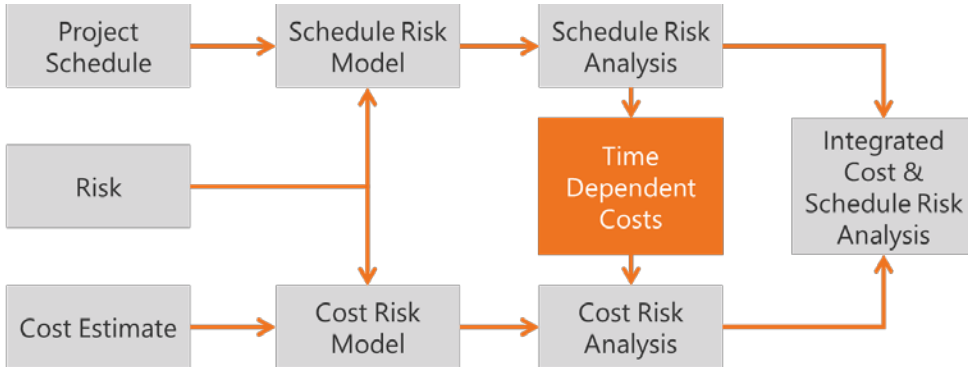
# Level 4

**Automated Ranking and Prioritisation of Risks**
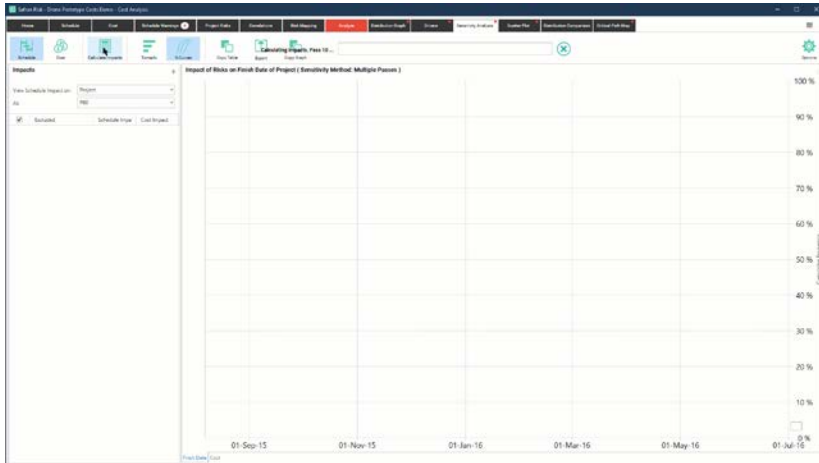
# Level 5

**Advanced Integrated Cost and Schedule Risk Analysis**

- Builds upon Level 4 by connecting cost to schedule, "Time is Money"

# Level 5

**Advanced Integrated Cost and Schedule Risk Analysis**

- Cost uncertainty and/or cost risks added to project cost estimate

- Model more realistic behaviour of project costs by linking schedule tasks with fixed or time dependent costs

- Scatter plot of finish dates and cost used to identify Joint Confidence Levels
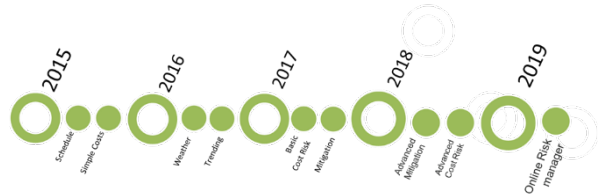
# Conclusion

| | More Realistic Forecasts | Identify Driving Risks | Set Expectations and actions | Focused Measures |
|---|---|---|---|---|
| Level 5: Advanced Integrated Cost-Schedule Risk Analysis | ✔ | ✔ | ✔ | ✔ |
| Level 4: Modern Quantitative Schedule Risk Analysis | ? | ? | ? | ? |
| Level 3: Basic Quantitative Risk Analysis | ? | ✘ | ✘ | ✘ |

# Safran Risk Development

**Continual Development and Upgrades**

- Roadmap of developments based on industry feedback and expert guidance

- Includes scripting options to modify risk model during analysis

- Next major development is an online web-based risk registry, for integration with Safran Risk

- Active development team with practical industry experience

# Questions?

- Trial: http://www.safran.com/risk
- Contact: santosh@auaspp.com.au