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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

"Most capable quantitative schedule risk assessment software on the market"

"I have never seen in my life great support for software like yours"

"After a few days using the software, I knew that it was miles beyond it competition when it comes to fully integrated cost and schedule risk analysis"

"Safran Risk is a very powerful risk analysis tool, including features that advanced users will appreciate, while still being easy to pick up and use"

"The team seemed genuinely proud of their product"

"The Safran team are second to none"

Which Industries Use Safran?

Oil & Gas	Infrastructure	Aerospace & Defence
Utilities	Engineering & Construction	Renewables



Safran Solutions



Safran Project™

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.



Safran Risk™

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



Project Risk Analysis Maturity

- Risk analysis maturity levels that characterize different organisations



The Journeymap to Project Risk Analysis
By David T. Hulett, Ph.D., FAACE, Published by Safran, March 2019



Level 0

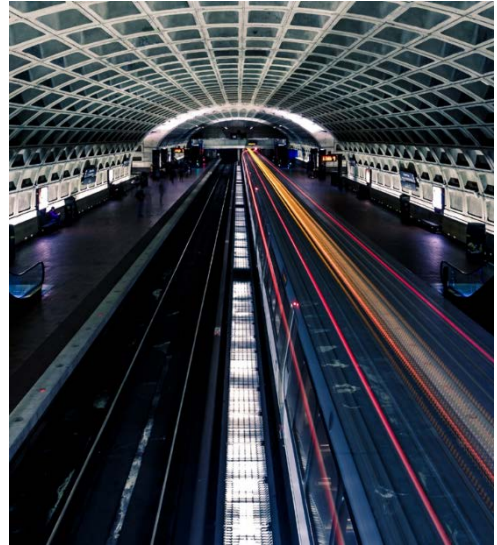
Unaware of Cost or Schedule Risk

- 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



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

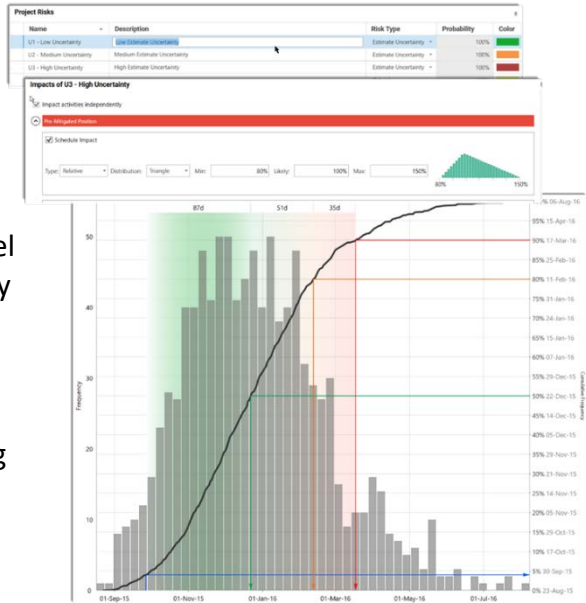
Risk = P x I

Probability	Threats					Opportunities					Probability
Very High	Green	Yellow	Red	Red	Red	Red	Red	Yellow	Green	Very High	
High	Green	Yellow	Red	Red	Red	Red	Yellow	Green	High		
Moderate	Green	Yellow	Red	Red	Red	Red	Yellow	Green	Moderate		
Low	Green	Yellow	Red	Red	Red	Yellow	Green	Green	Low		
Very Low	Green	Green	Green	Yellow	Yellow	Green	Green	Green	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



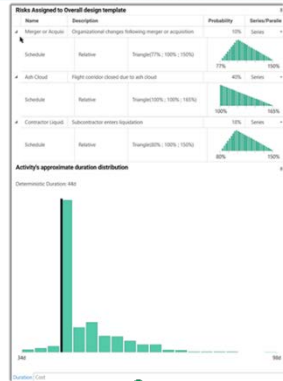
Level 4

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

Big Data to Analytics

ID	Description	Low	Med	High	Ash Cloud	Air Transport Required	Air Supply	Low Cost Uncertainty	Medium Cost Uncertainty	High Cost Uncertainty	Contractor Availability	Design	Communication	Construction	Management or Logistics	Customer	Procurement Delay	Storage	Timing Overrun	Weather
41000	Site Package																			
41001	Project Start																			
41002	Project Completion																			
41003	Procurement																			
41004	Design																			
41005	Overall design overheads																			
41006	Design of 100000																			
41007	Design advanced systems services																			
41008	Design specialist services																			
41009	Finalize Design																			
41010	Manufacture																			
41011	Construction																			
41012	Phase 1 Testing																			
41013	On-Site Commissioning																			



Level 4

Assigning Risks to Schedule Tasks

Map Risks to Activities

Showing 27 out of 28 activities

ID	Description	Risk Check	All Transport Required	Parts Supply	Low Cost Uncertainty	Medium Cost Uncertainty	High Cost Uncertainty	Contractor Liquidation	Design	Communications	Elements	Communications	Manager of Acquisitions	Outcomes	Procurement Design	Storage	Testing Overrun	Rebuild
10100	Design GPS system																	
10110	Design additional guidance systems																	
10120	Design special cars test																	
10130	Finalize Design																	
101000	Fabrication																	
101000	Fabricate concrete test frame																	
101100	Fabricate engine nozzles																	
101200	Fabricate fuel systems																	
101300	Finalize Design																	
101000000	Assemble fuel systems																	
101000000	Assemble engine components																	
101000000	Connect fuel and engine systems																	
101000000000	Phase 1 Testing																	
101000000000	Test fuel and engine systems																	
101100	Test test																	
10120	Test guidance																	
10130	Test GPS systems																	
10140	Test special cars test																	
101000000000000	On-Site Reconstruction																	
101000	Ship to site																	
101100	Re-assemble guidance																	
101200	Re-assemble fuel systems																	
101300	Re-assemble primary engine																	
101400	Reconstruct on site																	
101500	Final on site testing																	

Risks Assigned to Assemble fuel system

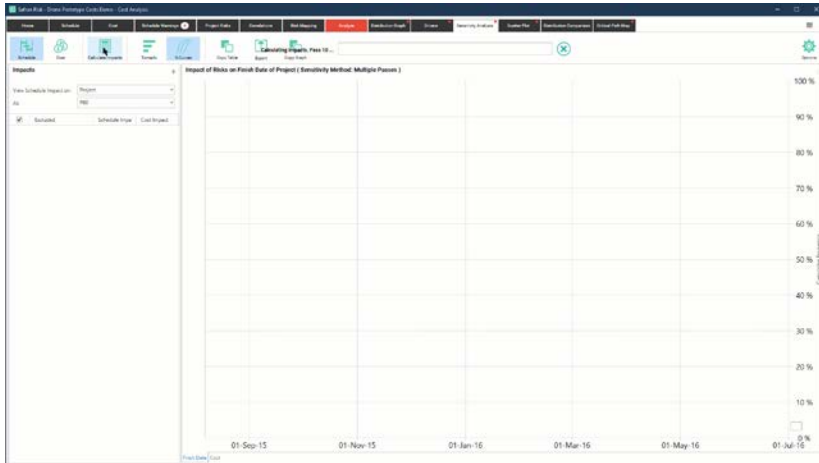
Name	Description	Probability	Series/Points
Procurement	Procurement process delay/d	10%	Series
Outsource	Outsource fabrication	10%	Series
Storage	Change in storage location	20%	Series
Communication	Internal communication issues	70%	Series
Low Cost	Low Estimate Uncertainty	100%	Series
Merger or A	Organizational changes following merger	10%	Series

Activity's approximate duration distribution



Level 4

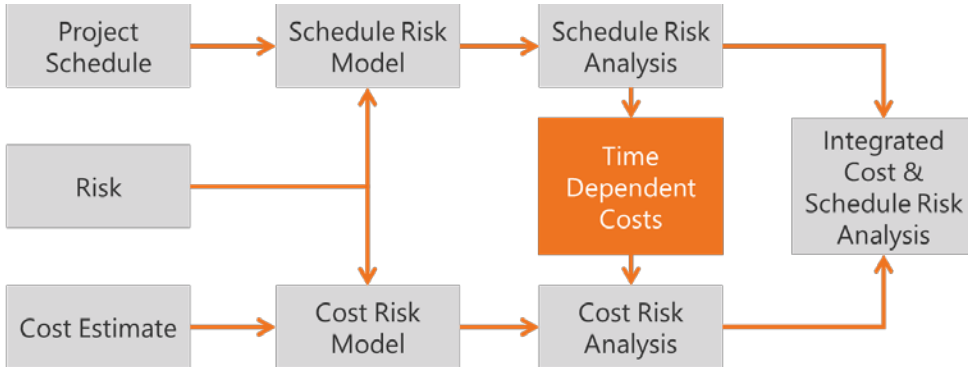
Automated Ranking and Prioritisation of Risks



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



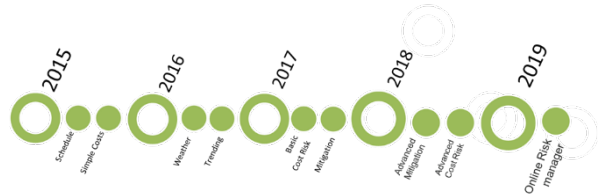
Conclusion

	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

