



What's the Risk?

LEVEL 1: IDENTIFICATION

Risk	Category
Poor soil conditions may require deep foundations, resulting in cost increase.	Cost
Utility relocation delay could result in longer schedule.	Schedule

LEVEL 2: DETERMINISTIC

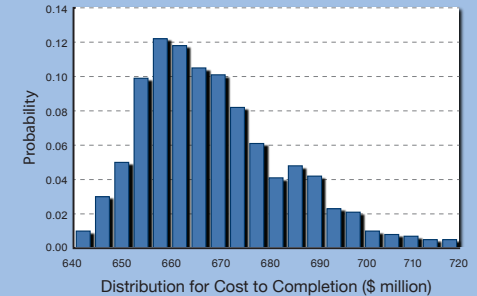
HEAT MAP

		M	M	H	H	H
E						
D	L	M	M	H	H	
C	L	L	M	M	H	
B	L	L	L	M	M	
A	L	L	L	L	M	
	a	b	c	d	e	

Probability

Impact

LEVEL 3: PROBABILISTIC



Definition

- Identify risks and opportunities.

- Analyze risk through single-point estimates of potential impacts.

- Analyze risk through probability distribution estimates of potential impacts.

Benefits

- Generates list of project risks and opportunities.

- Provides probability × impact matrix.
- Generates prioritized list of risks.
- Calculates expected value for contingency allocation of time or cost.

- Provides cumulative probability distribution.
- Increases probability of meeting project targets.
- Project cost or duration is based upon desired level of certainty.

Results

- Identify, allocate, and manage risks.
- Communicate potential risks to project stakeholders.
- Transfer organizational knowledge to projects.

- Make Go/No-go decisions based upon expected value.
- Prioritize risks to manage.
- Communicate risks intuitively and visually.
- Allocate resources to mitigate and manage the most significant risks.

- Clearly communicate project cost or schedule uncertainty.
- Determine impacts of risk events on project performance.
- Determine likelihood of achieving project outcomes.

Limitations

- Does not quantify the impact or probability of occurrence of risk events.
- Cannot assess the impact of risk events on the project.

- One-point estimate does not include uncertainty inherent in the risk.
- Is unable to communicate the collective impact of risks to achieve project targets.

- Is dependent on validity of information input into the model and complexity of model.

Requirements

- Permits minimal investment of team members' time to collaborate and create risk register.
- Requires experienced facilitator, capable of identifying risks.

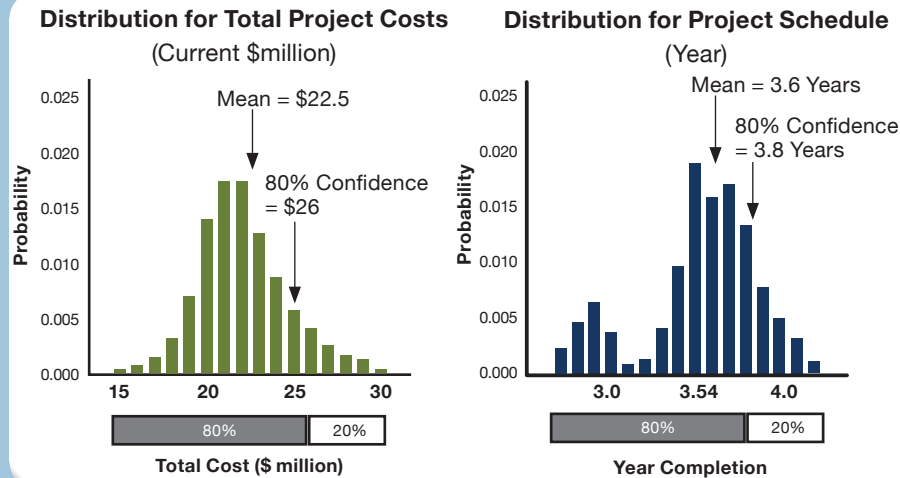
- Requires increased investment of time (2-5× Level 1 investment) to develop the single-point probability and estimated impact of each identified risk.
- Requires relevant experience and/or historical data.
- Requires experienced facilitator who can elicit expected probability and impact.

- Requires further investment of time (6-15× Level 1 investment) for in-house or outsourced expert to perform and analyze quantitative simulation.
- Requires experienced facilitator who can elicit multi-point estimates of probabilities and impacts of risks.

Interpreting Probabilistic Outputs

What is the range of cost or schedule?

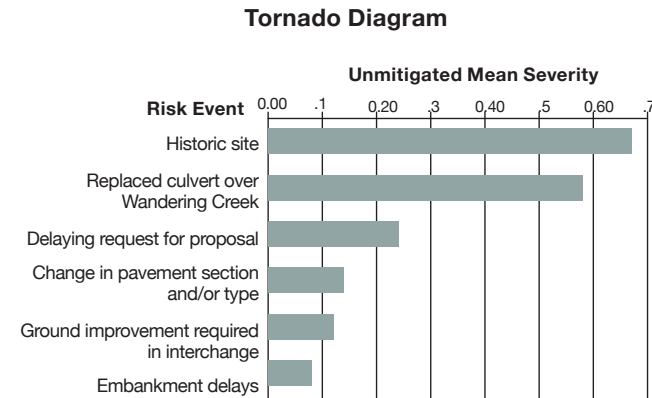
Cost/Time Probability Mass Function



What it means: Illustrates a range of project cost from \$15–\$30 million, with a mean cost of \$22.5 million. Illustrates a range of project schedule from 2.7–4.2 years, with a mean duration of 3.6 years.

What risks have the greatest impact, and where should I focus mitigation efforts?

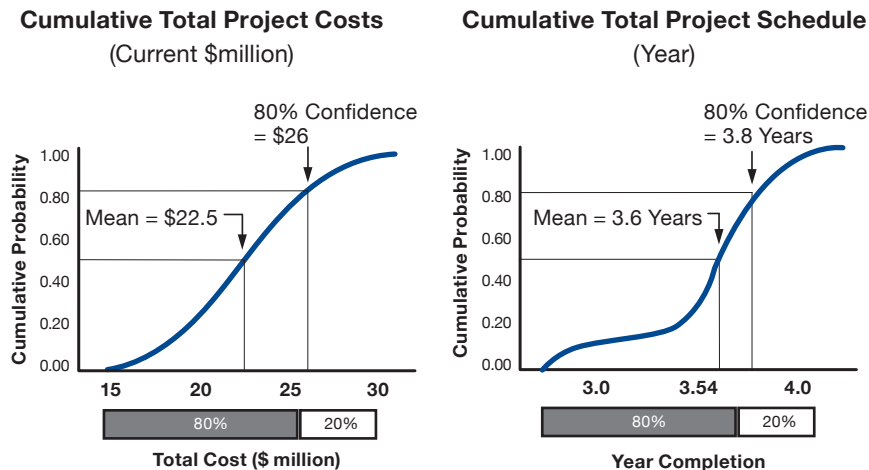
Sensitivity Analysis



What it means: Illustrates that the risk events “Historic site” and “Replaced culvert over Wandering Creek” have the greatest impact on cost uncertainty. Mitigation efforts should focus on these two risk events.

What is my confidence in cost or schedule?

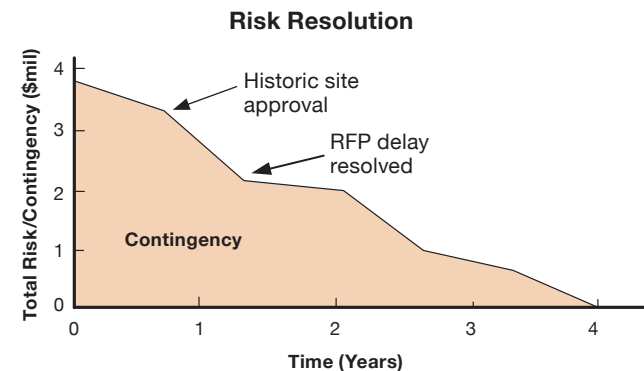
Cumulative Mass Function



What it means: Illustrates that the project’s cost and schedule will not exceed \$26 million or 3.8 years (at an 80-percent confidence level).

How much contingency do I need and when can I release it?

Contingency Drawdown



What it means: Illustrates that the “Historic site” risk event will be resolved after approximately one year, at which time its contingency can be released.