Risk informed value proposals in challenging times

SteVE Holmes, CVS-Life®, P.Eng, MoV,

You are working on a critical project

The pressure to deliver is intense

There are no easy text book solutions

How do you know you have the “right” answer?

How do you show them

there are other solutions?

SteVE Holmes, CVS-Life®, P.Eng, MoV,

- Professional Engineer
- Certified Value Specialist (CVS) - life
- Retired from 35 years with Ontario Ministry of Transportation (MTO)
  - Highway Engineering
  - VE Coordinator
  - Risk Specialist
  - Innovation Engineer
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- Director Value Analysis Canada 2000-2019
- Member American Association of State Transportation Officials (AASHTO) VE Technical Committee

Outline

- Value Analysis and Risk Analysis in Challenging Times
- Why Combine Risk with VA
- Risk Analysis – the basics
- Integrating Risk with VA

Challenging Times

The Zero Canada Project

CORONAVIRUS INFORMATION

The Zero Canada Project provides resources to help you manage your health, your finances and your family life as Canada reopens.

Visit the hub

Global debt hits record high of 331% of GDP in first quarter: IIF report

Coronavirus: Executive faces 'difficult economic decisions'

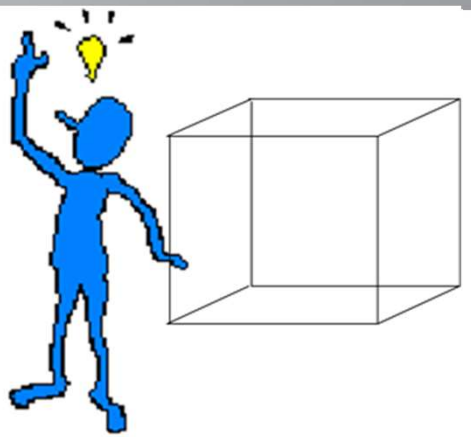
By Jayne McCormack
BBC News NI Political Reporter

The New Normal and Coronavirus

Need for Innovation

- Today's fiscal constraints requires innovative responses

- A fast and reliable process to understand needs and identify and evaluate alternative solutions is critical.



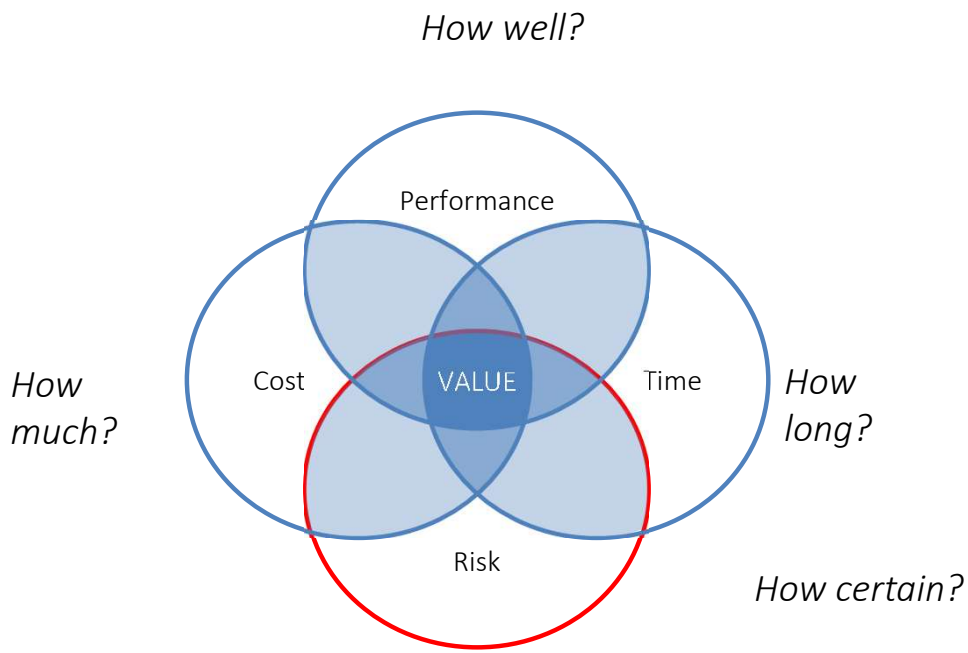
Why is Value Analysis the right process?

- Value Analysis is a structured approach to innovation.
- It uses creative and analytical techniques to reach a common understanding of needs.
- VA balances project objectives and performance with costs, schedule and risks, leading to quicker decision-making.

Why is Risk Analysis needed

- Systematically identifies uncertainties/risks
- Risk Analysis helps teams avoid optimism bias
- Risks that are identified cannot be ignored
- Deliberative risk analysis avoids crisis management

Elements of Value



Why Combine Risk and VA

- VA with RA combines both creative and analytical steps to generate risk informed solutions
- Project Risks provide a focus for the Value Study team
- VA accelerates decision making.

Risk Analysis – the basics

- Risk - an exposure to the chance of injury or loss
- Risk - an uncertain event or condition that, if it occurs, has an effect on at least one project objective, such as time, cost, scope or quality
- Risk Management - an active process to identify risks, assess exposures and develop action plans to bring risk within acceptable levels

Qualitative Risk

Definition: impact and probability assessed or judged, over a range

- Provides the ability to assess the importance of the risk without detailed information on probabilities or impacts
- 1-2 hour process
- Discussing risks opens team to uncertainties and opportunities.

Risk Identification

- A risk breakdown structure helps systematically identify risks.
- Review similar projects for risks

Risk Breakdown Structure

	Scope SCP	Property PPY	Railroad RR
n	Risk of Infrastructure Failure	Property Acquisition Issues - Expropriation, Hearings of Necessity, Relocations	Railroad Coordination and Realignments
	Additional Requirements resulting from stakeholder or EA concerns (developers, public trails, change in government direction)	Access Management, Cooridor Control	Railroad Coordination during construction (flagging, work restrictions, work windows etc)

Source: MTO RBS

SMART Risks

Specific	- Understand project impacts
Measureable	- Impacts and Likelihood
Attributable	- What is causing the risk (risk trigger)
Relevant	- Is the risk applicable?
Time Bound	- Will the risk occur during the project?

Risk Measurement

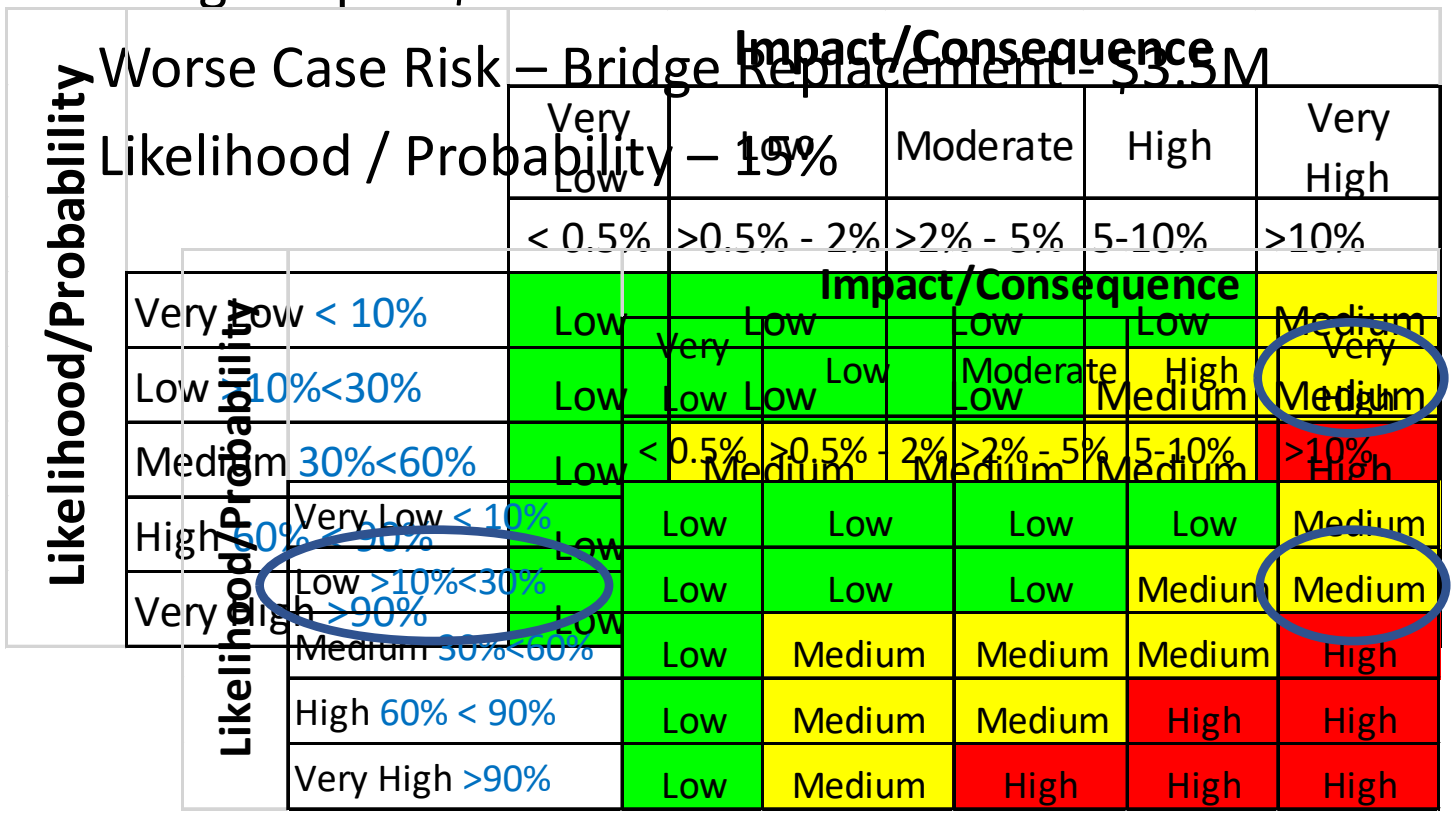
- Impact – consequences if risk occurs
- Likelihood – probability risk will occur
- Risk = impact x likelihood
- Risk Range – Worse Case to Best Case

Criticality Matrix

Bridge Repair $1.5M

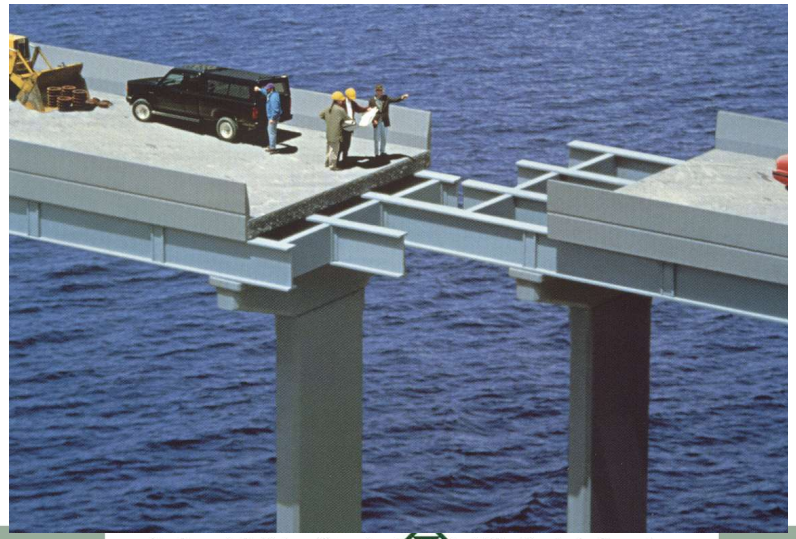
Worse Case Risk – Bridge Replacement - $3.5M

Likelihood / Probability – 15%



Risk Responses / Actions

Negative Risk (Threat)	Positive Risk (Opportunity)
Mitigate	Exploit
Transfer	Share
Avoid	Enhance
Accept	



Risk Register

- Common tool - critical to effective project management and includes:
  - Identification & Description
  - Impact / Severity
  - Likelihood / Probability
  - Response, and
  - Management Approach

Detailed Description of Risk Event (Specific, Measurable, Attributable, Relevant, Time bound) [SMART]	Risk Cost (without response) ($)	Probability	Cost Impact	Schedule Impact	Total	Cost Criticality	Schedule Criticali	Risk Response Strategy
					0			

Sample Risk Register

K REGISTER

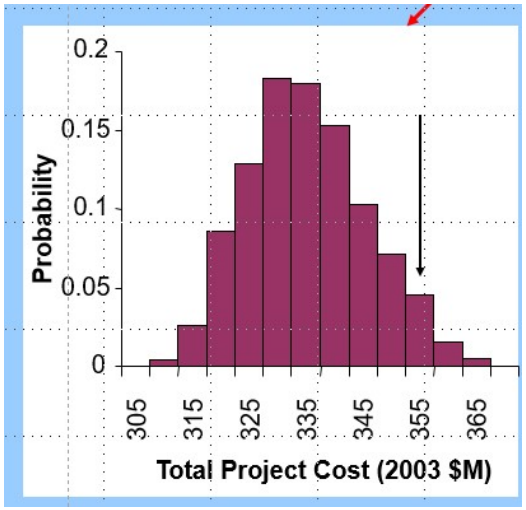
Risk Information						
Risk Category	**Threat / Opportunity**	**Risk Status**	**Risk Event Name**	**S.M.A.R.T. Risk Description (Specific, Measurable, Attributable, Relevant, and Time Bound)**	**Risk Trigger *(Symptoms)***	**Type of Risk *(Performance, Cost, Schedule)***
Environmental	Threat	Active	In-Water Work Windows	There is a chance that the current in-water work windows could be further reduced by the State Fish and Game Dept.	State Fish and Game Dept. reclassifies presence of certain sensitive fish species	Cost, Schedule

NCHRP 850 Value Management System Tool Risk Register

	Un-Managed State (Pre-Response)							
		Performance		Cost		Schedule		
sk ce,	Probability	Impact	Severity	Impact	Severity	Impact	Severity	Total Severity
le	Medium		0	Medium	0.36	High	0.48	0.280

Quantitative Risk Analysis

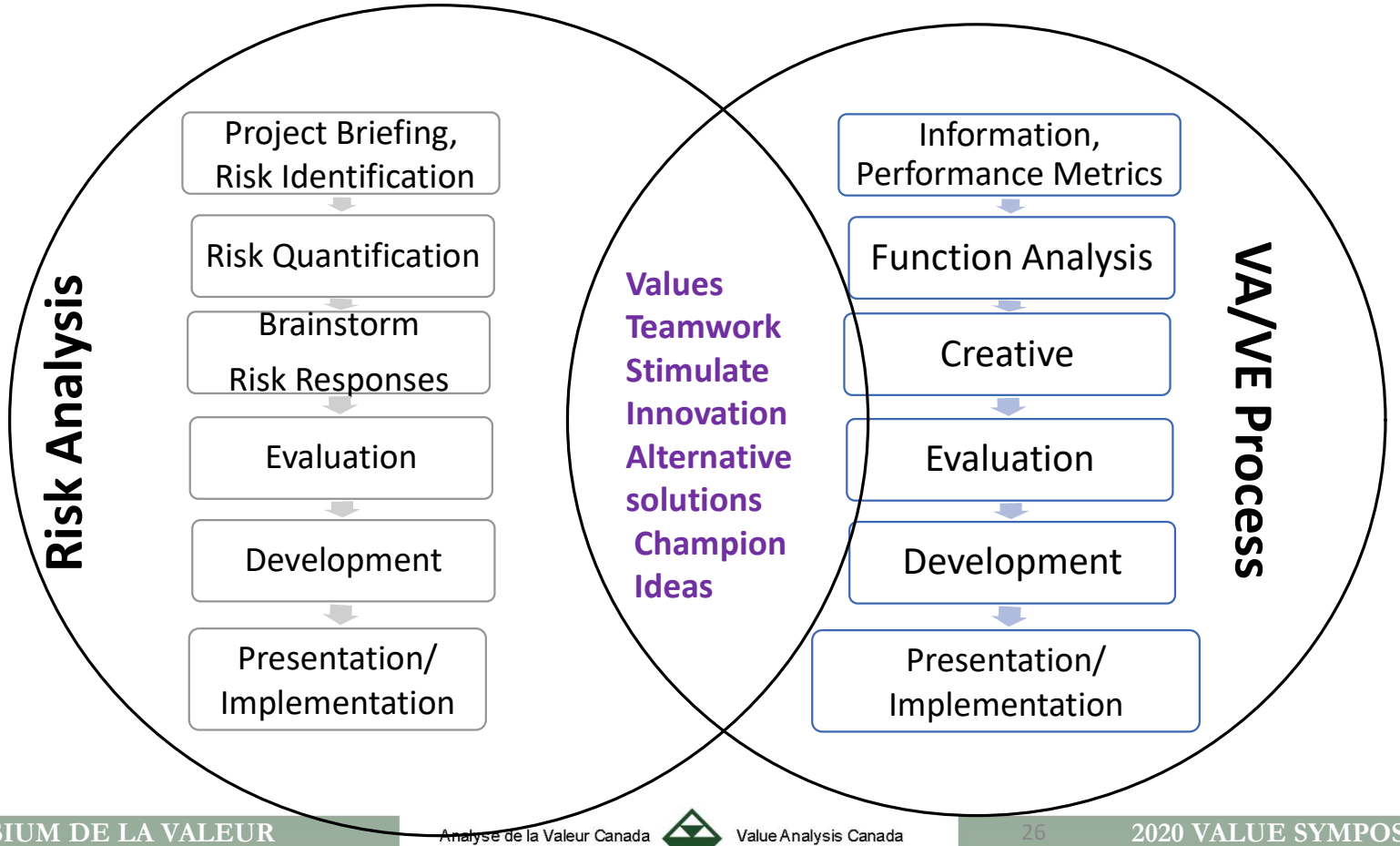
- Modelling the range of the likely project cost and project schedule on large or complex projects.
- Using a probabilistic simulation to model likely outcomes.
- Known as probabilistic risk based estimating or Cost Risk Assessment.



Qualitative versus Quantitative

Qualitative	Quantitative (probabilistic)
Can be incorporated into VA job plan	Requires 1-3 days prior to VA workshop and 1-2 days post VA workshop.
Easily understood	Modelled results require interpretation.
Each risk is assessed separately.	Cumulative impact of risks are modelled.
VA Team Members	VA Team Members, risk modeler, Risk Elicitor
Often led by VE team leader	Led by Risk Elicitor.

Integrating Risk with VA



Pre workshop

- Study Scoping
  - Confirm Study Scope
  - Identify Project Issues
  - Discuss known risks
  - Identify baseline info, performance measures
  - Confirm Subject Matter Experts
- Orientation Meeting
  - Distribute Risk Register
  - Brief team on workshop process

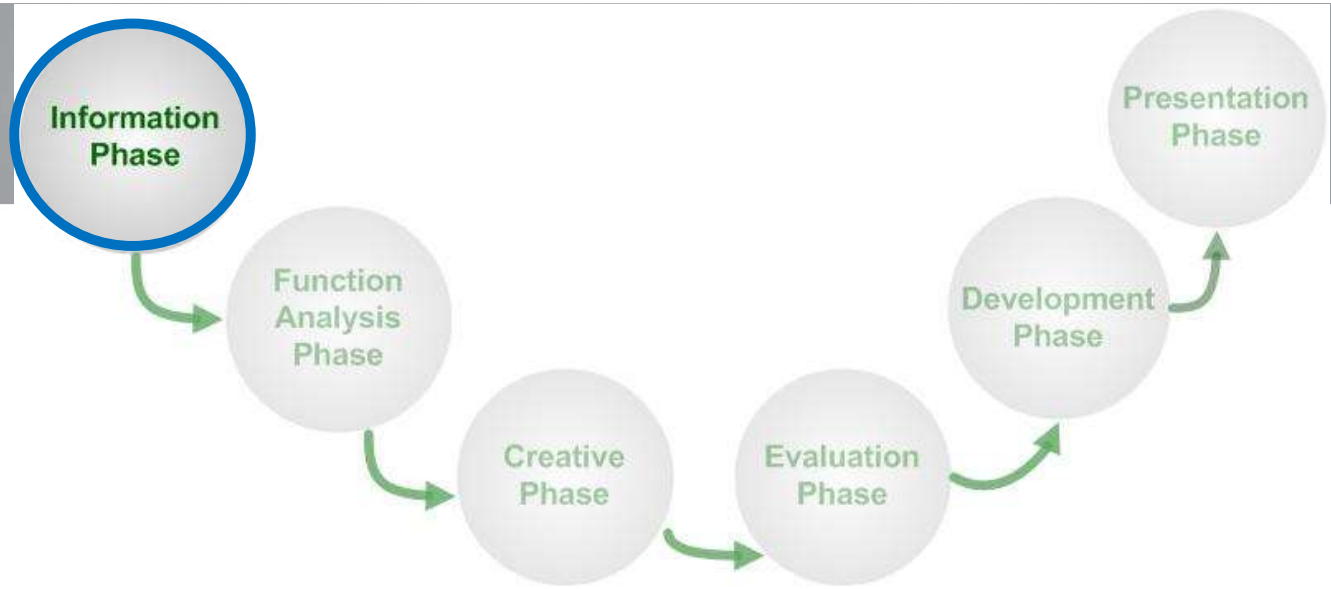
The VA/Risk Team

VA

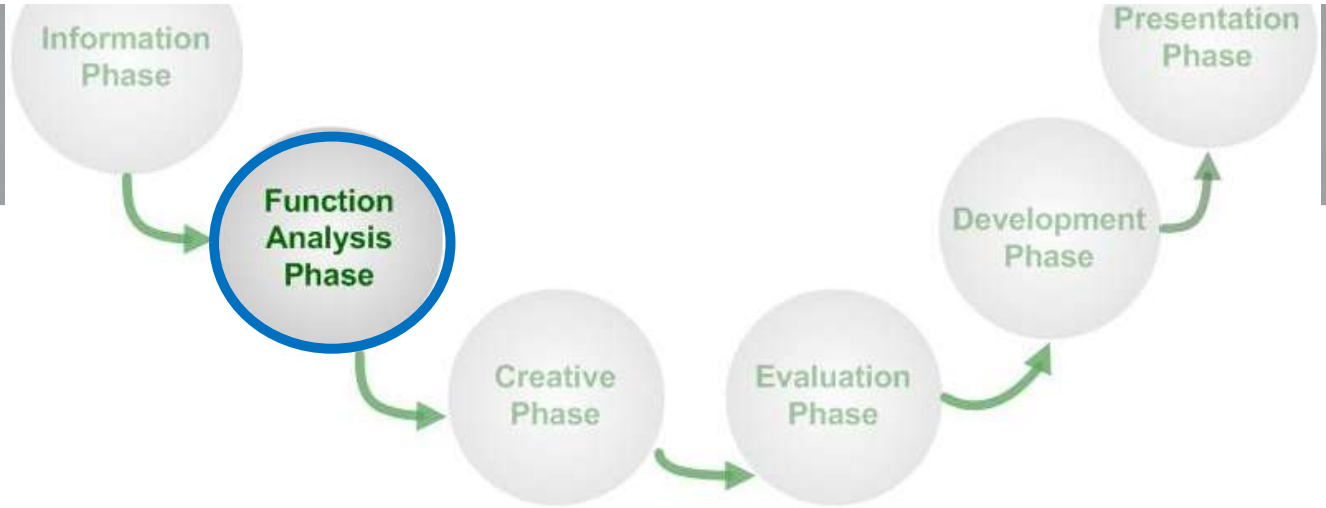
- Those who own the problem
- Those who are responsible for solutions
- Those who will benefit from the solutions

Risk

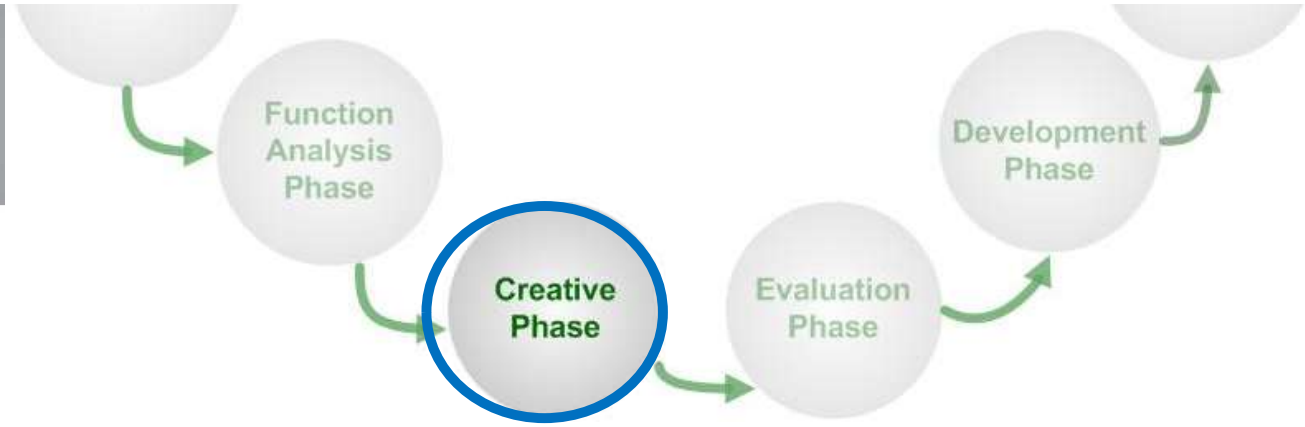
- SME's for all risk areas.
- Staff who experienced risks on similar projects.



- Review project information
- Clearly define project objectives and performance metrics
- Establish key constraints
- Review top Cost, Schedule, Performance Risks
- Update Risk Register



- Answers the question “What must it do?”
- Clarifies performance metrics through functions
- Identify Verb-Noun Pairs for function based brainstorming.



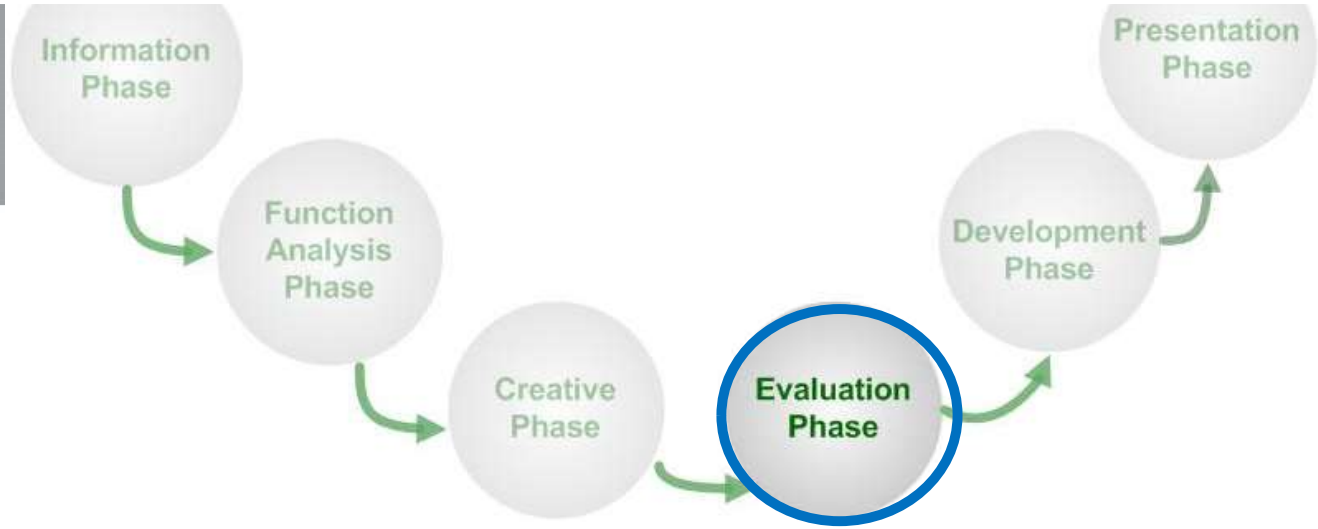
- Generates alternate ideas for performing functions
- Brainstorm risk response strategies

Verb - Noun Risks

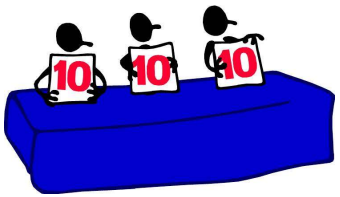
The TRB tool brainstorming of risk responses

Function		Ideas	Rating
Verb	Noun		
Accept	Soil Conditions	Maintain the EV contingency and incorporate into budget and schedule	
Mitigate	Soil Conditions	Perform additional borings at bent locations	
Avoid	Soil Conditions	Clear span the floodway to avoid potential poor soils	
Transfer	Soil Conditions	Shift project delivery method to Design-Build and have contractor bear the risk	

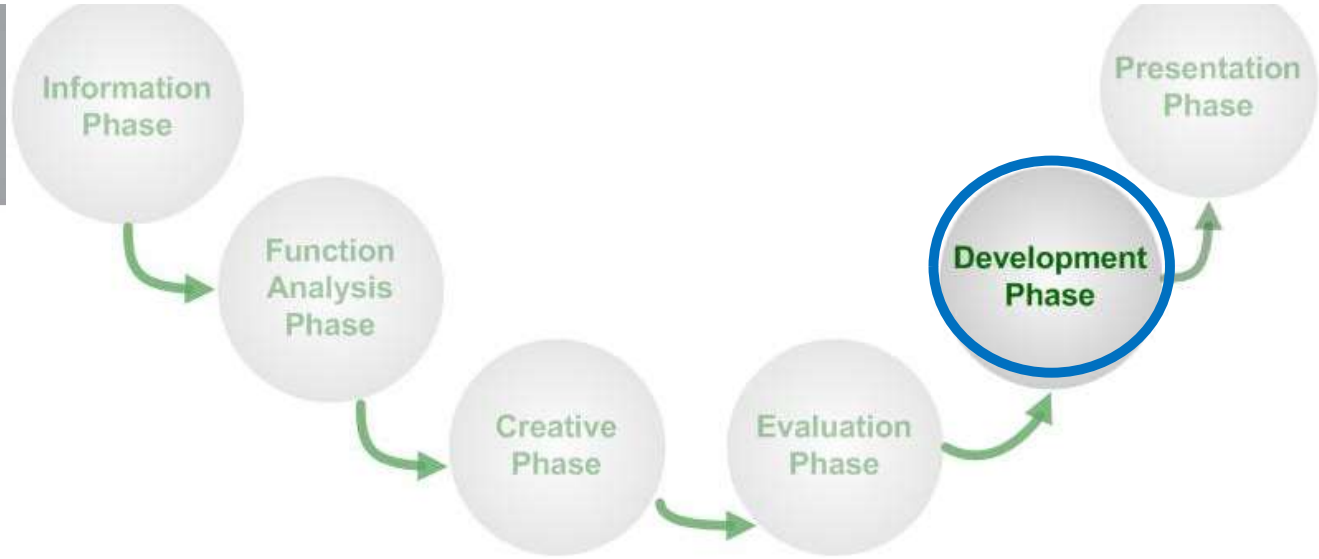
Function		Ideas	Rating	Assigned t
Verb	Noun			
Exploit	Funding	Modify the scope to lengthen the frontage road and improve project performance		
Share	Funding	Offer SIWFT a cost sharing approach in order to extend frontage road		
Enhance	Funding			



- Ideas from the creative phase are evaluated and prioritized for their potential to:
  - Save cost
  - Improve Performance
  - Manage Risk (cost, schedule, performance)

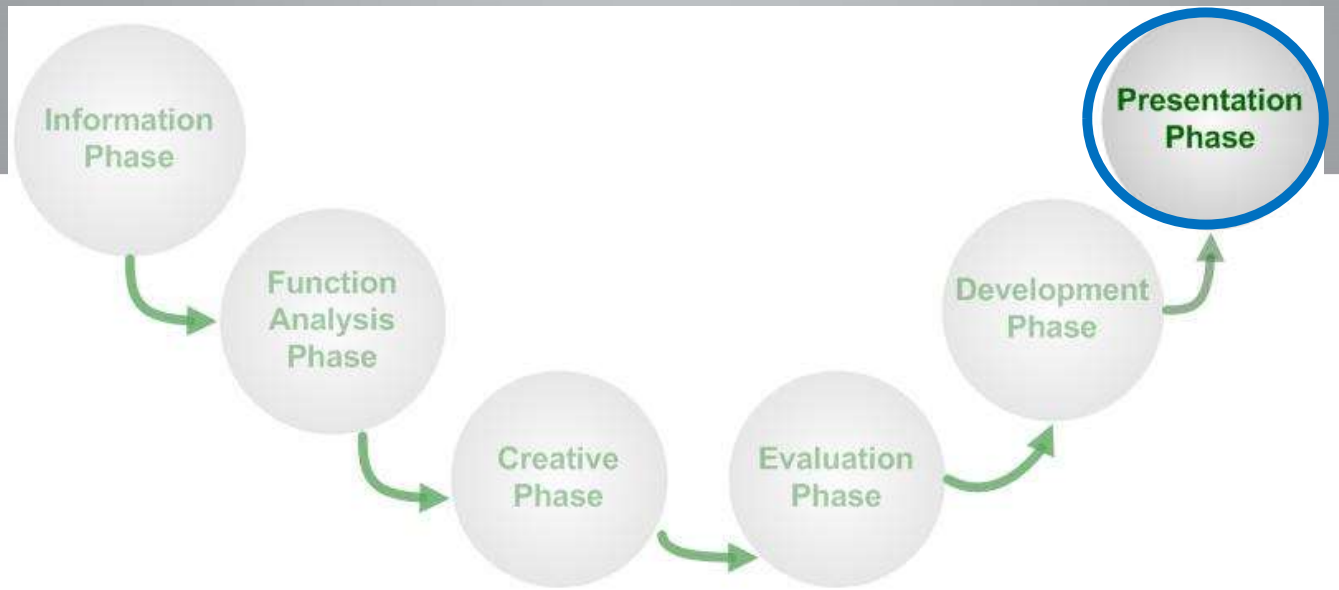


- Ideas with high cost, schedule or performance risks are typically eliminated



- Compare value proposal risks to baseline risk
- Compare value proposal performance to baseline
- Eliminate value proposals where risk greater than rewards

Discussion of Risk Impacts:
Because they require less in-channel falsework, both the 2'-0" RC slab and the 6'-4" PC girder alternatives present less risk of adverse impacts to the river channel.



- Demonstrate depth, knowledge and thoroughness by:
  - Review the baseline
  - Identify uncertainties/ concerns with baseline
  - Highlight top risks (threats and opportunities)
  - Identify benefits of value proposals and risks
  - Identify steps to reduce uncertainty with value proposals

Further Information

- NCHRP Report 850
  - Value Management System Tool
  - Sample Project Application
  - Training Videos

- A National Highway Institute eBook Training in Probabilistic Risk-based Estimating is expected to be released in 2021.

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