Project Risk: A PMI Approach

April 11, 2007
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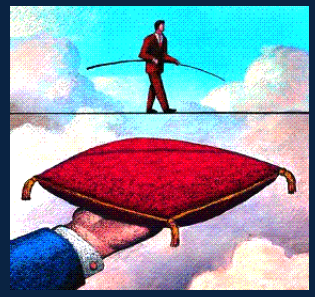

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You may wonder why an architect is speaking to you today on risk

12 Years ago, met with 25 others downtown to discuss forming a local chapter of the PMI

Local chapter has taken off and so has PMI internationally, This is probably a good thing

Everybody these days seems to be called a project manager

Today Risk based on a Project Management Institute Approach with some diversions

PMI org promoting stand of good PM practice and terminology worldwide

Lingua Franca for project managers

The PMI document is called the Proj Mgmt B of K or PMBOK

There are nine knowledge areas in the PMBOK including risk.
Risk is now more visible, RFP's now ask how we will respond, Some not sure how to deal with it

Introduction only, if you were to study for PMP designation it would take 100-120 hours
While the nine knowledge areas are studied separately the art of PM is knowing how to apply them
Resource not a methodology

Familiar with the six aspects of R Management

Proactive not reactive

Different people or groups of people have different perceptions of risk at different times

I recall someone telling me that you are not an engineer until you made a $50,000 dollar mistake.

I suspect that amount is much higher today.

We want to do good work for our clients, we all want projects that run smoothly, maintain the public trust

Project Risk Management

- Risk Management Planning
- Risk Identification
- Qualitative Risk Analysis
- Quantitative Risk Analysis
- Risk Response Planning
- Risk Monitoring and Control

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When you first see this slide the amount of information seems daunting

Man Planning – How to approach and plan R man activities

Identification – *Determining* which risks might affect the project

Qualitative – Analysis of risks to *prioritize* project impacts

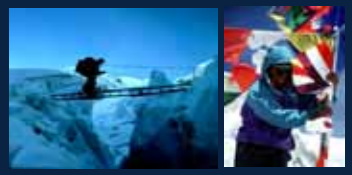
Quantitative – Assessing the probability and impacts of risk, *estimating effects*

Risk Resp Planning – Developing procedures to enhance opportunities and reduce threats

Risk Mon and Control – Mon exist R, Ident new R, Exec R resp P, Mon effect and Taking corr action

I want to dwell on this a bit as it forms our index - Like knowledge areas we study separately…

Risk - PMI



- Is an uncertain event or condition that if it occurs has positive or negative effect
- Includes threats as well as opportunities
- Relationship with other PM Processes

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Hazard
- CCPE Discussion Paper

- A chemical or physical condition that has the potential to cause harm or damage to people, the environment, assets or production processes

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February 2006

Research Committee

Canadian Council of Professional Engineers

Hazard is the potential risk event that exists regardless of the person's position to it or knowledge of it to harm them or cause damage.

Risk
- CCPE Discussion Paper

- The possibility of injury, loss or environmental injury created by a hazard. Risk is a function of probability, severity of consequences and perception of communication received
- Different people or groups have different levels of risk tolerance at different times

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Risk is a dynamic process

Note that this definition includes one of my messages to you…

that different people or groups …

This man may have a different view of his own risk than you might

Domino Loss Causation Model -Westray Coal Mine Explosion

Immediate Causes

Substandard Practices – Poor housekeeping, clean-up, coal dust

Substandard Conditions – High methane concentrations

Basic Causes

Personal Factors – stress caused by exposure to methane and fatigue from 12 hours shifts

Job Factors – lack of safe work practices and procedures

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Risk Management Systems

- Implemented, supported and enforced by management as a system and cultural attitude
- Safety management programs, standards, mandatory compliance, QC, QA

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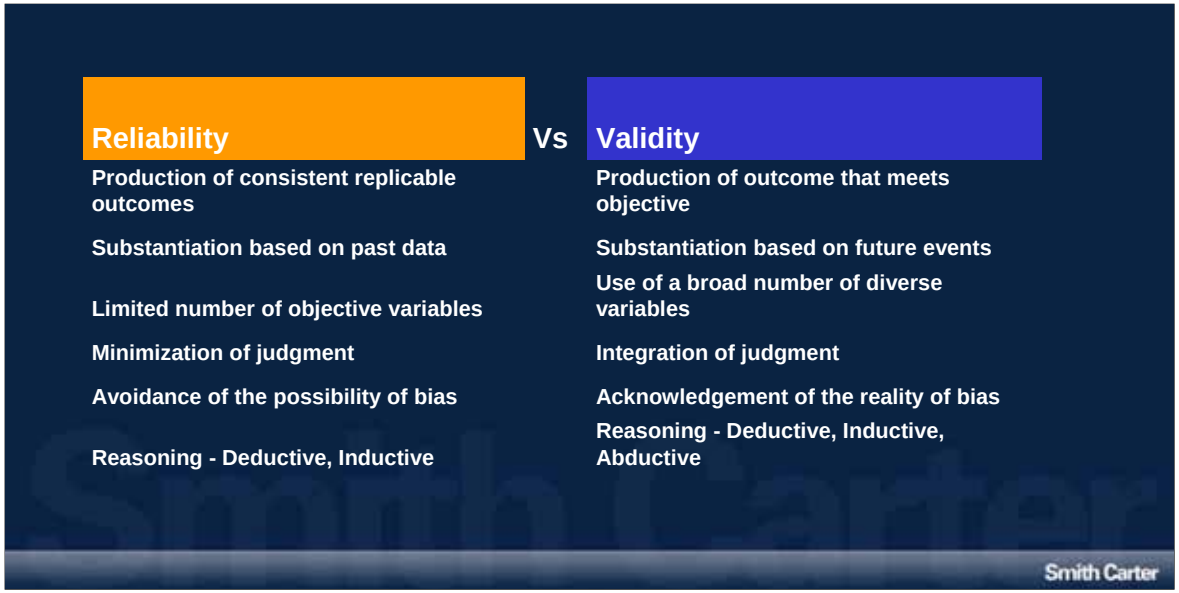
Lack of Risk Management as Root Cause

Which brings us to another one of my messages to you - Be proactive not reactive



Ongoing Tension – Business Models

used to characterize an approach to

Component Selection

Systems Design

Problem Solving

Personal bias regarding risk

Risk Management Planning

- How to approach and plan risk management activities
- Level to match the risk and importance of the project for your organization
- Methodologies for the project life cycle
- Will vary with project stage, amount of information and flexibility allowed for risk management

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Here is a picture of a young engineer training how to deal with contractors

If you were designing your first nuclear power plant you might spend more time on risk management planning than if your were designing your 20th water treatment plant.

Keep in mind that lack of risk management applied can be a project risk

Risk Management Planning - Issues

- Communication - high quality data, document assumptions
- Metrics - thresholds for project success warnings and triggers for action
- Allocation – roles and responsibilities
- Timing – iterative process, perception

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Risk Identification

- Determining which risks might affect the project
- Positive or negative - internal or external
- Categories common to the industry
- Technical, quality or performance risks
- Brainstorming, interviewing, Delphi technique, SWOT, checklists, cause and effect diagrams, assumption analysis

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Qualitative Risk Analysis

- Analysis of risks to prioritize project impacts and guide risk responses
- Time criticality can amplify risks
- Quality of data affects risk assessment
- Performed iteratively, circumstances may change as the project develops

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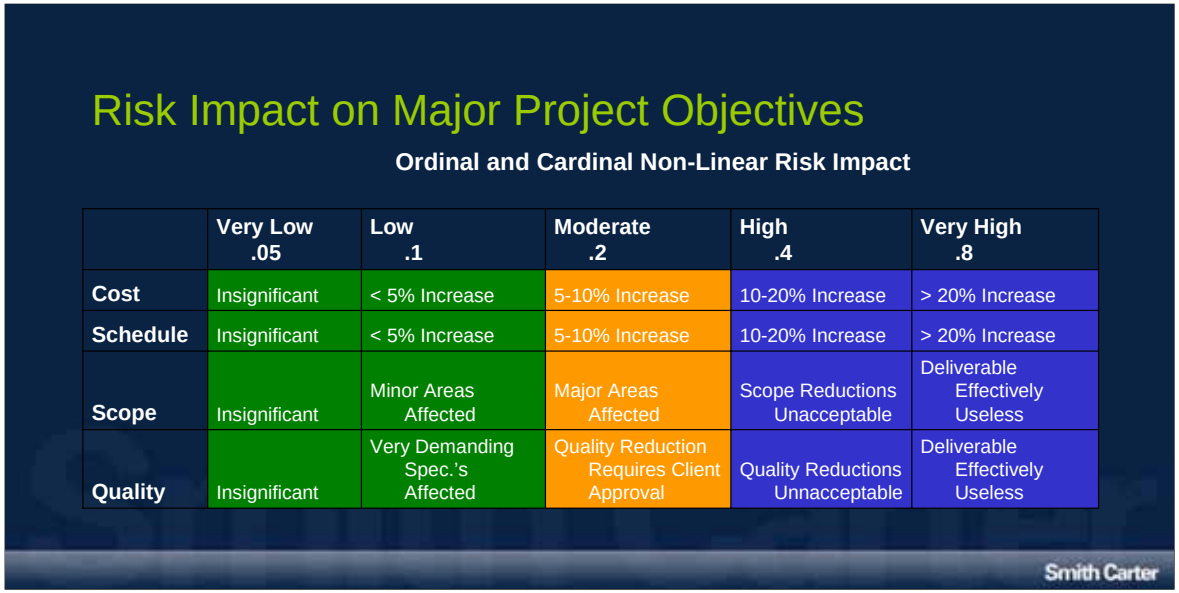

	Very Low .05	Low .1	Moderate .2	High .4	Very High .8
Cost	Insignificant	< 5% Increase	5-10% Increase	10-20% Increase	> 20% Increase
Schedule	Insignificant	< 5% Increase	5-10% Increase	10-20% Increase	> 20% Increase
Scope	Insignificant	Minor Areas Affected	Major Areas Affected	Scope Reductions Unacceptable	Deliverable Effectively Useless
Quality	Insignificant	Very Demanding Spec.'s Affected	Quality Reduction Requires Client Approval	Quality Reductions Unnacceptable	Deliverable Effectively Useless

Should be done at the start of the project – Does anyone here do this?

Risk measured two ways

-Ordinal – in words

-Cardinal – using numbers, as a fraction of one

-Can also be linear or non-linear

Risk thresholds colour coded

Problem is not all project objectives have equal risk metrics

Probability Impact Matrix – Single Risk

Probability						
	0.9	**0.09**	0.27	0.45	0.63	0.81
	0.7	**0.07**	0.21	0.35	0.49	0.63
	0.5	**0.05**	0.15	0.25	0.35	0.45
	0.3	**0.03**	0.09	0.15	0.21	0.27
	0.1	**0.01**	0.03	0.05	0.07	0.09
		0.1	0.3	0.5	0.7	0.9
		Impact				

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Note that in the PM world risk and probability is measured as a fraction of 1

Quantitative Risk Analysis

- Assessing the probability and impacts of risks and estimating their effects
- Rationale for risk ranges guides strategies for response
- Sensitivity analysis
- Monte Carlo technique

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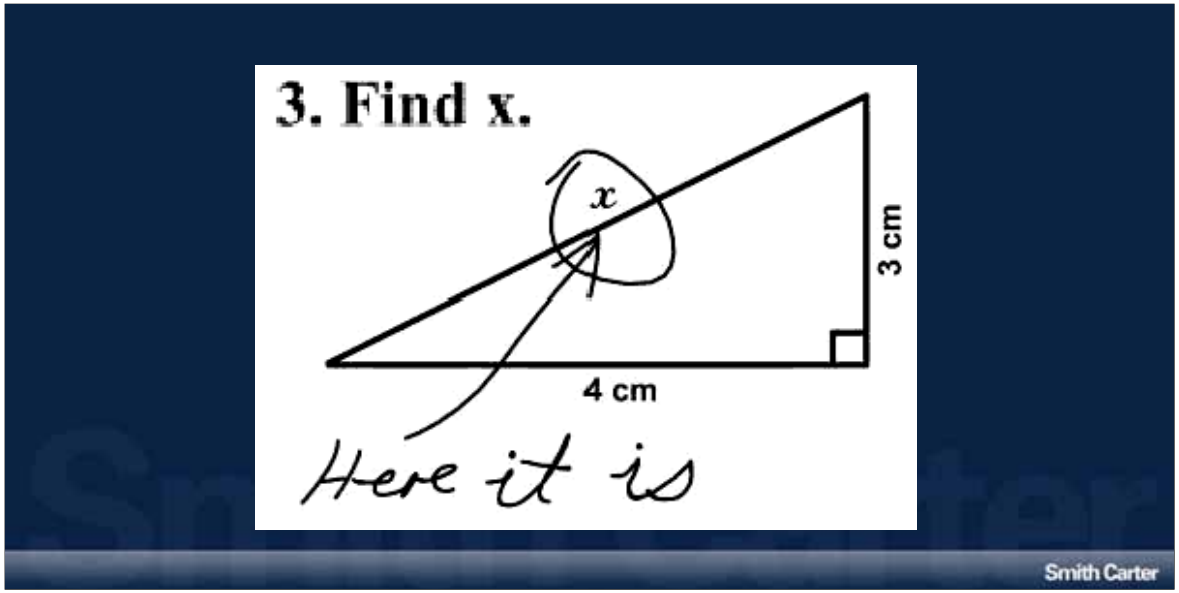
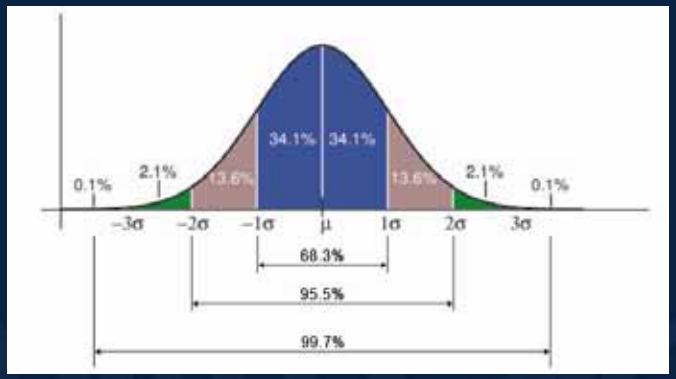


We are going to do some math now.

When I first saw this I thought it was funny

Then I showed it to an engineer and he said 5.

The Normal Distribution Curve



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Here is what I use

Assuming you have good historical data and a large sample set

The most important thing is determining the mean, that's all I use

One Standard deviation from the mean provides 68.2% of all results…

Other distributions as well

Triangular Distributions -Mode is highest value - Mean may be asymmetrical

Regression to the Mean

Quantitative Risk Analysis - Outputs

- Prioritized list of quantified risks
- Probability of achieving project objectives with the current plan
- Trend analysis

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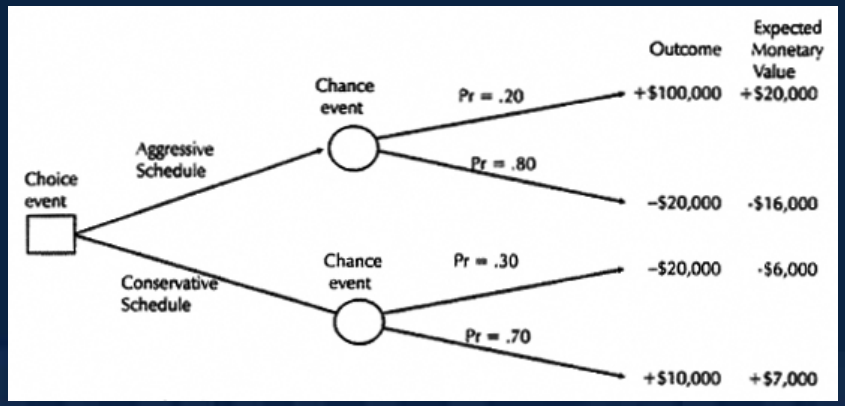
The PMBOK is designed so that the knowledge areas all have common a format inputs, tools and techniques and outputs

Outputs of one section are often the inputs to another

Tip for studying, reduce amount of info to process, I taped all PMBOK knowledge areas with all their inputs, tools and techniques and output on a sheet of foam core and connected outputs from one area to inputs of another that matched like Russell Crowe in A Beautiful Mind

Decision Tree



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Used to weigh a business opportunity or risk

Options add to 100 %

Multiply probability by benefit or loss

Add up all sub options

Aggressive Schedule results is $4,000

Conservative Schedule result is $1,000

Risk Response Planning

- Developing procedures to enhance opportunities and reduce threats
- Inputs all previous data
- Risk thresholds for project, triggers
- Risk ownership by project team members

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Response Categories

Risk response
- Avoidance
- Transference
- Mitigation
- Acceptance

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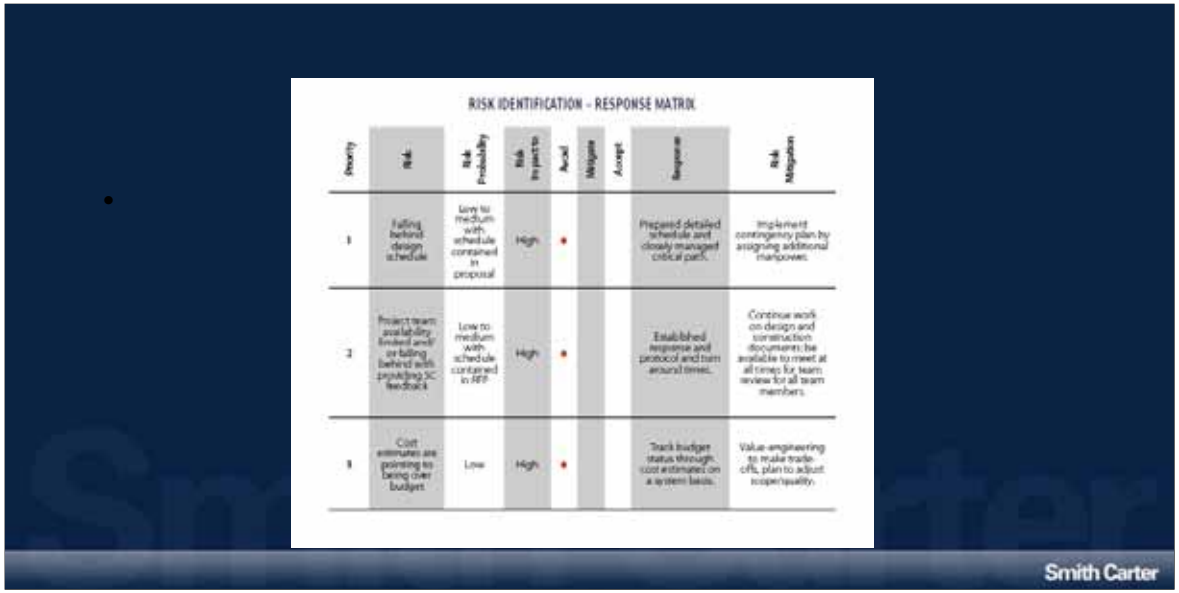

Risk Response Spreadsheet by a Consultant

Risk Categories listed along the top

Note transference is not included

Risk Response Selection

- Appropriate to the severity of the risk
- Cost effective and timely to be successful
- Realistic within the project context
- Agreed upon by all parties
- Owned by a responsible person
- Specific actions

Imagine you are in a boardroom and you have to make a tough project decision

We have all been in this situation – right?

Did it follow these criteria?

Dynamic of the different people involved at a specific point in time

Response Implementation

- Thresholds for action
- Budgets, response times, contingencies
- Primary and back-up plans
- Secondary and residual Risks

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So imagine now that you have to take action and respond – Do you ignore the pain and keep …

Implementation process closely resembles the CO process during contract administration

My neighbour for example decided to fill in the sides of his concrete approach to his garage with topsoil after his wife drove off the edge…

It is important to keep in mind that implementation of or risk responses may change the project plan

Risk Monitoring

- Monitoring identified risks, residual risks, identifying new risks
- Execution plans should be monitored as well as effectiveness

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Risk Control

- Taking corrective action
  - Choosing alternative strategies
  - Implementing contingency plan
  - Replanning the project

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Picture is appropriate – Represents the cyclical nature of project management

Whether corrective action has a small or large impact each change represents a cycle to itself of project and risk management

Significant changes may require replanning the project and starting over.

“An expert is someone who knows the worst things that can happen and knows how to avoid them”

Niels Bohr

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Risk Management Mantra I believe in

Hope I have help make you more familiar with the six aspects of risk management
Communicated the importance of being proactive not reactive and that
different people or groups have different levels of risk tolerance at different times