

HOW WELL DO YOU SLEEP AT NIGHT?

# PROJECT RISK MANAGEMENT

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# Presentation Outline

- ① Why do we need Risk Management?
- ② Benefits of Risk Management
- ③ Risk Management Standards/  
Guidelines
- ④ Project Risk Management Approach &  
Processes
- ⑤ Further Important Considerations

# Why do we need Risk Management?

## ● Titanic – 1912

- Design Faults – Transverse bulkheads not high enough – No inner hull (Like the Great Eastern, 1858)
- Not enough lifeboats (53%)
- Insufficient preparation for evacuation
- Complacency – “unsinkable”
- Part of a systemic problem – White Star - \$!



# Why do we need Risk Management?

- She sank on 15 April 1912
- Approx 1500 people died, Only 700 saved
- Dramatic change in maritime safety regulations thereafter
- Irony – White Star never survived – so much for the competitive advantage by trimming standards



# Why do we need Risk Management?

## ◎ Channel Tunnel Project

- Marvel of engineering
- BOO(T) Project
- Concurrent Engineering
- Failure as a project
  - Budget increase from £4.87bn to over £10bn
  - Time over-run
  - Business viability of venture? (Tax payers covering 'miscalculated' income stream)



# Why do we need Risk Management?

- BP – Gulf of Mexico Oil Spill, 2010



# Why do we need Risk Management?



**BP has said the cost of cleaning up the oil leak in the Gulf of Mexico has now reached \$2.65bn (£1.76bn) – BBC, June 2010**



# Why do we need Risk Management?



# Why do we need Risk Management?

- “At the end of the day, BP’s inept risk management sank the company. Had its management and board realized the magnitude of financial exposure to them should an accident occur they might have insisted on expensive, fail-safe, back-up systems. The same risk management mentality should have also applied to regulators in the region who, according to a disturbing report, appear to have left it all up to the oil companies and their suppliers. That aside, the ramifications of this gigantic risk management mishap are profound.” (Diane Francis, Financial Post, 2010).

# Why do we need Risk Management?

- Evidence that vast numbers of projects continue to fail...and for the same old reasons (APM, Oct, 2011) – lack of appropriate risk management processes  
Not capturing lessons learnt + over confidence...

“Failed: Seven out of 10 gov IT projects”

“Bridge project costs increase by \$4.35 million.”

“Hungary: Toxic spill factory chief executive arrested”

“Council pays millions to bail out stadium”

“Rena: race to pump oil from 'dying ship'”

“Two dozen planes sit idle because the project to build the next generation airliner has stalled yet again”

“IT failures cost \$4.5 Billion”

# Benefits of Risk Management

- ⦿ Appropriate Risk Management planning & implementation can prevent such disasters

“Chance favours the prepared mind” (Louis Pasteur, 1822-1895)

- ⦿ Can positively assist with the challenges faced by NZ Local Government:
  - Complex social, political, cultural environment – multiple stakeholders
  - Natural & Human disasters
  - Rapid pace of development in some areas
  - Current economic instability

# Benefits of Risk Management

- ◎ Benefits of Project Risk Management
  - Research – Risk Management has positive impact on projects (objectives, triple constraint – t,\$,Q,S,CS)
  - Increased certainty & fewer surprises
  - More effective management of change
  - More efficient use of resources

# Benefits of Risk Management?

- Better management through improved decision making
- Improved value for money
- Increased opportunity for innovation v
- Improved ability to deal with a crisis if it eventuates

# Risk Management Standards

- ◎ Large number of standards
  - PM BoK (PMI), Ch10, 2004
  - AS/NZS 4360:2004
  - AS/NZS ISO 31000:2009
  - Risk Management Standard (IRM, ALARM, AIRMIC – 2002)
  - Prince 2 (2009)
  - OCG (2002)...
- ◎ Plethora and consistency is part of the problem
- ◎ Approach and processes – blend of standards and literature

# Project Risk Management Processes

## Risk Management Fundamentals

- ⦿ A risk is not a certainty
- ⦿ Systematic, Proactive, Explicit
- ⦿ Threats & Opportunities
- ⦿ Definitions of Risk Management
  - “The culture, processes and structures that are directed towards realising potential opportunities, whilst managing adverse effects” (AS/NZS 4360:2004)
  - “Uncertainty that matters” (Hillson, 2004)

# Project Risk Management Processes

## Risk Management Fundamentals

- ⦿ Iterative & 'alive'
- ⦿ Link to project objectives
- ⦿ Tailored to the needs of the project
  - Nature of the project
  - Perceived level of risk
  - Importance of the project to the organisation
  - Risk tolerance

# Project Risk Management Processes

## Risk Management Fundamentals

### ⦿ Inputs required

- Project background
- Historical records
- Lessons learnt from previous projects
- Outputs from project planning (goals & objectives, scope, WBS, schedule, estimates, procurement plan, project constraints, assumptions, risk tolerance)

# Project Risk Management Processes

- ① Risk Management Planning
- ② Risk Identification
- ③ Qualitative Risk Analysis
- ④ Quantitative Risk Analysis
- ⑤ Risk Response Plan
- ⑥ Risk Monitoring & Control

# Project Risk Management Processes

## Risk Management Planning

- ⦿ How to proceed? Who should be involved? When? How frequently?
- ⦿ Methodology
- ⦿ Roles & responsibilities
- ⦿ Budget for the RM process
- ⦿ Timing
- ⦿ Scoring & interpretation (consistency is important)
- ⦿ Thresholds

# Project Risk Management Processes

## Risk Management Planning

- Reporting formats
- Tracking (monitor risks & document for future projects)
- Establish internal & external context

# Project Risk Management Processes

## Risk Identification

- ◎ Methods
  - Categories & lists
  - Historical records (Lessons Learnt)
  - Brainstorming
  - Expert opinions
  - Workshops
- ◎ Spend time identifying risks appropriately

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# Project Risk Management Processes

## Risk Identification

- ⊙ Threats and Opportunities
  - Threat (downside risk)
  - Opportunity (upside risk)
- ⊙ Defining risk appropriately is critical
  - Use Cause-Risk-Effect meta-language
  - Example of a threat

Cause	Risk	Effect
Due to upper management not supporting the project	Resources may not be available	Resulting in not being able to complete the project on time

# Project Risk Management Processes

## Risk Identification

- Example of an opportunity

Cause	Opportunity	Effect
A Competitor may release a new technology	Which could also be available for our project	Saving time on the project




# Project Risk Management Processes

## Qualitative Risk Assessment

- Use a Likelihood/ Impact matrix to prioritise
- Likelihood x Impact = Risk Level

### Example 1

- Likelihood
  - 1 = Rare
  - 2 = Unlikely
  - 3 = Moderate
  - 4 = Likely
  - 5 = Almost Certain
- Impact (on the project objectives)
  - 1 = Insignificant
  - 2 = Minor
  - 3 = Moderate
  - 4 = Major
  - 5 = Catastrophe (R)/ Significant (O)

High	
Medium	
Low	

		5	10	15	20	25
	4	8	12	16	20	20
Likelihood	3	6	9	12	15	15
	2	4	6	8	10	10
	1	2	3	4	5	5
						Impact

# Project Risk Management Processes

## Qualitative Risk Assessment

### Example 2

Measures of <u>Likelihood</u> of Occurrence	
<b>Almost Certain</b>	Expected to occur
<b>Likely</b>	Will probably occur in most circumstances
<b>Possible</b>	Could occur at some stage
<b>Unlikely</b>	Not expected to occur
<b>Rare</b>	Only expected to occur in exceptional circumstances

# Project Risk Management Processes

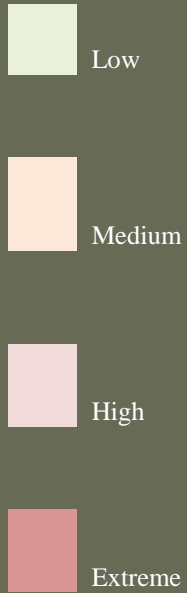
## Qualitative Risk Assessment

Measures of <u>Impact/Consequence</u> - Threat					
	Negligible	Low	Moderate	High	Extreme
<b>Scope Impact</b>	Barely noticeable	Minor	Major	Unacceptable	Requires project redefinition
<b>Cost Impact</b>	Insignificant	< 5%	5-10%	10-20%	> 20%
<b>Schedule Impact</b>	Insignificant	< 5%	5-10%	10-20%	> 20%
<b>Quality Impact</b>	Degradation barely noticeable	Minimal areas affected	Requires stakeholder approval	Quality reduction is unacceptable	End result is effectively unusable
<b>Other Impact</b>	Barely noticeable	Minor	Significant impact	Severe impact	Highest impact

Measures of <u>Impact/Consequence</u> - Opportunity					
	Negligible	Low	Moderate	High	Extreme
<b>Scope Impact</b>	Barely noticeable	Minor	Medium	Major	Very Significant
<b>Cost Impact</b>	Insignificant	< 5%	5-10%	10-20%	> 20%
<b>Schedule Impact</b>	Insignificant	< 5%	5-10%	10-20%	> 20%
<b>Quality Impact</b>	Improvement barely noticeable	Minimal areas affected	Medium areas affected	Major	Very Significant
<b>Other Impact</b>	Barely noticeable	Minor	Medium impact	Major impact	Very Significant Impact

# Project Risk Management Processes

## Qualitative Risk Assessment



Likelihood		Impact				
		Negligible	Low	Moderate	High	Extreme
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

# Project Risk Management Processes

## Quantitative Risk Assessment

- ⦿ Focus on numerical analysis of risk
- ⦿ Probability & Impact (prioritised risks)
- ⦿ Seeking more objective component of expected value
  - Probability of 20% (instead of rating of say 2)
  - Impact of 2w or \$30k (instead of say a rating of 3)
- ⦿ How much risk? Where? – to focus efforts in highest risk areas

# Project Risk Management Processes

## Quantitative Risk Assessment

- After RRP, Qt RA done to see benefits
- Trick – Balance effort with needs of the project
- Focus on the risks that warrant a response
- Qt RA is “not the silver bullet”
- No point doing quantification if risks are not identified
- Risk Identification is paramount

# Project Risk Management Processes

## Quantitative Risk Assessment

- ① Limit subjectivity in estimates
  - Expert opinion
  - Estimate in smaller components
  - Detailed
- ① Time & Cost are common quantitative (Quality/ Customer Satisfaction – difficult to measure, but important)

# Project Risk Management Processes

## Quantitative Risk Assessment

### ① Technique – Expected Value

- The probability weighted average of all possible outcomes
- To determine which risks go through to RRP

Risk Id	Task	Probability	Cost Impact	Expected Value of the Cost	Move to RRP
14 (R)	b	30%	\$66,000	\$19,800	Yes
20 (R)	b	30%	\$8,000	\$2,400	No
6 (O)	e	15%	-\$35,000	-\$5,250	Yes

# Project Risk Management Processes

## Quantitative Risk Assessment

- Expected Value (level of risk exposure a project has)

<i>Project Estimate</i>				\$600,000
Risk Id	Task	Probability	Cost Impact	Expected Value of Cost
1	A	5%	\$75,000	\$3,750
2	A	55%	-\$60,000	-\$33,000
3	A	75%	\$100,000	\$75,000
4	A	5%	-\$25,000	-\$1,250
5	A	15%	\$8,000	\$1,200
<i>Total Expected Value of the cost of risk</i>				\$45,700

- Best Case –  $600,000 - (60,000 + 25,000) = \$515,000$
- With no further analysis (mgt's expectation) = \$600,000
- Expected value of the project –  $600,000 + 45,700 = \$645,700$
- Worst Case –  $600,000 + \$183 = \$783,000$

# Project Risk Management Processes

## Quantitative Risk Assessment

- After RRP redo analysis to see if risks have decreased
- Expected Value (level of risk exposure) can determine if schedule or cost management objectives are realistic
- ◎ Other Quantitative technique – Monte Carlo Simulation
  - Determining project cost and time through probabilistic distributions (instead of deterministic determinations)-(optimistic-most likely-pessimistic)
  - Monte Carlo simulations can show the riskiness of a project (t and \$)
  - RRP can help decrease the probability of specific risks

# Project Risk Management Processes

## Risk Response Plan

- ◉ Developing options & determining actions to reduce Threats & enhance Opportunities on the project objectives
- ◉ 3 Levels
  - Do something to eliminate the R before it happens or increase it for Os.
  - Do something if it happens – *Contingency Plan*
  - Do something if the contingency plans are not effective – *Fallback Plan*
- ◉ Triggers – Early warning sign that tells R owners/ PMs when to implement *contingency* or *fallback* plans
- ◉ Residual Risks – Which Risks Remain? Team to capture at risk reviews – improve RRPs to eliminate Residual Risk

# Project Risk Management Processes

## Risk Response Plan

- ◎ 7 A's for effective Risk Responses
  - **Appropriate** (appropriate level of response for the R)
  - **Affordable**
  - **Actionable** (an action window (timeframe) should be determined for risk responses)
  - **Achievable**
  - **Assessed** (post-response R assessment – look for residual + 2ndary risks)
  - **Agreed**
  - **Allocated & Accepted** (each risk response should be owned by a single person. They are accountable for implementing the response)

# Project Risk Management Processes

## Risk Response Plan

### ⦿ Threats

- **Avoidance** ie: avoid the risk altogether – eliminate the cause eg: change project scope
- **Mitigation** ie: attempt to reduce likelihood &/or consequences
- **Acceptance** ie: accept the risk eg: active – contingency; or passive – do nothing
- **Transference** ie: transfer the risk to another party eg: insurance, contractual...

# Project Risk Management Processes

## Risk Response Plan

### ◎ Opportunities

- **Exploit** (avoidance) – Increase the likelihood of the opportunity by making the cause more likely
- **Enhance** (mitigate) – Increasing the likelihood or impact
- **Accept** (acceptance) – If it happens, it happens
- **Sharing** (transference) – Retaining opportunities instead of transferring to others.

# Project Risk Management Processes

## Risk Register

- ⦿ Established, distributed to the team & stakeholders & continually monitored/updated
- ⦿ Can consist of the following:
  - Risk Id
  - Date Id
  - Risk (cause-risk-effect)
  - Likelihood/Impact
  - Risk Score
  - Quantitative assessment

# Project Risk Management Processes

## Risk Register

- Preventative/ enabling actions (RRPs)
- Trigger
- Contingency plan
- Fallback plan
- Risk owner

# Project Risk Management Processes

## Risk Monitoring & Control

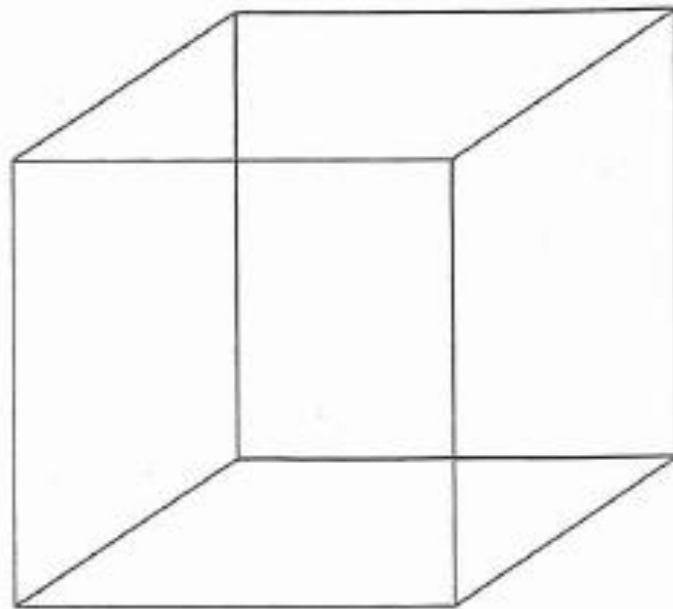
- Risks should be explicitly managed throughout the project life cycle
- Keep track of identified Rs/Os
- Monitor residual, 2ndary Rs
- Monitor RRPs and their effectiveness
- Id new Rs/Os
- How?
  - Periodic project risk reviews
  - Continually update the risk register
  - Risks/ Opportunities part of each PCG agenda
  - PM takes overall responsibility for continually updating and reviewing the risk register and progress with RRPs

# Further Important Considerations

## ⦿ Attitudes/ Perceptions

- Take cognisance of attitudes shaped by perceptions
- The human mind has a fundamental tendency to create certainty
- At an unconscious level, our perceptual systems automatically transform uncertainty into certainty – eg Necker Cube

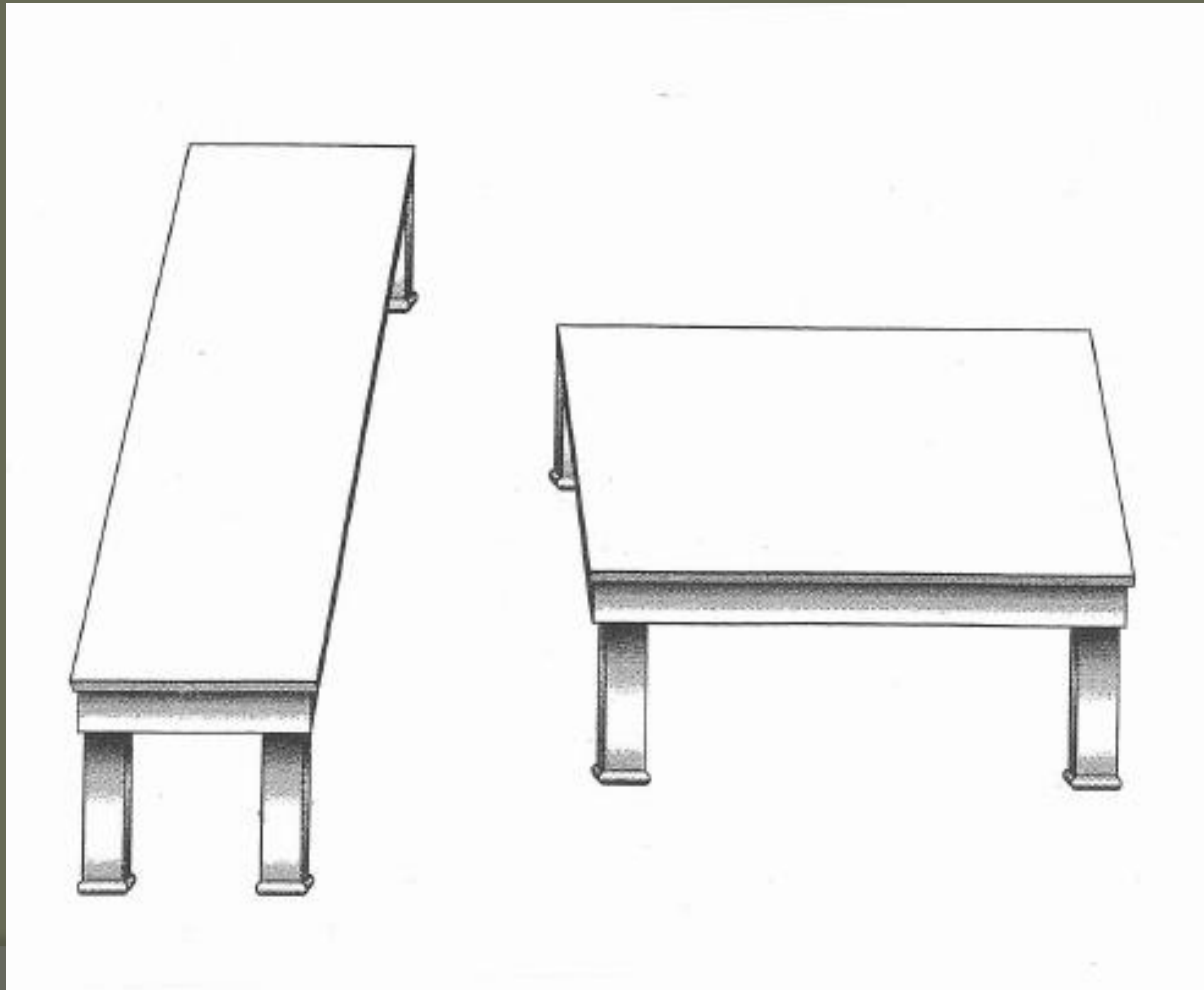
# Further Important Considerations



**FIGURE 2-1.** *The Necker cube.* If you fixate on the drawing, your perceptual impression shifts between two different cubes—one projecting into and the other out of the page.

# Further Important Considerations

- Roger Shepard's Turning Tables



# Further Important Considerations

- The perceptual system analyses incomplete & ambiguous information & sells the best guess to the conscious experience as a definitive product
- The illusion of certainty – Susan's story
- So many influences that shape our perceptions and attitudes:

# Further Important Considerations

*According to repeated nationwide surveys,*

## More Doctors Smoke **CAMELS** than any other cigarette!

Doctors in every branch of medicine were asked, "What cigarette do you smoke?" The brand named most was Camel!

You'll smoke Camels for the same reason so many doctors enjoy them. Camels have real, real mildness, pack after pack, and a flavor unmatched by any other cigarette. Make this sensible man: Smoke only Camels for 30 days and see how well Camels please your taste. How well they suit your throat as you smoke. You'll see how enjoyable a cigarette can be!

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**DR. ROBERT W. HARRIS**, M.D., says, "I smoke Camels. They give me a real, real mildness and a flavor that's just what I need."

**DR. ROBERT W. HARRIS**, M.D., says, "I smoke Camels. They give me a real, real mildness and a flavor that's just what I need."

*For 30 days, test Camels in your "T-Zone" (T for Throat, T for Taste).*  
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Hit her with tangy Tiptalet Cherry. Or rich, grape-y Tiptalet Burgundy. Or luscious Tiptalet Blueberry. It's Wild Tiptalet. It's new. Different. Delicious in taste and in aroma. A puff in her direction and she'll follow you, anywhere. Or less... you get smoking satisfaction without smoking smoke.

<b>TIPALET</b> CHERRY	<b>TIPALET</b> BURGUNDY	<b>TIPALET</b> BLUEBERRY	<b>TIPALET</b> WILD
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Smokers of America, do yourself a favor. Make your next cigarette a **Tiptalet**.

New from Murriell. About 5 for 25¢.

# Further Important Considerations



# Further Important Considerations

- ⦿ Consider perceptions and attitudes very carefully
- ⦿ Perhaps Franklin's Law can help –  
“Nothing in life is certain, but death and taxes”

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# Further Important Considerations

## ◎ Complexity

- Irrationality
- Non-linear processes
- 'Butterfly Effect'
- Complexity Theory, Chaos Theory, System Dynamics

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# Further Important Considerations

## ◎ 'Black Swans'

- Low 'probability' High impact events
  - Holistic view of systems
  - Continuous observation & monitoring of risks