Project Risk Management

Presented by
Stephen Smith

Introduction

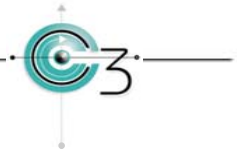
- Risk Management
  - Insurance
  - Business
  - Financial
  - **Project Risk Management**

Project

- A temporary endeavour undertaken to create a unique product or service
- A series of activities designed to achieve a specific outcome within a set budget and timescale

Project Management

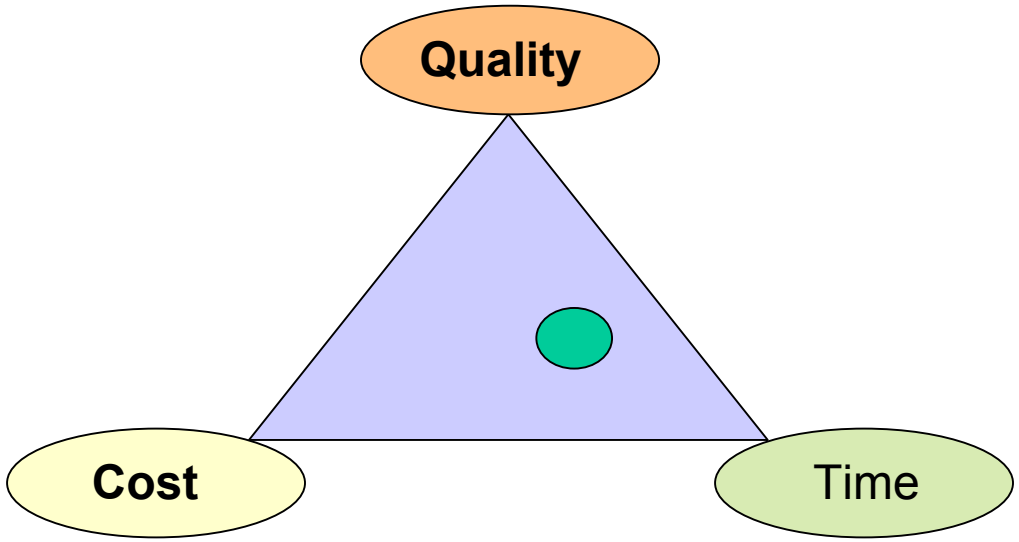
Currie & Brown



- The application of knowledge, skills tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project

Currie & Brown

- The balancing of competing demands of:



Risk Definitions

- **Risk** – an **uncertain event** or condition that, if it occurs, has a **positive or negative affect** on a project objective

A risk has a cause and, if it occurs, an effect. – PMBOK (Project Management Body of Knowledge)

Lets digress

- Sun Tzu – Art of War
- Translated into French 1782
- Legend – Napoleons key to success
- 13 Chapters on waging war
- Chapter 4 – Tactical Dispositions

Tactics

- He wins his battles by making no mistakes.
  - He plans no superfluous marches, he devises no futile attacks. One who seeks to conquer by sheer strength, clever though he may be at winning pitched battles, is also liable on occasion to be vanquished; **whereas he who can look into the future and discern conditions that are not yet manifest, will never make a blunder and therefore invariably win.**

Winning

- In PM environment
  - Quality
  - Cost
  - Time

  AVOIDING mistakes

Project Disasters

Original:

- Estimate - AUS$7m
- Schedule - 4 years

Actual:

- Cost - AUS$102m
- Duration - 14 years

Research

- Google – search string
  - Construction project cost and time overruns

Risk Management

- Better way to achieve project Aims and Objectives

Definitions

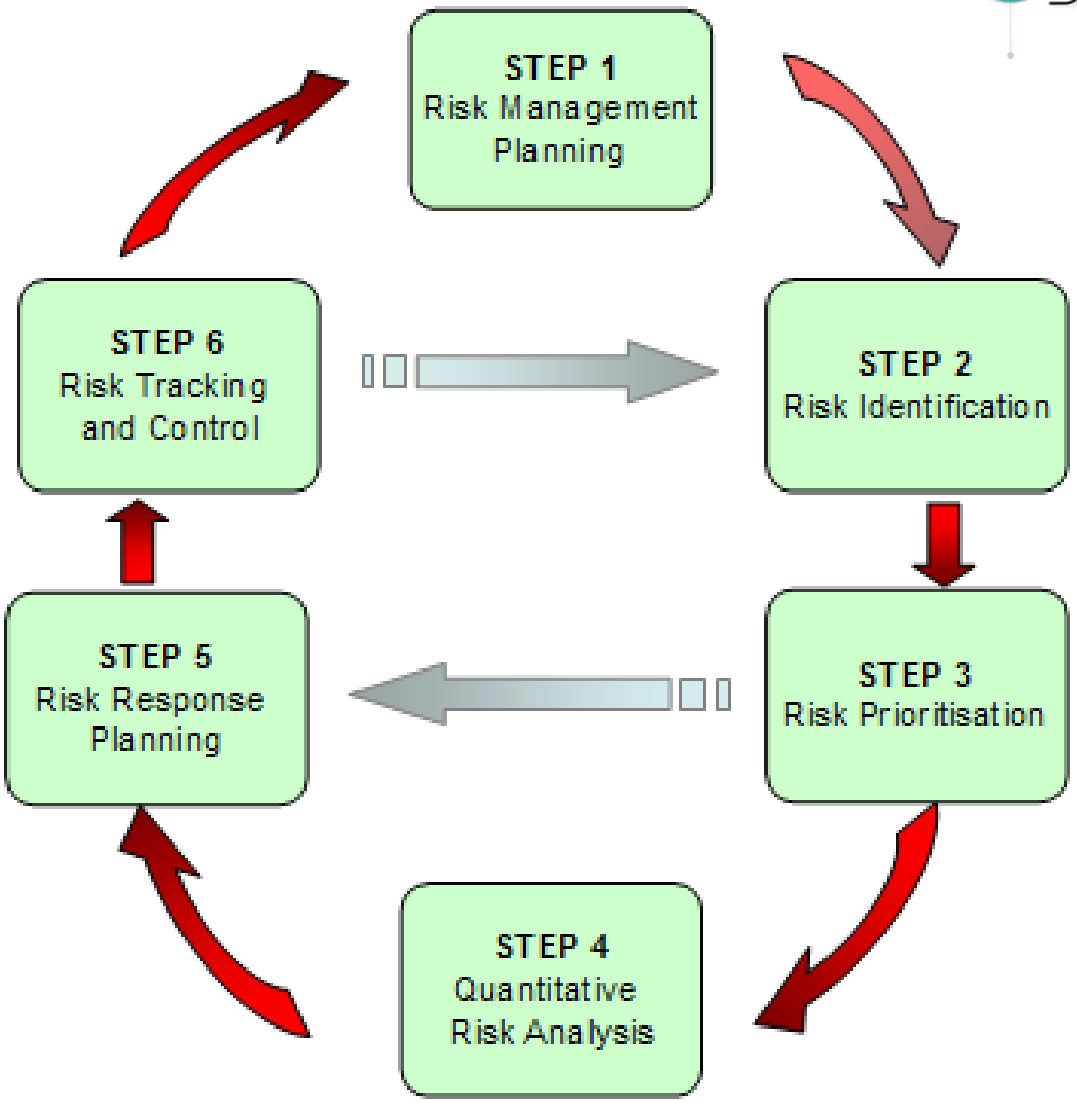
- **Project Aims**
  - The clearly defined deliverables, which have to be met to fulfil a specific requirement

Definitions

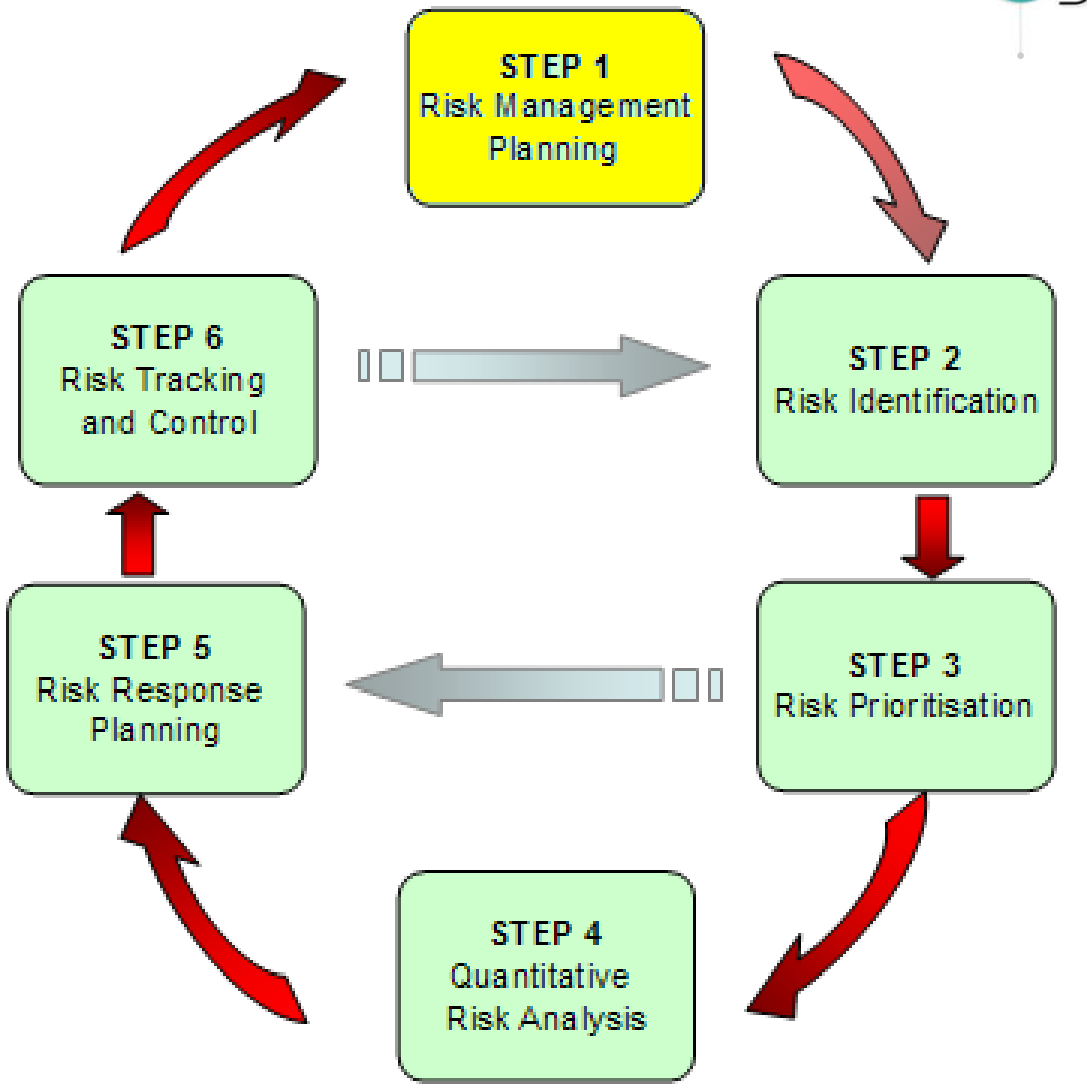
- **Project Objectives –**
- **cost,**
- **time,**
- **quality**

  Additional objectives: e.g. Environmental, health and safety, no disruption to existing facilities etc.

Risk Management Methodology



Step 1 - RM Planning



Step 1 - RM Planning

- Risk Management Plan
  - **identification,**
  - **prioritisation, assessment,**
  - **analysis,**
  - **response planning and**
  - **tracking and control**

Does not address individual risks –

Step 1 - RM Planning

Risk Management Planning **Inputs**

- **Project Definition** –
  - statement of need
  - business case
- **Organisational Risk Requirements** –
  - current organisational Risk Management Methodology
- **Defined Roles and Responsibilities** –
  - roles and responsibilities
  - documented and indicate the decision making process
- **Stakeholder Risk Tolerances** –
  - different tolerances for risk
  - identifying the risk tolerances of the different stakeholders will enable the project team to prioritise and respond appropriately to project risk
- **Template for Risk Management Plan** –
  - pre-defined risk management plan templates

Step 1 - RM Planning

Risk Management Planning **Procedure**

- **Planning Meetings** – hold planning meetings in order to develop the risk management plan and obtain stakeholder buy-in

Step 1 - RM Planning

Risk Management Planning **Deliverables**

- **Risk Management Plan** – Including the following:
  - **Risk Management Process** - Approaches, tools, and data sources. Early stage, the aims, objectives and scope of the project identified
  - **Risk Management Hierarchy** - Describe how the various functional areas will manage their own risk process
  - **Roles and Responsibilities** –
    - **Identify individuals / teams to fill roles**
    - **Risk Co-ordinator to oversee the risk management process and ensure mitigation procedures are implemented**
    - **Risk Manager responsible for delivery of the complete risk management service**
    - **Risk Facilitator from outside the project to help perform an independent unbiased risk analysis**

Step 1 - RM Planning

Risk Management Planning **Deliverables**

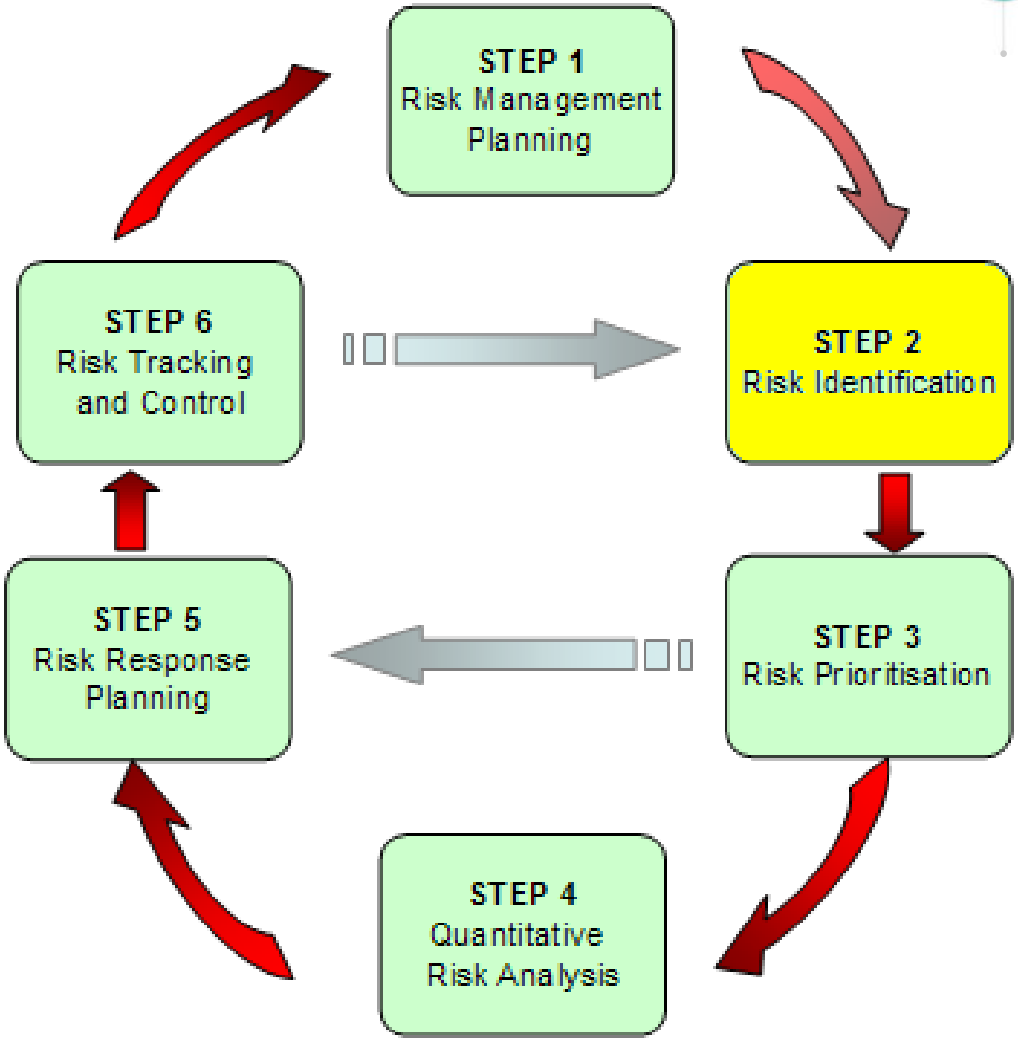
- **Budgeting** –
  - Budget for hiring external risk management consultants
- **Timing** –
  - Frequency throughout project lifecycle
- **Scoring and Interpretation** –
  - Methods of scoring – Impact/Probability
- **Acceptable Tolerance** –
  - Acceptable tolerances and targets
  - Proceed through the gates on meeting criteria

Step 1 - RM Planning

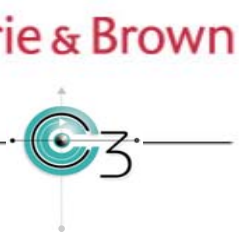
Risk Management Planning **Deliverables**

- **Reporting Standards** –
  - Define how results of risk management process will be documented, analysed and communicated to the project team, internal and external stakeholders, and project sponsors
- **Project Risk Database** –
  - Recording and centralising risk related information
  - Risk registers and risk templates etc. should be standardised to facilitate ease of data transfer between different projects
- **Quality Assurance** –
  - Compliance with company QA procedures

Step 2 – Risk Identification



Step 2 – Risk Identification



- Involves determining which risks might affect the project and documenting their characteristics
- Participants in risk identification generally include the following:
  - Project team
  - Risk management team
  - Subject matter experts
  - Customers
  - End users
  - Stakeholders
- Risk identification occurs throughout the life of the project

Step 2 – Risk Identification

Risk Identification **Inputs**

- **Risk Management Plan**
- **Project Work Breakdown Structure and Project Programme**
- **Project Planning Outputs -** Projects aims, objectives, and scope
- **Risk Categories -** The risk categories should reflect common sources of risk:
  - Health & Safety Risks
  - Budget Risks
  - Schedule Risks
  - Quality/Technical Risks
  - Communication Risks
- **Historical Information -** Use information from prior projects

Step 2 – Risk Identification

Risk Identification **Procedure**

- **Documentation Reviews -** Perform a structured review of the business case, statement of need and project identification documents
- **Info Gathering Techniques**
  - **Brainstorming**
  - **Interviewing**
- **Checklists - Checklists can be developed based on historical information and knowledge accumulated**
  - **Advantage:** it facilitates identification based on lessons learned
  - **Disadvantage:** it may limit risk identification to only the items on the checklist
  - **Checklists should always be supplemented by other risk identification techniques**
- **Assumption Analysis -** Every project is conceived and developed based on a set of assumptions. Project team identifies risks from assumptions made in development of the business case

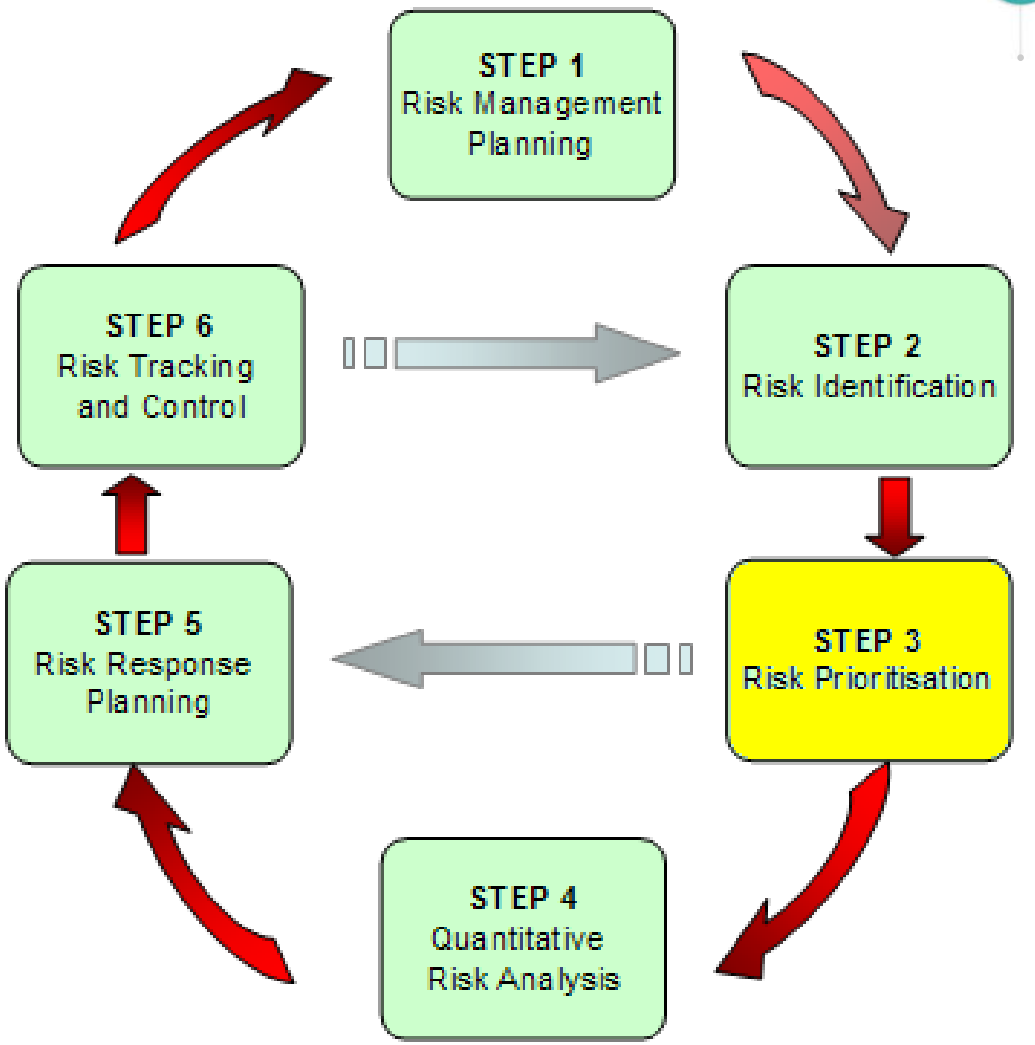
Step 2 – Risk Identification

Currie & Brown

Risk Identification **Deliverables**

- **Risk List** – Unprioritised list of Project Risks

Step 3 – Risk Prioritisation



Step 3 – Risk Assessment and Prioritisation

- **Risk assessment and prioritisation -** Scoring
  - Assessing impact of a risk should it materialise, and probability that an identified risk will materialise.
  - Revisited at different stages during the project process

Step 3 – Risk Assessment and Prioritisation

Currie & Brown

Risk Assessment and Prioritisation **Inputs**

- **Risk Management Plan**
- **Risk Identification**
- **Scales of Probability and Impact**

Step 3 – Risk Assessment and Prioritisation

Currie & Brown

Risk Assessment and Prioritisation **Procedure**

- **Risk Probability and Impact**
  - *Risk probability* is the likelihood that a risk will occur
  - *Risk impact* is the effect on a project if the risk occurs
- **Analysis of risks using probability and impact help identify those risks that should be managed aggressively**
- **Probability/Impact Risk Rating Matrix -** A matrix may be constructed that assigns risk ratings to risks based on combining probability and impact scales. One: SWIFT analysis
- **Calculated Risk Exposure -** To complete risk prioritisation, the specific risk's exposure must be determined. Exposure is a combination of probability and impact (using SWIFT analysis above)

Step 3 – Risk Assessment and Prioritisation

Currie & Brown

Risk Assessment and Prioritisation **Deliverables**

- **Project Risk Register -** The project Risk Register is derived from assessing the probability impact of the risk list and utilising score ratings to rank the risks
- **Risk Matrix -** Risk matrix displays current prioritisation of risks. It is the high level tool used to communicate risks and priorities
- **List of Risks for Additional Management -** Risks classified as high or moderate would be prime candidates for more analysis, including quantitative risk analysis, and for risk management action

SWIFT Analysis – Page 1 of 4

1.Probability

Level	Descrip.	Safety Definition	Commercial Probability		
1	Incredible	The event is unlikely to occur, but may be theoretically possible. It can be assumed that it will occur very exceptionally, but not less than once every 100 years.	0% to 5%	Nil Chance	Cost/time impact is not possible. Nuisance, current expense impact only. Financial/time impact not to be considered.
2	Improbable	So unlikely that it can be assumed that it will not occur or it cannot occur.	5% to 45%	Unlikely	Cost/time impact is remotely possible. Medium losses within the margin of insurance deducible (or excess). Risk may be transferred to contractor.
3	Remote	Unlikely but possible in the period of concern (eg once in ten times in the life of the project).	45% to 55%	As Likely as Not	Cost/time has little less than an equal chance of occurring. Manageable losses. Risk may be shared.
4	Occasional	Some time in the period of the project.	55% to 95%	Likely	Cost/time impact is fairly possible. Range of largest previous losses. On priority one review list.
5	Probable	Several times in the period of the project.	95% to 99%	Almost Certain	Cost/time impact is certain. Serious losses. On priority one review list.
6	Frequent	Likely to occur frequently, many times during the period of the project.	100%	Certain	Cost/time impact is certain. Most serious – total lost type. On priority one review list.

SWIFT Analysis – Page 2 of 4

Currie & Brown

Impact

Lev.	Descrip.	Severity	Equivalent Fatalities	Severity on System	Commercial Impact	
1	Minor	So minor as to be regarded as without consequence.	0.001	Superficial Damage	NIL	So minor as to be regarded as without consequence.
2	Marginal	Serious minor injury (requiring more that 3 days off work) or several minor injuries resulting in up to 3 days off work.	0.01	Minor Damage/ Repair to Structure / System	LOW	Can be accommodated as part of contingency, may require an insurance claim.
3	Critical	Occupational threatening injury or illness, substantial damages.	1	Major Damage/ Repair to Structure / System	MEDIUM	Possibility of exceeding contingency.
4	Catastrophic	Multi Fatality and/or major injuries.	>1	Total Collapse of Structure / System	HIGH	Sever financial implications/ major system loss/ loss of major possession.

SWIFT Analysis – Page 3 of 4

Currie & Brown

1.Risk Ranking

Consequence / Probability	4 Very High	3 High	2 Medium	1 Low →
6 Frequent	24: Intolerable	Intolerable	Intolerable	Tolerable
5 Probable	Intolerable	Intolerable	Tolerable	Tolerable
4 Occasional	Intolerable	Intolerable	Tolerable	Negligible
3 Remote	Intolerable	Tolerable	Tolerable	Negligible
2 Improbable	Tolerable	Tolerable	Negligible	Negligible
1 Incredible	Negligible	Negligible	Negligible	Negligible

The aim is to ideally reduce the RISK to as low a level (number) as possible. The Control measure may affect both the Consequence and Probability.

SWIFT Analysis – Page 4 of 4

The risk ranking number obtained represents the following:

24 to 12 HIGH	Events with risks that would have an intolerable effect on the ability to achieve the project objectives. It is certain that risk mitigation measures will be required.
12 to 6 MEDIUM	Events with a level of risk that are considered to be of a tolerable nature and can be managed by introducing risk mitigation measures.
4 and below LOW	Events with risks that are considered as negligible in nature. Whilst these risks may be considered as “low”, they should be continuously monitored and re-evaluated.

If risks are at intolerable levels, then action has to be taken to reduce them to tolerable levels.

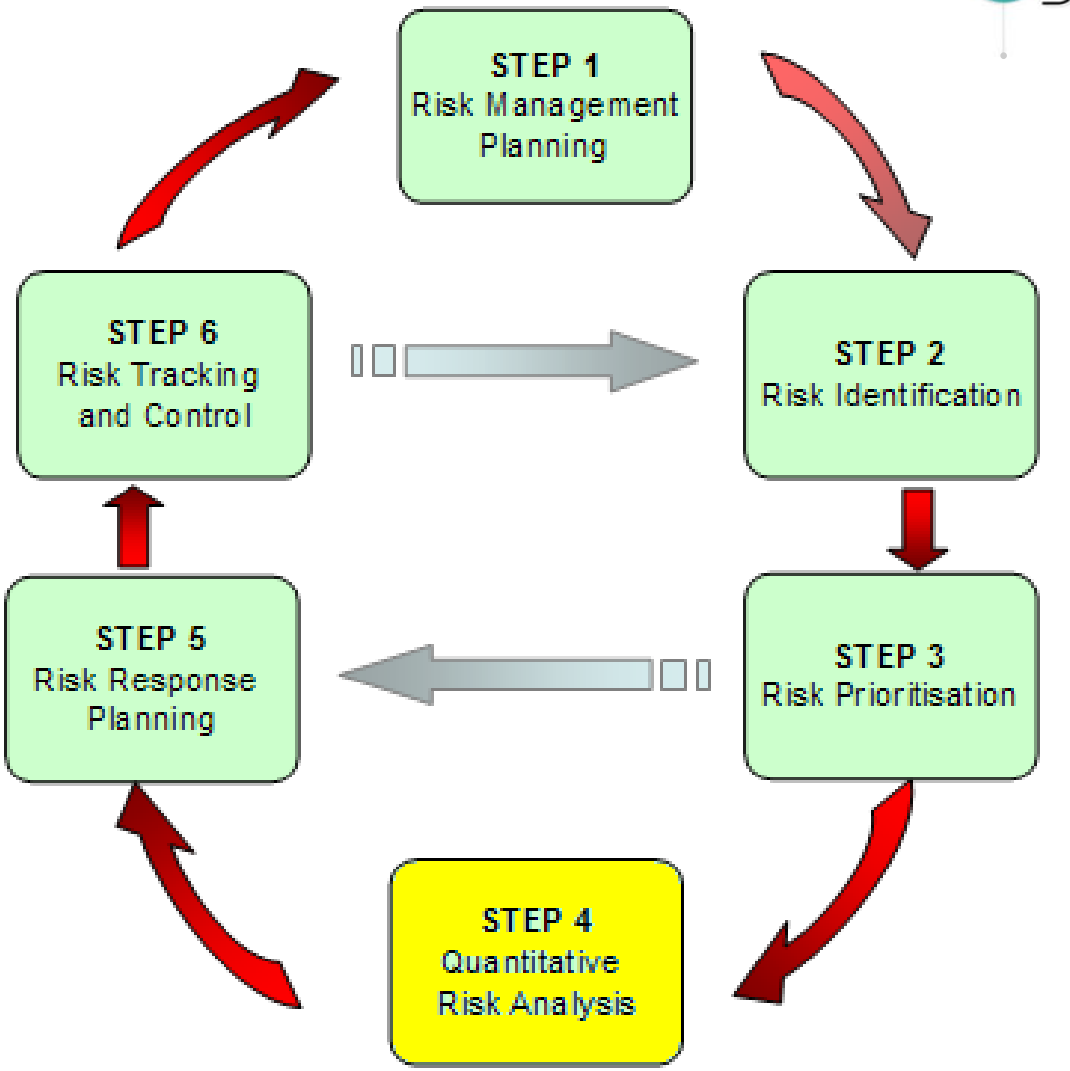
Risk Matrix

Currie & Brown

Impact / Probability	4 - Showstopper	3 - High Risk	2 - Medium Risk	1 - Low R
6 - Frequent		003		044
5 - Probable	064 087	001 002 007 014 021 025 026 035 045 051 052 072 074 092 095 096	005 079	061
4 - Occasional	022	004 006 008 009 016 031 032 037 041 047 055 063 068 075 094	011 012 013 028 030 042 054 073 076 077	
3 - Remote	093	019 033 036 038 039 040 053 057 062 065 088	023 024 027 034 066 067	015 017 018
2 - Improbable	010 043	058 059 071 090	069 078 084 085	020 029 046 070
1 - Incredible	048 049 050 083	082 086 089		056 060 080 081

RED – High level risk scoring over 12 on SWIFT Analysis and potential 'show stopper'
AMBER – Medium level risk scoring 5-10 on SWIFT Analysis and at higher scores potential serious risk
GREEN – Low level risk scoring 0-4 on SWIFT Analysis and must be closely monitoring on a monthly basis

Step 4 – Quantitative Risk Analysis



Thumb rule

- Level of contingency by rule of thumb
- Risk based estimating to develop contingencies for cost and time

Step 4 – Quantitative Risk Analysis

- Aims to quantify cost and time/performance impacts of risks
- Techniques such as three point estimates and Monte Carlo simulation to:
  - Quantify the risk exposure for the project, and determine the size of cost and schedule contingency reserves that may be needed
  - Identify risks requiring the most attention by quantifying their relative contribution to project risk
  - Identify realistic and achievable cost, schedule or scope targets

Step 4 – Quantitative Risk Analysis

Quantitative Risk Analysis **Inputs**

- **Risk Management Plan**
- **Risk Identification**
- **Risk Assessment and Prioritisation**

Step 4 – Quantitative Risk Analysis

Quantitative Risk Analysis **Procedure**

- **Three Point Estimating -** Used to determine the minimum, most likely and maximum cost scenarios should a certain risk materialise; used to determine realistic outturn cost of that risk based on its impact/probability rating and the minimum, most likely, maximum estimate

- **Monte Carlo Simulation -** A project simulation uses a model that translates the uncertainties specified at a detailed level into their potential impact on project objectives. Project cost simulations are typically performed using the Monte Carlo technique

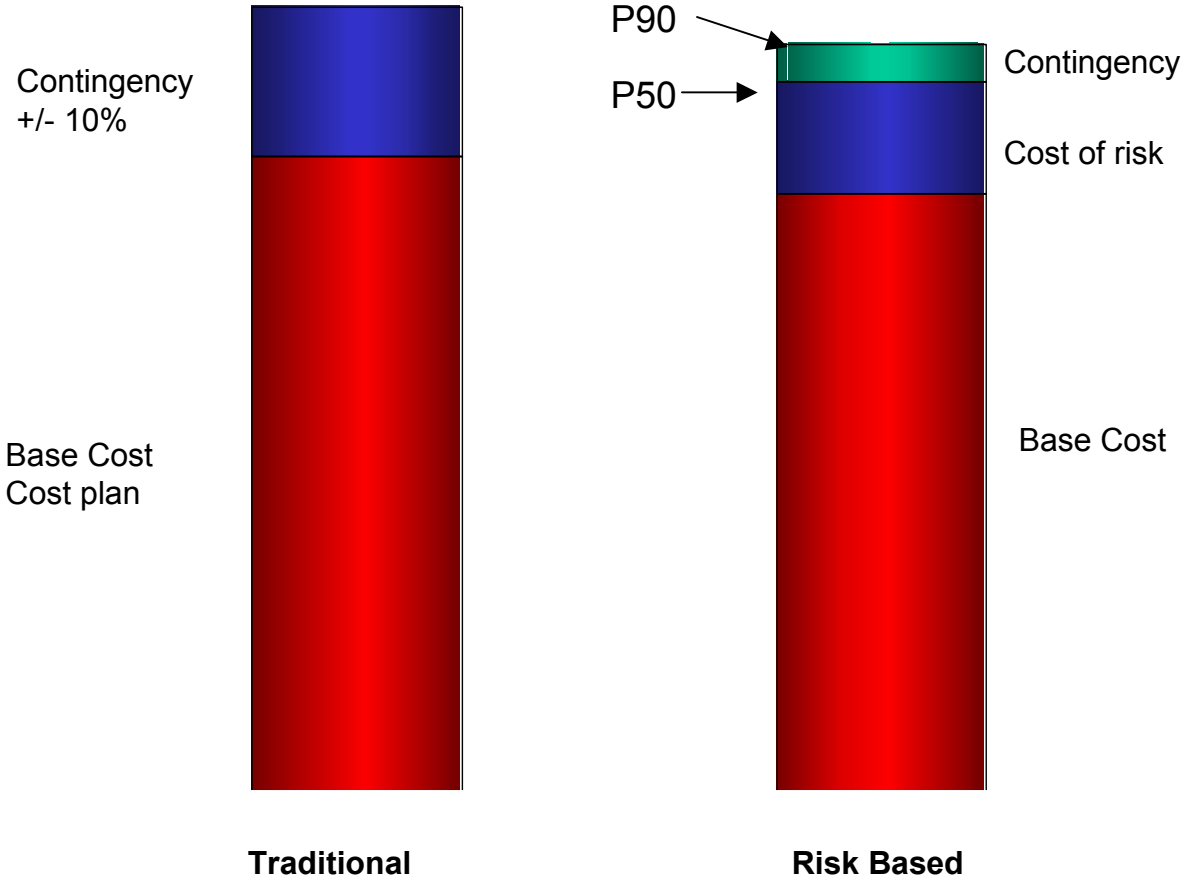
Step 4 – Quantitative Risk Analysis

Currie & Brown

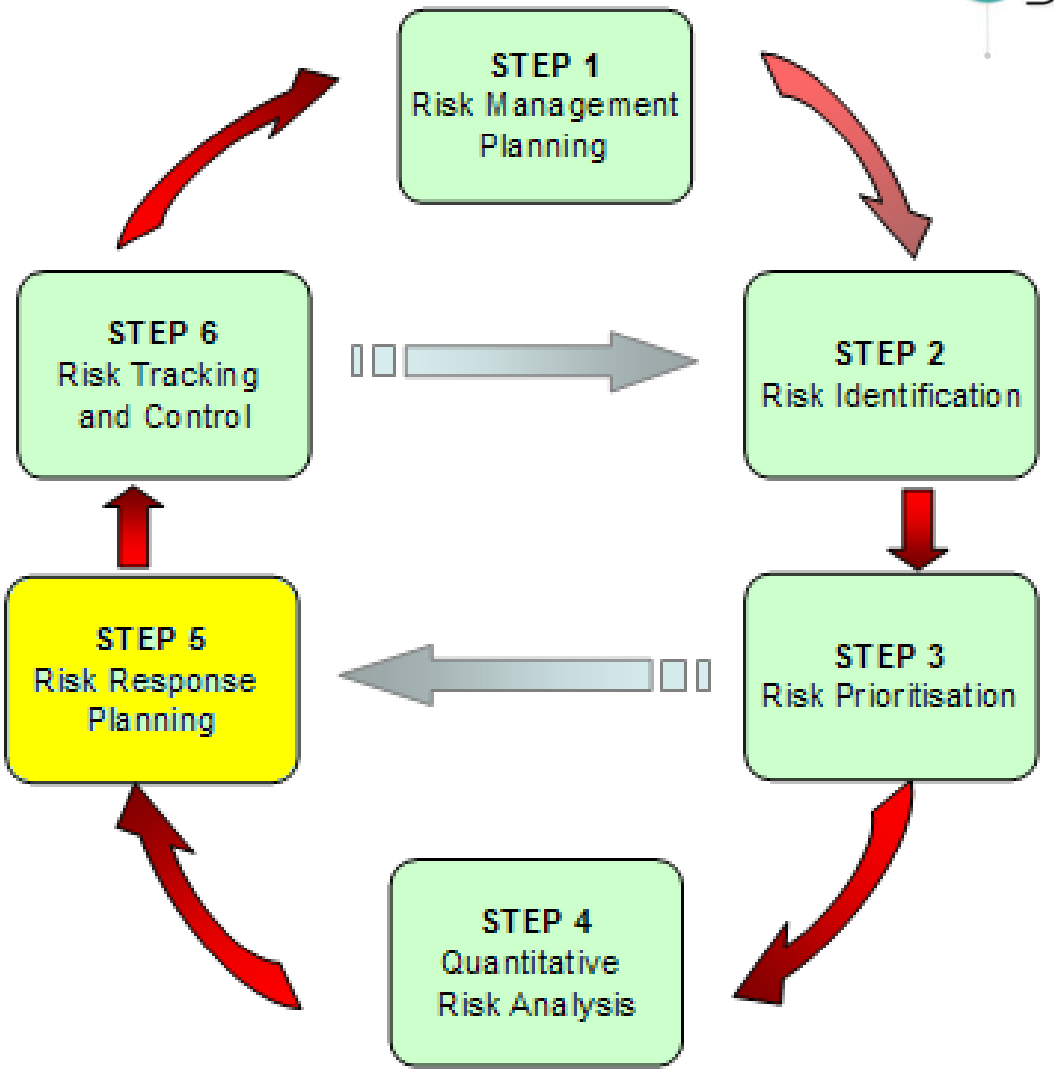
Quantitative Risk Analysis **Deliverables**

- **Cost of Risk and Contingency Levels – Contingency Schedule** based on the current knowledge of the risks facing the project
- Base cost plus Cost of Risk = P50

Traditional vs Risk Estimating



Step 5 – Risk Response Planning



Step 5 – Risk Response Planning

- Developing options and determining actions to reduce threats to the project's objectives
- The identification and assignment of individuals or parties to take responsibility for agreed risk response

Step 5 – Risk Response Planning

Risk Response Planning **Inputs**

- **Risk Management Planning**
- **Risk Identification**
- **Risk Assessment and Prioritisation**
- **List of Potential Responses –**
  - In the risk identification process, actions may be identified that respond to individual risks or categories of risk
- **Common Risk Causes –**
  - This situation may reveal opportunities to mitigate two or more project risks by consolidating the risks under one heading and responding with one generic mitigation plan

Step 5 – Risk Response Planning

Risk Response Planning **Procedure**

- **Risk Champions -** Risk Champions or Risk Owners must be appointed who will take responsibility for managing the high priority risks
- **Risk Mitigation Planning –**
  - Mitigation plans should be completed for the high level priority risks by Risk Champion/Owners
  - Mitigation seeks to reduce the probability and/or consequence of an adverse risk event to an acceptable threshold
  - Risk mitigation may take the form of implementing a new course of action that will reduce the problem, or changing conditions so that the probability of the risk occurring is reduced
  - Where it is not possible to reduce probability, a mitigation response might address the risk impact by targeting linkages that determine the severity

Step 5 – Risk Response Planning

Risk Response Planning **Deliverables**

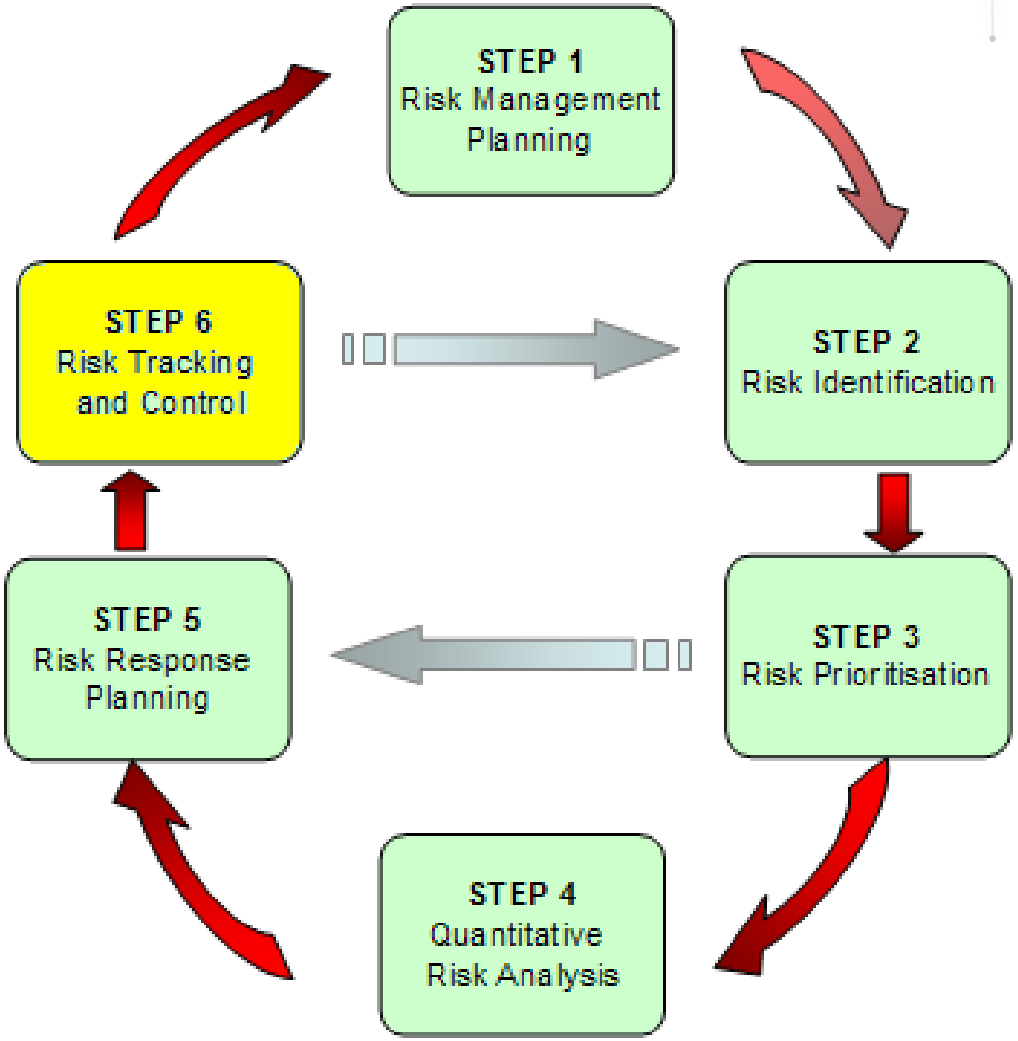
- **Risk Mitigation Plan -** The risk mitigation plan should be written to the level of detail at which the actions will be taken. It should include some or all of the following:
  - Identified risks, their descriptions and impacts
  - Risk Champions/Owners
  - Specific actions to be taken to prevent the risk arising or to respond to a risk that does arise
  - Risk strategy (method selected to deal with the risk) – Hold, Evade, Lower, Pass, Share (HELPS)
  - Results from risk prioritisation
  - Cost of risk should it materialise

Risk Matrix

Currie & Brown

DESCRIPTION	OWNER
Description of the risk.	*Contact for the risk.*
IMPACT – "AS IS"	**SCORE**
What is the impact of the risk on other risks?	*Risk Score*
LEADING PRACTICES – "TO BE"	
In the industry	
GAPS	**COST OF RISK**
Key gaps and deficiencies between the "AS-IS" and the "TO-BE" scenario.	Minimum, Most Likely, Maximum
ACTION PLANS AND TIMELINES	
Steps to be taken to complete the GAP along with the timeline. *Mitigate by* **Lower** *(HELPS)*	

Step 6 – Risk Tracking and Control



Step 6 – Risk Tracking and Control

- **Risk tracking and control – Continuous Risk management**

- **Purpose of risk tracking:**
  - Risk plans have been implemented as planned
  - Risk actions are as effective as expected, or if new responses should be developed
  - Project assumptions are still valid
  - Risk exposure has changed from its prior state, with analysis of trends
  - Proper policies and procedures are followed
  - Risks have occurred or arisen that were not previously identified

Step 6 – Risk Tracking and Control

Currie & Brown

Risk Tracking and Control **Inputs**

- **Risk Management Plan**
- **Risk Identification**
- **Project Communication -** Reports, risk matrixes, tracking tools, problem indicators etc used in the monitoring of risks should be included
- **Scope Changes -** Scope changes often require new risk analysis and response plans

Step 6 – Risk Tracking and Control

Currie & Brown

Risk Tracking and Control **Procedure**

- **Periodic Project Risk Reviews –**
  - Project Risk Reviews should be regularly scheduled throughout the life of the project
  - Risk rankings and prioritisation may change for identified risks during the life of the project
  - New risks may arise that had not been anticipated at previous stages in the project
  - Changes may require additional qualitative or quantitative analysis

Step 6 – Risk Tracking and Control

Currie & Brown

Risk Tracking and Control Deliverables

- **Risk Review Report**
  - **Continuous updating of**
    - Risk Register
    - Risk Mitigation Plan
- **Risk Database –**
  - Developing project risk profiles
  - Lessons Learnt

Conclusion

Currie & Brown