Project Risk Management


## Risks belong to projects as does air to breath.

Project Risk Management - The Most Importan...
Roland Wanner

## Murphy's Law

## Murphy's Law

"Anything that can go wrong, will go wrong."
O'Toole's Law
"Murphy was an optimist."


## PROACTIVE VS REACTIVE RISK IDENTIFICATION

ABILITY TO CONTROL


## The Risk Management Process

Effective Stakeholder Engagement (ESHE) is crucial for proper Risk Management


## Risk Definitions

## Risk

An uncertain event or condition If it occurs, it will impact at least one project output / outcome

## Issue

A risk (known or unknown) that has materialized


Trigger
An event that causes a risk to become an issue."

Risk has two components: 1. Probability: This is the likelihood that an event will occur. 2.
Seriousness: This is the impact of the event if it does occur.

Million Dollar Maverick
Alan Weiss

## Typical Sources of Project Risk

Unknown stakeholders

Fuzzy scope / requirements
Poor estimates / under-resourcing
Project team capability
External dependencies
Decision / dependency bottlenecks
Lack of organizational commitment

## The Risk Management Process





## Critical Success Factors for Risk Management

Early, recurrent, and comprehensive identification

Multiple, diverse perspectives (objectivity)

Recognize the limitations of your sources \& data


## The Risk Management Process

## Risk: Probability

| ALMOST CERTAIN |
| :---: | :---: |
| (5) |$\quad$ The risk is expected to occur at least once in the project

## Two Ways To Identify Risks



## Qualitative Risk

Relating to, measuring, or measured by the QUALITY of something rather than its QUANTITY

The IMPACT the risk will have on the project.


## Quantitative Risk

Relating to, measuring, or measured by the QUANTITY of something rather than its QUALITY

The NUMBER of times the risk is expected to occur within the project


## Probability / Likelihood of trigger event occurring

Quantitative (statistical) methods
Qualitative (subjective) priority

Mean, median, mode
Three-point estimates
Expected value
Monte Carlo analysis

Almost certain
Likely
Possible
Unlikely
Rare

## Ways to determine Risk Probability

Mean, median, mode
Three-point estimates (PERT)
Expected value
Monte Carlo analysis


## Risk: Using the Numbers

$$
\begin{aligned}
& 46 \% \\
& 34 \% \\
& 40 \% \\
& 39 \% \\
& 34 \%
\end{aligned}
$$

Our party is to be held 15 November.
Over the past 5 years the chances of inclement weather striking on that date are:

## Risk: Using the Numbers

Historic Data Percentages of Rain:
46\%

34\%

40\%

39\%

34\%

Mean (Average): 38.6
Median: 40
Mode: 34
Highest Historical \#: 46
Lowest Historical \#: 34
PERT = Optimistic $+(4 x$ Most Likely $) ~+$ Pessimistic / 6

$$
\begin{gathered}
\text { PERT }=34+(4 \times 34)+46 / 6 \\
\text { PERT }=34+(136)+46 / 6 \\
\text { PERT }=216 / 6 \\
\text { PERT }=36
\end{gathered}
$$

## Risk: Expected Value

Uses estimated probabilities to examine possible outcomes

To calculate: multiply the value of the variable by the probability of it occurring.
$(1 / 6 \times 1)+(1 / 6 \times 2)+(1 / 6 \times 3)+(1 / 6 \times 4)+(1 / 6 \times 5)+(1 / 6 \times 6)=$

$$
3.5
$$

Think of rolling a six-sided die.
If you were to roll the dice multiple times you would see the average is 3.5

## Risk: Monte Carlo Analysis

Calculates the range of possible outcomes and the probabilities they will occur for any choice of action.

Developed by scientists working on the Atom Bomb and was named for the city.

Common Distributions include:

Normal: Bell Curve
Lognormal: Positively skewed outcomes
Uniform: All values have equal chance of occurring
Triangular: User defined Minimum, Most Likely and Maximum values of occurrence

PERT: Optimistic, Most Likely and Pessimistic
Discrete: User defined thresholds

## Risk Probability (defined)

| Almost Certain <br> (5) | Greater than $90 \%$ chance this opportunity / risk will happen |
| :---: | :---: |
| Likely <br> $(4)$ | Greater than $70 \%$ chance this opportunity / risk will happen |
| Possible <br> (3) | Greater than $50 \%$ chance this opportunity / risk will happen |
| Unlikely <br> (2) | Greater than $30 \%$ chance this opportunity / risk will happen |
| Rare <br> (1) | Less than $30 \%$ chance this opportunity / risk will happen |

## Risk: Putting it all together

| Almost Certain <br> $(5)$ | Greater than $90 \%$ chance this opportunity / risk will happen |
| :---: | :--- |
| Likely <br> $(4)$ | Greater than $70 \%$ chance this opportunity / risk will happen |
| Possible <br> $(3)$ | Greater than $50 \%$ chance this opportunity / risk will happen |
| Unlikely <br> $(2)$ | Greater than $30 \%$ chance this opportunity / risk will happen |
| Rare <br> $(1)$ | Less than $30 \%$ chance this opportunity / risk will happen |

A 36\% chance means it is UNLIKELY we will experience inclement weather for the date of the party

## Risk: Prize Winners Don't Attend the Party

Triggers:
1: Not enough notice given. Invites currently scheduled to go out two weeks before the party. (Likely)

2: They are too busy working to attend.
(Unlikely)
3: Accident / Injury / Illness (Rare)

Probability Score
1: Likely (4)
2: Unlikely (2)
3: (Rare 1)

## Overall Risk Probability?????

Almost Certain (5), Likely (4), Possible (3), Unlikely (2), Rare (1)

## Risk: Prize Winners Don't Attend the Party

Triggers:
1: Not enough notice given. Invites currently scheduled to go out two weeks before the party. (Likely)

2: They are too busy working to attend.
(Unlikely)
3: Accident / Injury / Illness (Rare)

Probability Score
1: Likely (4)
2: Unlikely (2)
3: (Rare 1)

Overall Risk Probability:
4 LIKELY
Almost Certain (5), Likely (4), Possible (3), Unlikely (2), Rare (1)

## IMPACT / CONSEQUENCES IF A RISK BECOMES AN ISSUE

WHAT IS IMPACTED

Time / Cost / Scope
Health and Safety
Business as usual
Natural Environment
Brand and Reputation
IMPACT / CONSEQUENCES IF A RISK BECOMES AN ISSUE
WHAT IS IMPACTED
Time / Cost / Scope
Health and Safety
Business as usualNatural EnvironmentBrand and Reputation
Massive

Major
Moderate
Minor
Insignificant

Risk Impacts


## Risk Impact: Time and Cost

| NEGATIVE IMPACT |
| :---: | :---: | :---: |
| $(-)$ |$\quad$| POSITIVE IMPACT |
| :---: |
| $(+)$ |

## Risk Impact: Project Scope and Outcomes

|  | NEGATIVE IMPACT <br> (-) | POSITIVE IMPACT <br> (+) |
| :---: | :---: | :---: |
| Massive (5) | Changes to scope that mean the project will not realize most or all of its intended outcomes | Changes to scope meaning the project will realize a number of new (unplanned) benefits |
| Major <br> (4) | Changes to scope that mean the project will not realize some of its intended outcomes | Changes to scope that benefit entirely new groups of stakeholders |
| Moderate (3) | Changes to scope that will no longer benefit some stakeholder groups | Changes to scope that benefit a larger group of existing stakeholders |
| Minor <br> (2) | Changes to scope that mean the project's intended outcomes are now noticeably overstated | Changes to scope which mean the intended outcomes are now noticeably understated |
| Insignificant <br> (1) | Changes to scope the mean the project's outcomes will fall short on a small number of measures | Changes to scope that slightly enhance the projects benefits |

## Risk Impact: Business as Usual

|  | NEGATIVE IMPACT <br> (-) | POSITIVEIMPACT <br> ( + |
| :---: | :---: | :---: |
| Massive (5) | Catastrophic failure in operations with considerable time to restore (Could be on-going) | Operational disruption is avoided entirely |
| Major (4) | Widespread disruption to operations with an uncertain timeframe for resolution | The need for operational disruption is significantly reduced |
| Moderate (3) | Disruption to operations and/or priority customers demanding major intervention | Operational outages can significantly reduced in frequency duration or impact |
| Minor (2) | Localized disruption that demands minor corrective action | Operational outages can be reduced in frequency, duration or impact |
| Insignificant <br> (1) | Negligble impact on operations - no discernible disruption | Operational outages can be better planned for and anticipated |

## Risk Impact: Health and Safety

|  | NEGATIVE IMPACT <br> $(-)$ | POSITIVE IMPACT <br> $(+)$ |
| :---: | :---: | :---: |
| Massive <br> (5) | Permanent disability or fatality | Reduce instances of permanent disability |
| or fatality |  |  |

## Risk Impact: The Natural Environment

|  | NEGATIVE IMPACT <br> (-) | POSITIVE IMPACT <br> (+) |
| :---: | :---: | :---: |
| Massive (5) | Widespread and irreversible environmental damage | Environmental benefits that are widespread and self-sustaining |
| Major <br> (4) | Environmental damage that will continue beyond the life of the project | Environmental benefits that are sustainable beyond the life of the project |
| Moderate (3) | Environmental damage that extends beyond the location of the project - but no impacts | Environmental benefits that are sustainable beyond the location of the project |
| Minor <br> (2) | Damage within the projects boundaries that can be easily remedied | Environment benefits that are specific to the location of the project |
| Insignificant <br> (1) | Small-scale or localized damage that will quickly self repair | Environmental benefits that are specific to the location of the project |

## Risk Impact: Brand and Reputation

|  | NEGATIVE IMPACT <br> (-) | POSITIVE IMPACT <br> ( + |
| :---: | :---: | :---: |
| Massive (5) | Will cause a fundamental loss of community/stakeholder confidence in our project or org | Will generate whole of community enthusiasm for our project or org |
| Major <br> (4) | Cause alarm among stakeholders likely that regulators or owners will take action | Will generate excitement for the project among new and existing stakeholders |
| Moderate (3) | Will cause stakeholders to actively express their dissatisfaction | Will encourage stakeholders to actively express support for the project |
| Minor <br> (2) | Will register with stakeholders and cause them concern | Will register with stakeholders and heighten their interest |
| Insignificant <br> (1) | Will only be of interest to the project team | Will only be of interest to the project team |

## The Risk Management Process



## Overall Risk Priority

## PROBABILITY x IMPACT

| Risk Matrix |  | MPACT |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | INSIGNIFICANT ( + /-1) | MINOR $(+/-2)$ | MODERATE <br> (+/-3) | $\underset{(+/-4)}{\text { MAJOR }}$ | $\underset{\substack{\text { MASSIVE } \\(\uparrow-5)}}{ }$ |
| $\begin{aligned} & P \\ & R \end{aligned}$ | ALMOST CERTAIN (5) | +/-5 | +/-10 | +/-15 | +/- 20 | +/-25 |
| B | $\begin{gathered} \text { LIKELY } \\ (4) \end{gathered}$ | - 4 | +/-8 | +/-12 | +/-16 | +/-20 |
| B | $\underset{(3)}{\text { POSIBLE }}$ | +/-3 | +/-6 | +/-9 | +/-12 | +/-15 |
|  | UNLIKELY <br> (2) | +/- 2 | +/-4 | +/-6 | +/-8 | +/-10 |
| Y | $\underset{\text { (1) }}{\text { RARE }}$ | +/-1 | +/-2 | +/-3 | +/-4 | +/-5 |


|  |  | IMPACT |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Risk Matrix |  | insicNilicant | MINOR | MODERATE | MASOR | MAssive |
| PROBABILITY | ALMOST CERTAIN (5) |  |  |  |  |  |
|  | LIKELLY |  |  |  | -16 |  |
|  | POSSIBLE |  |  |  |  |  |
|  | $\underset{(2)}{\text { UNLIKELY }}$ |  |  |  |  |  |
|  | $\begin{gathered} \text { RARE } \\ (1) \end{gathered}$ |  |  |  |  |  |

Risk: Prize winners do not attend the party

| Risk Matrix |  | $M P A B$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | INSIGNIFICANT $(+/-1)$ | $\underset{(+/-2)}{\text { MINOR }}$ | MODERATE <br> ( $+/-3$ ) | $\underset{(+/-4)}{\text { MAJOR }}$ | MASSIVE $(+/-5)$ |
| $\begin{aligned} & P \\ & P \end{aligned}$ | ALMOST CERTAIN (5) |  |  |  |  |  |
| $B$ | LIKELY <br> (4) |  |  |  |  |  |
| $B$ | POSSIBLE (3) |  |  |  |  |  |
|  | UNLIKELY <br> (2) |  |  |  |  | -10 |
|  | RARE <br> (1) |  |  |  |  |  |

Risk: Only 20 people attend (instead of the 200 planned for)

| Risk Matrix |  | $M P A B$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | INSIGNIFICANT $(+/-1)$ | $\underset{(+/-2)}{\text { MINOR }}$ | MODERATE <br> (+/-3) | $\begin{gathered} \text { MAJOR } \\ (+/-4) \end{gathered}$ | $\begin{gathered} \text { MASSIVE } \\ (+/-5) \end{gathered}$ |
|  | ALMOST CERTAIN (5) |  |  |  |  |  |
| B | LIKELY <br> (4) |  |  |  |  |  |
| $B$ | $\underset{(3)}{\text { POSSIBLE }}$ |  |  |  |  |  |
|  | UNLIKELY <br> (2) |  |  |  |  |  |
|  | RARE <br> (1) |  | -2 |  |  |  |

Risk: Bad weather hits the area

| Risk Matrix |  | IMPACT |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | INSIGNIFICANT <br> (+/-1) | $\underset{(1 /-2)}{\text { MINOR }}$ | moderate | $\underset{\substack{\text { MAOOR } \\(1 /-4)}}{\text { an }}$ | MASSIVE |
| $\begin{aligned} & P \\ & R \end{aligned}$ | ALMOST CERTAIN (5) |  |  |  |  |  |
| $\begin{aligned} & \mathrm{O} \\ & \mathrm{~B} \end{aligned}$ | $\underset{(4)}{\text { LIKELY }}$ |  |  |  |  |  |
| $\begin{aligned} & A \\ & B \end{aligned}$ | $\underset{(3)}{\text { PosIBLE }}$ |  |  |  |  |  |
| L | UNLIKELY <br> (2) |  |  |  |  |  |
| T | $\underbrace{}_{\substack{\text { RARE } \\(2)}}$ | 1 |  |  |  |  |

## Risk: Staff too busy working to attend the party

## The Risk Management Process



## IMPACT (NOTE: POSITIVE OR NEGATIVE)



Treating Risks


## Risk Tolerance / Appetite / Threshold

The degree, amount, or volume of risk that an organization or individual will withstand.

ALL people/organizations/ elements have varying degrees of risk tolerance.

## ROAM

Use ROAM to understand / brief Risk Mitigation


## ROAM Risk Management

Their is no longer a risk
Someone has accepted responsibility for managing the risk

ACCEPTED
Choosing to take no action on the risk

MITIGATED
Risk is reduced, but not eliminated

When the stakes are high, preparation is everything.

An Astronaut's Guide to Life on Earth
Chris Hadfield

## Risk Treatment Strategy: High Risk

High Risk requires IMMEDIATE action.
Act immediately by adding tasks to (or removing tasks from) the project plan until the residual risk is LOW

## You can:

- Change probability (Transfer or outsource)
- Change impact (Share ie insurance)
- Avoid (Remove the risk source)

TO UPDATE: Scope Document (WBS or other), Project Schedule and Project Budget

| Project Profile Tool |  |
| :---: | :---: |
| Project name: |  |
|  | Use the dropdown menus to select the relevant risks |
| Project cost | Greater than 15\% of program budget <br> Greater than $25 \%$ margin of error assumed in cost estimate <br> Expected costs are neither allowed for in the annual budget nor externally financed |
| Project time | The project will take more than 6 months to deliver <br> Greater than $25 \%$ margin of error assumed in time estimate <br> The project must be delivered on or by a fixed date |
| Project scope | We have never successfully delivered a project like this |
| Project impact | Project delivery will noticeably impact most or all of our organization, including core service delivery <br> The project has several major precedent or subsequent dependencies <br> Employees and/or the public may be at risk of serious injury, illness or loss of life during project delivery <br> Project outcomes will fulfil most or all of the strategic objectives of our organization |
| Project stakeholders | The project will depend on collaboration with new and/or unknown partners <br> The project and/or its outcomes will be highly visible in the community |
| THIS PROJECT IS: | HIGH RISK |

## Risk Treatment Strategy: MEDIUM Risk

A Medium Risk requires us to establish a contingency.

Introduce TIME / COST Contingencies that respond to the risk and identify TRIGGERS for their activation.

A contingency is an action that is only exercised if the risk triggers and becomes an issue.

TO UPDATE: Risk Register, Project Schedule and Project Budget

| Project Profile Tool |  |
| :---: | :---: |
| Project name: |  |
|  | Use the dropdown menus to select the relevant tisks |
| Project cost | Between 5-15\% of program budget <br> $\pm 25 \%$ confidence in cost estimate <br> Expected costs are partially allowed for in the annual budget or financed by the client |
| Project time | The project can be delivered in less than 6 months <br> $\pm 25 \%$ confidence in time estimate <br> The project has a preferred (but not mandated) delivery window |
| Project scope | We have successfully delivered this project at least once before |
| Project impact | Project delivery will noticeably impact several departments in our organization <br> The project has some major precedent or subsequent dependencies <br> Employees and/or the public may be at risk of minor injury or illness during project delivery <br> Project outcomes will fulfil several strategic objectives of our organization |
| Project stakeholders | Some project work will need to be shared with proven, existing partners |
|  | There is likely to be some community interest in the project and/or its outcomes |
| THIS PROJECT IS: | MEDIUM RISK |

## Contingency Reserves

Pre-authorized reserve of time or money
Best maintained at the task level
Returned to the business when risk retired

Enables speedy response in a crisis
Encourages more comprehensive risk identification and management


## Management Reserves

General cash reserve maintained for "surprises"

Best maintained at the program / portfolio level

Usually a fixed percentage of the program's total time and budget

Distributes risk across multiple projects

Gives greater flexibility in a crisis


## Risk: What if Prize Winners Do Not Attend?

## Contingency plan

Announce the first runner-up as the winner (Update schedule, budget and risk register to reflect this)

```
MURPMYM
ITAW
Nothing is as
    easy as it
        looks,
    Everything takes
    longer than you
        expect,
    And if anything
        can go wrrong
        it will,
        AT THE WORST
POSSIBLE MOMENT!
```


## Risk: What if Prize Winners Do Not Attend?

Contingency plan
Announce the first runner-up as the winner
(Update schedule, budget and risk register to reflect this)

Secondary risks
Prize winners names engraved on awards


## Risk: What if Prize Winners Do Not Attend?

Contingency plan
Announce the first runner-up as the winner
(Update schedule, budget and risk register to reflect this)

Secondary risks
Prize winners names engraved on awards

## Residual Risks

Backlash if people find out the real winner

```
    MURPMYMEN
    [IAWW
    Nothing is as
        easy as it
        looks,
    Ewerything takes
    longer than you
        expect,
    And if anything
        can go wwrong
            it will,
    AT THE WORST
POSSIBLE MOMENT!
```


## Risk Treatment Strategy: LOW Risk

Project Profile Tool
Project name:

|  | Use the dropdown menus to select the relevant triss |
| :---: | :---: |
| Project cost | Less than 5\% of program budget <br> $\pm 10 \%$ confidence in cost estimate <br> Expected costs are fully allowed for in the annual budget or financed by the client |
| Project time | The project can be delivered in less than 3 months $\pm 10 \%$ confidence in time estimate <br> The project has no fixed deadline for delivery |
| Project scope | We have successfully delivered this project five (5) or more times |
| Project impact | Project delivery will noticeably impact one (1) department in our organization <br> The project has no major precedent or subsequent dependencies <br> Project delivery presents no employee or public health and/or safety risks <br> Project outcomes will fulfil one (1) strategic objective of our organization |
| Project stakeholders | The project can be fully delivered by our current staff |
|  | The project is only of internal interest to our organization |
| THIS PROJECT IS: | LOW RISK |

## The Risk Management Process



## Risk Register Components

Identification number Risk description
A risk owner
Probability / impact ratings Risk treatment
Probability and impact detail Action and contingency plans Residual and secondary risks Last / next review date


| << Back to Register |  | Prize winners don't attend the party |  |  |  | Next Risk >> |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ref | RISK / OPPORTUNITY | OWNER | Probability | ImPACT | PRIORITY | Last review | next review |
| 3 Prize winners don't attend the party |  | Angus P | Likely | Major | High |  |  |
| RISK detall |  |  |  |  |  |  |  |
| PROBABILITY |  |  |  |  |  |  |  |
| tricger event |  |  | notes | PROBABILITY |  |  | RATING |
| Not enough notice given (invites only going out 2 weeks prior to party) |  |  |  | There is a greater than $70 \%$ chance this opportunity / risk will happen |  |  | Likely |
| Too busy working to attend |  |  |  | There is a greater than $30 \%$ chance this opportunity / risk will happen |  |  | Unlikely |
| Accident / Injury / Illness |  |  |  | There is a greater than $30 \%$ chance this opportunity / risk will happen |  |  | Unlikely |
| ImPACT |  |  |  |  |  |  |  |
| FACTOR |  | notes |  | ImPACT |  |  | RATING |
| time |  |  |  | The opportunity / risk will have no impact on project time |  |  | None |
| cost |  |  |  | The opportunity / risk will have no impact on project cost |  |  | None |
| SCOPE |  |  |  | The risk will demand changes to scope that mean the project's intended outcomes are now noticeably overstated |  |  | Minor negative |
| OPERATIONS |  |  |  | The opportunity will mean that operational outages can be better anticipated and planned for |  |  | Insignificant positive |
| HEALTH \& SAFETY |  |  |  | The opportunity / risk will not impact people's health and/or safety |  |  | None |
| BRAND / REPUTATION |  |  |  | The risk will cause alarm among stakeholders - it is likely that regulators and/or owners will take intervening action |  |  | Major negative |
| NATURAL ENVIRONMENT |  |  |  | The opportunity / risk will not impact the natural environment |  |  | None |

## Risk Management Overview



## Take-aways from Risk

Issues materialize after identified or unidentified trigger events occur.

Following the process will help alleviate pains from risks and issues.

Knowing how to strategically address risk will make your projects more successful.


Questions?

