"Using Advanced Risk Management to advance your projects"

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Best Practices Interactive Discussion

1. Assessing and developing a proactive risk management culture
2. Why is Opportunity Identification often overlooked
3. The myth of Risk Mitigation
4. Innovative Risk Response planning
5. Challenges with Probability & consequence determination

A Risk Management Process Model

1. Risk Planning
2. Risk Identification
   a. Broad w/ Threats & Opportunities
3. Qualitative Risk Assessment
   a. Probability, Impact, Timing & Frequency
   b. Risk Prioritization
   c. Assumptions & Biases
4. Quantitative Risk Assessment
   a. Sensitivity Analysis
   b. EMV, Monte Carlo Simulation & Decision Trees
5. Risk Response Planning
6. Risk Monitoring & Control

Risk Definitions

- "Risk is all about _____ or, more importantly, the _____ on the achievement of objectives. The really successful organizations work on _____ _____ involved in achieving their objectives and ensuring they manage their risks so as to ensure a successful outcome."
  -Kevin Knight, International Organization for Standardization (ISO)
- The objective of risk management is to increase the _____ and decrease the _____ events
- "Taking the _____ out of risk management"

6 Risk Factors to Calculate & Communicate

1. Probability
2. Impact
3. Frequency
4. Timing

- Tolerance
  - Static or variable?
- Threshold
  - Cost, Schedule, Scope, or Quality

- Which of these 6 variables are in your risk plan?
- How do you identify, monitor and communicate these 6 risk variables?

Risk Culture

- Metrics of:
  - Risk Threshold
  - Risk Appetite
  - Risk Tolerance
- "Rules Based" risk management
- Risk Maturity and Process; Scalable
- Knowledge, Environment, Motivation
- Assumptions & Biases

Culture: Is risk management real work?

- Is there a "rock solid" Value Proposition for Risk Management?
- Selling it to the Customer, sponsor and team
  a. Past Successes (internal or external)
  b. Past Failures (internal or external)
  c. Utilize your competition
  d. 3rd party references
  e. Published articles, HBR, business stories, etc.

Calculate & Communicate Risk Scores

- Add P&I score and divide by sum of the risks
- Score changes (lower) after risk response planning.
- Risk Score conversations
- "How much more would management be willing to invest if we can lower the risk score by 25%?
- Risk Scores and Portfolio Management
  - Which projects to select?
  - Which require mature resources?
  - Which require more resources?

O^2 = Overlooked Opportunities

- What risks are associated with this room?
- The high value of WBS
- Opportunities often overlooked because:
  a. Pessimism & Predisposition to find errors
  b. External Locus of Control
  c. Strength of negative rewards
  d. Absence of positive rewards
  e. Others and how to address?

O^2 = Overlooked Opportunities

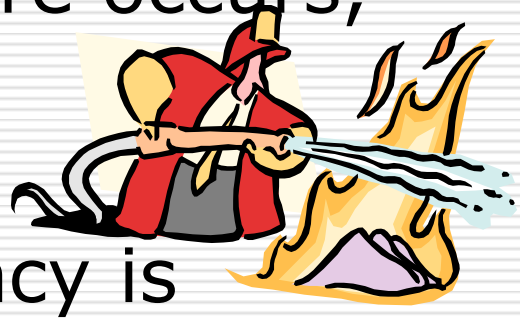
1. Prompt List w/categories
2. Affinity Diagrams
3. Brainstorming Sessions
4. Delphi Methodology
5. Review Historical Records
6. Conduct “Pre-Mortem”
7. Expert Interviews
8. Nominal Group Technique
9. Cause & Effect Diagrams and SWOT Analysis
10. Failure Modes & Effect Analysis

The Myth of Risk Mitigation

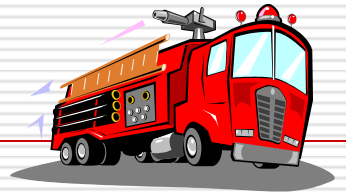
- Risk Mitigation means……

Three Levels of Risk Response

- Do Something if the risk occurs – Level I
  - Reactive Risk Response
- Do Something before risk before occurs, Level II
  - Contingency Plan
- Do Something if the Contingency is ineffective – Level III
  - Fallback Plan



Plan Risk Response



- Objective
  - Risk Management planning to decrease project risk
  - Accomplished by:
    - Decreasing Probability & Impact of threats
    - Increasing Probability & Impact of Opportunities
  - Change in project team dynamics +/-
  - Activities & Individuals with highest risk scores & common causes of risk
  - Robust root cause analysis

Options for Plan Risk Response

4 Threat Response options

(often confused with risk mitigation)

- Avoidance: Eliminate Threat By Eliminating Cause
- Mitigation: Reducing the Expected Value by reducing Probability or Impact (or both)
- Acceptance (defer): "If it Happens, It Happens" for threats and opportunities
- Transfer: Assigning the Risk to Someone Else (subcontract, warranty or insurance)

Options for Plan Risk Response

4 Opportunity Response options

- Exploit: Making the Cause more probable
- Enhance: Increasing Expected Time, Quality or Monetary Value by increasing its Probability or Impact (or both*)
- Accept (defer): "If it Happens, It Happens"
- Sharing: Retaining appropriate opportunities Instead of transferring to others

Plan Risk Response – Mitigation Most common strategy, Why?

- Mitigation Options
  1. Change approach for task
  2. Prototype
  3. Simplify processes
  4. Delete tasks, US Mail
  5. Add time
  6. Increase redundancy, NASA
  7. Add or change resources
  8. Outsource
  9. Postpone tasks, decrease probability
  10. Accelerate tasks, decrease impact
  11. Assign task to customer.
  12. Increase time in development phase

Plan Risk Response - Accept

1. Other 3 strategies not possible
2. Other 3 strategies create larger secondary risks
3. Other 3 strategies require excessive resources

Plan Risk Response - Transfer

- Shift the consequence to others.
  - Insurance
  - Performance Bonds
  - Options, Derivatives, Commodities
  - Laws, Regulations, Exceptions, and Exclusions
  - Mergers, Acquisitions, Joint Ventures, Divesture of assets

Update the Project Plan

- Risk Responses can
  1. Change scope of work
  2. Change WBS
  3. Change work packages
  4. Change procurement or service contracts
  5. Change cost, schedule, quality, resources
  6. Reassign activities
- Do we meet objectives?
- What if revised plan has unacceptable new costs or schedule dates?

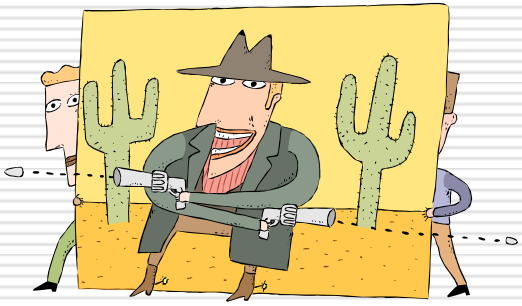
Plan Risk Response – Leftovers

- Risks that remain are Residual Risks
- Contingency and Fallback plans must be developed!
- Ghost risk: How to manage?

Plan Risk Response – Risk Owners

1. Must be assigned here if not already done!
2. Has particular risk knowledge
3. Help Create Response, Contingency & Fallback Plans
4. Responsible for executing Response, Contingency & Fallback plans
5. Held Accountable for Managing Risk & consequences
6. Does Risk Register Reporting

Risk Triggers



- Early Warning Sign – threat or opportunity is about to occur
  - Launches Contingency or Fallback Plans
- Consider Answers to:
  1. What will happen just before risk occurs?
  2. What can we measure to discover risk is about to occur?
  3. How will we know right away when it occurs?
  4. Related to FMEA detection measure
- Develop risk triggers for:
  - Early exit of Boomers from workforce, resignation of PM, reduction in project funding
- Document in Risk Response Plan

Risk Response Reserves

Contingency Reserves

1. Used for known unknowns developed in risk plan
2. Usually managed and "owned" by the project manager
3. Derived via Quantitative analysis methods

Management Reserves

1. Used for unknown unknowns not identified in risk plan
2. Usually held "owned" by the sponsor, portfolio, company, etc.
3. Derived via Qualitative analysis methods

Risk Response Reserves

1. Visible or hidden reserves?
2. Two Types:
   a. Contingency Reserves – More defensible, higher probability of inclusion
   b. Management Reserves – Less defensible, higher probability of being cut by upper management.
3. A corporate culture for reserve management should exist.
4. **Project Schedule** = Critical Path + Contingency Reserve + Management Reserve
5. **Project Budget** = Cost of Tasks + Contingency Reserve + Management Reserve
6. Quality Reserves, others?

Management Reserves for Risk 4 options

1. Use Set Amount based on history or Company Policy (e.g. 10%, 15%)
2. Guess
   - If Only doing Qualitative Risk Analysis
   - Based on Number & risk activity scores
   - High risk, hard to define, often cut from budget
3. Expected Monetary Value
   - If doing Quantitative Risk Analysis
   - Total Cost of Tasks + EV of Residual Risks
   - Add Separate MR
   - Preferred Method
4. Monte Carlo Simulation
   - Knowledge required
   - Not preferred due to WBS, Logic, estimation error potential

Innovative Risk Response Planning

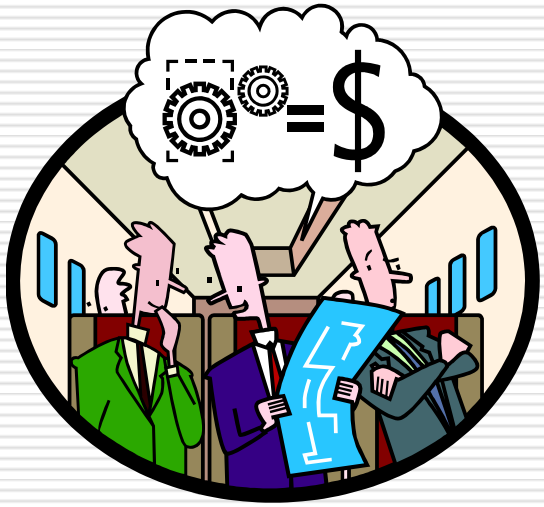
- Contracting & Procurement Risk
- Make, Buy or Lease analysis
- Contract types and Risk Management
  - Fixed price, lump sum
  - Cost plus
  - Fixed Fee
  - Time & Material
  - Partnerships & Trust factor
- Contracting and Risk ownership transfer
- Incentives, Penalties & Liquidated Damages
- Source Selection Criteria
- Market conditions & "Good Reference" game

Plan Risk Response - Important Outputs

- Residual risks
- Secondary risks
- Contingency plans
- Fallback plans
- Risk owners
- Risk Triggers
- Time, Cost, Quality, etc., reserves

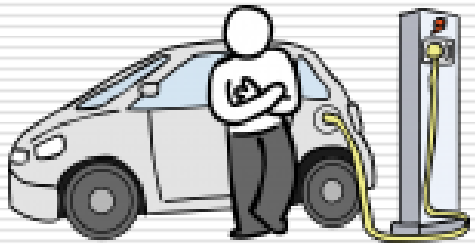
Plan Risk Response Summary

1. Plan for threats & opportunities
2. Plan for risk before they occur with Contingency & Fallback Plans
3. “The call for Creativity & Innovation”
4. Multiple response options
5. Risk Response and & Procurement
6. Risk owners
7. Update plan after responses
8. Include contingency & MR



Probability and Impact determination

- Due to increasing investments in battery storage technology, the cost of electric vehicles may decrease, creating a market for recharging stations.



1. How to determine probability of this risk?
2. How to determine impact of this risk?

Probability & Impact
Difficulty in Quantification Determination

- Probability
  1. We'll get sued?
  2. Of my identify being stolen?
  3. Critical asset be lost, attacked, acquired?
  4. Of another tornado hitting Lambert?
  5. Of all data being recovered during data transfer?
- Consequence
  1. Damages
  2. Change orders
  3. Lawsuits costs
  4. Delay costs
  5. How much will implementing back up system cost?

Leverage Risk Identification tools

1. Prompt List w/categories
2. Affinity Diagrams
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Quantitative Risk Analysis – Objectives

A. Determine Project Risk Level & Acceptability
B. Numerical determinations of variables:
   1. Cost compliance confidence
   2. Schedule compliance confidence
   3. Quality compliance confidence, i.e. Customer Satisfaction
   4. Others
C. Above 4 before & after risk response planning

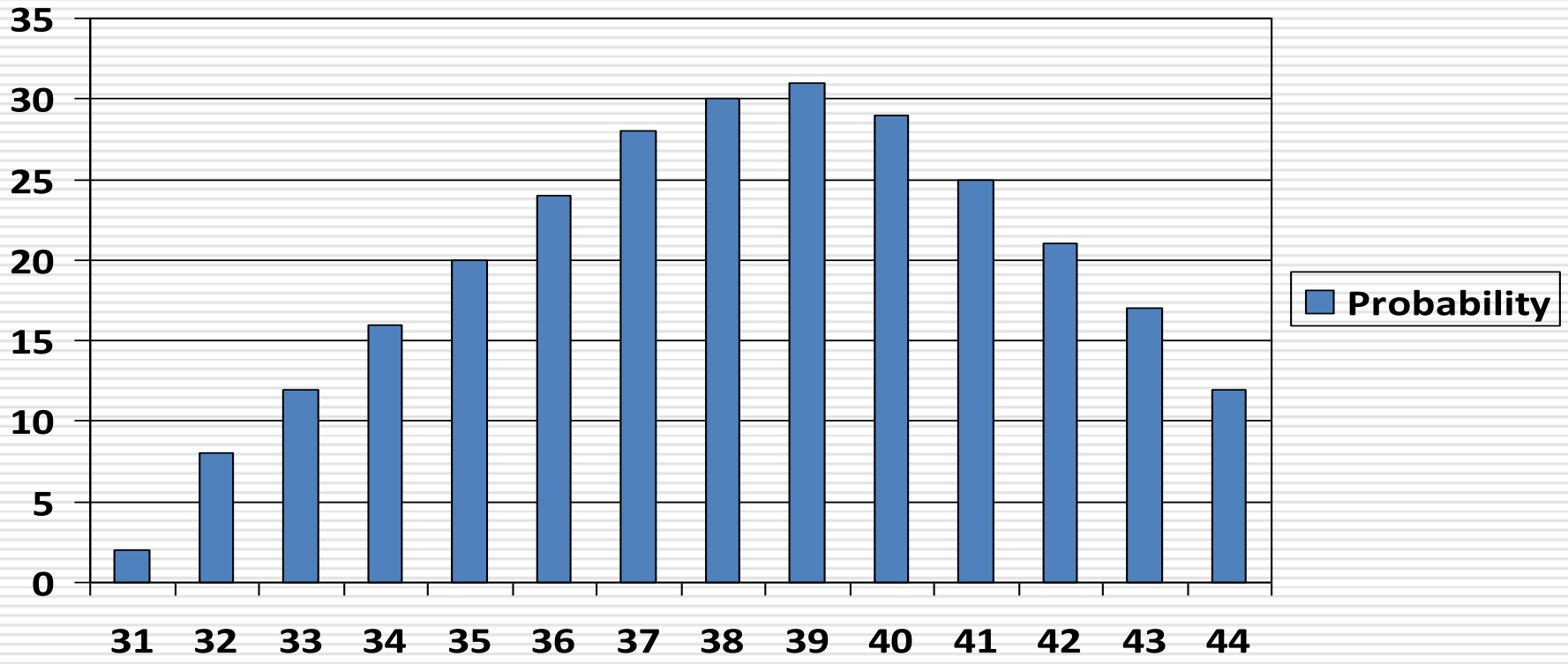
Quantitative Risk Analysis

- Expected Monetary Value (EMV):
  - Calculates the expected value of a decision based on its risk event probability and value
- Determine EMV of risk and the entire project
- Excellent tool to:
  1. Challenge management go/no-go decisions
  2. Challenge managements resource assignments & milestones

Monte Carlo Simulation

- Determining:
  - Will we finish on a certain date?
  - Will we end up at a certain costs?
- Single, multi-point and continuous distribution
- Multiple (hundreds) scenarios, random samples, Excel based
- Each changed variable = a plausible scenario.
- A project managers "Crystal Ball"

Continuous Probability Distribution



Precision illustrated by data width (standard deviation
Not necessarily more accurate, but definitely less subjective

Monte Carlo Simulation

Advantages

a. Overall assessment
b. Does not weigh estimates toward most likely estimates
c. Helps to remove biases
d. Provides time and cost contingencies
e. Points to activities with highest risk of becoming critical

Disadvantages

a. Provides overall risk assessment, not at task or work package level.
b. GI/GO – it requires valid inputs.
c. Software purchase
d. Software competency

Quantitative Risk Analysis
Decision Trees

a. Diagramming method used to help select best course of action in situations in which future outcomes are uncertain
b. Drawn chronologically from left to right, growing like tree branches
c. Reduce future uncertainty by making best decision today.

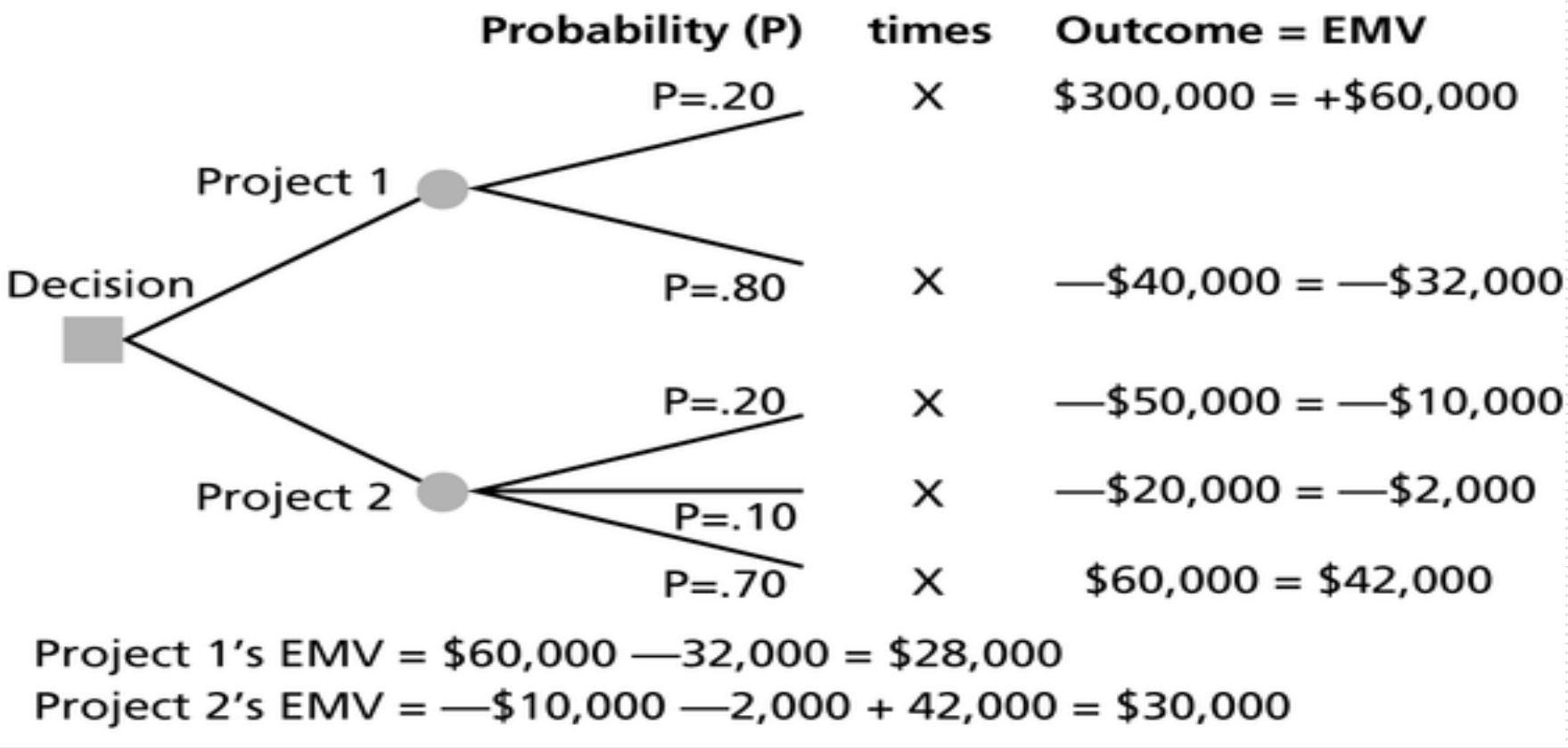
- Nodes

1. Decision nodes, represented by Squares, variables or actions the decision maker controls
2. Chance nodes, represented by circles, variables or actions the decision maker cannot control
3. Terminal or End nodes, represented by unconnected branched, end points where outcome values are attached.

Decision Tree Numbers

1. Decision Tree Annotations
   a. Probabilities
   b. Outcome values
   c. Node expected monetary values
2. Decision Tree Calculations – Back Solving
   a. At chance node calculate EMV in dollars
   b. Replace decision node with value of its best option.
   c. If cost exists, subtract to maximize EMV
3. Decision Tree Software

Decision Tree Example – Select a Crane



Project 1's EMV = $60,000 —32,000 = $28,000

Project 2's EMV = —$10,000 —2,000 + 42,000 = $30,000

Summary and Abraham Lincoln

1. Assess and develop a proactive risk management culture
2. Maximize Opportunity Identification
3. Risk Response not Risk Mitigation
4. Innovative Risk Response planning
5. Invest in accurate Probability & consequence determination

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