

Risk

The Real World of Project Management

You gotta' ask yourself – Do you feel lucky?

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Innovate • Celebrate

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Risk

"Maybe I can't define it, but I know it when I see it!"

- Risk - 1: possibility of loss or injury; 2: a dangerous element or factor; 3: the chance of loss or the perils to the subject matter of an insurance contract

Risk - What happens when you try to do anything

...and when you choose to do nothing.

Assessment

(what and where is it)

Analysis

(how real is it)

Management

(what do I do with it)

Risk Assessment

- by Contract...
 - Financial exposure or liability
 - Performance
- in Business...
 - ROI/ROR
 - Continuity
 - Flexibility
- In Operations...
 - Contingency
 - Integration\Connectivity
 - EH & S
 - (Environmental Health and Safety)

Risk Analysis

Methodologies

- Contract Review
 - Indemnification, Liability Limits
- Business Continuity/Recovery
 - Monte Carlo Studies
 - statistical analyses
 - “What if...”
- Failure Mode Effect Analysis
 - Fault Tree Studies
 - “Haz-Ops”

Risk Management

- Transfer
 - by Contract
- Mitigate
 - Failure Mode Effect Analysis
 - Supply & Delivery Chain Management
- Manage
 - Insurance

Risk Assessment – Contracts

Capital Projects

- Financial
 - Lump Sum
 - Time & Material
 - 'Cost Plus' (fee or percentage)
 - GMP
- Execution
 - Spec\Bid\Build
 - Turnkey
 - Design/Build
- Performance
 - Output\Yield
 - Schedule
 - "a date certain" and "time is of the essence"
 - Liquidated Damages

Risk Assessment - Business

- Financial
 - ROR\ROI or IRR (research and infrastructure)
 - 'Take or Pay' contracts
- Flexibility
 - 'What if' Scenarios
 - Competitive Market Studies
 - Multi-Product Plants or Campaign Approach
- Continuity\Survivability
 - Force Majeure (key idea: *unavoidable* event)
 - Natural Disasters
 - Man-made Disasters
 - Scenario Planning

Remember G.I.G.O.!

Risk Assessment - Operations

- Continuity – Connectivity - Survivability
 - How does this location, operation, function integrate into the corporate\business 'ecological' system?
 - What happens if it isn't there?
- Operationally
 - What happens if it goes down?
 - Liabilities to...
 - Personnel? Community?
 - Shareholders? Stakeholders?
 - EH&S? Regulatory?

Risk Analysis

Contracts Clauses

- Indemnification Liability Limits
- Incentives Liquidated Damages

•Business Continuity/Recovery

- Monte Carlo Studies
- "What if..."

•Failure Mode Effect Analysis

- Fault Tree Studies
- "Haz-Ops"

Risk Management

•Transfer the risk!

(the 'hot potato' approach)

- Indemnification Clauses
 - "hold harmless", "no damages for delay"
- Limited Liability Clauses
- Waiver of lien rights

Aha!! Get the potato out of your hands!

...however...

The province of good counsel...
...putting your client in the position
to allocate risk rationally.

- "Risk allocation is the process of identifying project risks and determining how they may be equitably and realistically shared by all parties on a construction project."

"Enlightened Risk Allocation: The 21st Century Owner's Guide to Cost Effectiveness" (Produced by the American Consulting Engineers Council and the Associated General Contractors of America), Page 2.

Risk Management

Mitigate:

- Figure out what can go wrong
- How it can go wrong
- When it can go wrong and
- What happens if it does go wrong
- Then figure out what you want to do about it

Risk Management

Mitigate

- Failure Mode Effect Analysis (broad screen)
- Fault Tree Study
- Risk Study
 - “Haz Ops” (typically narrower screen)

Outcomes?

- Diversification and Redundancy Options
- Recovery Plans
- Supply & Delivery Chain Management

Risk Management

Manage

- Proper management of risk requires the thoughtful and skillful use of all of the above techniques plus

INSURANCE!

- Performance Bonds
- Payment Bonds
- Contract provisions to address defaults
- OCIPs (Owner Controlled Insurance Programs)
- Subguard Insurance
- Guarantees

Types of Risk

- **Owner Defaults**
 - (i.e. Airport projects for US Airways, Delta, etc.)
- **Prime Contractor Defaults**
 - (J.A. Jones/Holtzmann AG)
- **Subcontractor...**
 - ...fails to perform
 - Specialty Piping sub
 - ...Is acquired or merges
 - (U.S. Filter, Alfa Laval Biokinetics)
 - ...vendor\supplier quits the business

Types of Risk

- **The Plant is late...**
 1. ...due to late design?
 2. ...due to late construction?
 3. ...due to late decisions by Owner?
 4. ...due to any of the items in 1,2 & 3 above
- **Plant output is not as expected...**
 - ...due to poor process definition,
 - ...due to poor process development,
 - ...due to inappropriate process technology,
 - ...due to inadequate supporting utilities,
 - ...due to poor material inputs.

Types of Risk

- **Labor**
 - Availability
 - Strike
 - Interruption due to natural event
 - Political Issues
- **Material Supply Chain**
 - Availability (concrete, steel, plywood)
 - Unexpected Cost Escalations (steel, fuel, concrete)
 - Event away from the site (flood, storm, earthquake)
- **External Event**
 - Political disruption
 - War
 - Terrorism
- **Natural Event**
 - Flood, Storm, Ice, Earthquake

So this 'Fault Tree' thing...?

What's that all about?

Things to Consider...

Contracts

- Are the terms reasonable? enforceable? A disincentive?
- Is there a workable Dispute Resolution process?
 - On larger projects consider a DRB or standing neutral(s)

Business - Other Options...

- Make or Buy?
- Multi-sourcing internally? externally?
- What are the impacts of this project on the overall business?

Operations

- What are the impacts of this plant going off-line?
- Financial – revenue loss
- Liabilities – contractually; environmentally

Focusing on the Project...

What do you need?

- Participation and 'buy in' from all of the project stakeholders.
- Atmosphere conducive to candid exchange ideas
- Understanding of the 'business proposition' of the project

Start with...

- Understanding of the critical process attributes
- Block Flow Diagrams
- Utility Flow Diagrams
- Process Flow Diagrams

Focusing on the Project...

What do you get?

- Understanding of the risks associated with operations
 - The process identifies 'what if' scenarios
- A list of 'must haves' and 'nice to haves'
 - The process helps prioritize essential operations and conditional operations
- A framework for 'emergency operations'
 - The development of worst case scenarios provides emergency planning for the facility
- A framework for value engineering efforts (if required)
 - The identification of essential and conditional elements puts a non-monetary 'pecking order' on systems, equipment and operations

So Remember!

- There are known knowns. These are things we know that we know.
- There are known unknowns. That is to say, there are things that we know we don't know.
- But there are also unknown unknowns. There are things we don't know we don't know.

[Donald Rumsfeld](#)

Thank You!



About the presenters

• E. Mitchell Swann, P.E., LEED AP

- Mr. Swann has over 24 years of extensive experience on both domestic and international projects in the areas of consulting, design engineering, construction, project and departmental management, forensic engineering and construction claims analysis. Mr. Swann's career includes the engineering and design of mechanical and control systems across a wide range of industries and building types including commercial buildings, central plants, research facilities, microelectronics, pharmaceuticals, biotech, broadcasting, computer centers and institutional buildings.
- Mr. Swann has been an active member of ISPE since 1990. He has given numerous presentations to ISPE, ASHRAE, ABA and other professional organizations. He has also been a contributor to ISPE/FDA Baseline Design Guides. Mr. Swann has served as Chair or Voting member on several ASHRAE Technical Committees including Cleanrooms and Legal Education, co-authored an ASHRAE Guide on Design/Bid and is Vice-Chair of the ABA's Committee on ADR in Construction. Mr. Swann currently serves on the Board of Directors for The Enterprise Center of Philadelphia, the Philadelphia Chapter of the National Association of Asian American Professionals and was elected as the 2002 President of the Greater Philadelphia Chapter of the National Society of Black Engineers. He is also a nominee for the Delaware Valley Engineer of the Year.

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About the presenters

• Robert N. Kennedy, P.E.

- Mr. Kennedy has over 30 years of progressive responsibility in industry with expertise in capital planning, design and construction, and Project Controls. He has functional experience in corporate operations, project management, capital cost planning and management, project finances, planning, scheduling, procurement, construction management, design, sales, marketing, estimating, cost control, administration, and client relations. He has significant engineering experience with pharmaceutical production and research facilities, manufacturing facilities, institutional facilities, commercial, office and retail buildings, industrial/chemical complexes, data centers, power plants, and heavy/highway projects.
- Mr. Kennedy is a member of the Delaware Valley Chapter and is active on the Student Activity Committee. He has made various presentations for the Chapter Education Series on Project Management, Cost Estimating, and Benchmarking.

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