Achieving Predictable Projects

In a World of Black Swan Risks

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Achieving Predictable Projects

In a World of Black Swan Risks

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Agenda

- Black swan risks
- What risks are you including?
- Risk assessment
  - An owners and contractors perspective
- How do you assess and manage those risks?
  - Levels of analysis
  - Risk management techniques
- How will you manage risk in the future?
How Deep is Your Risk Pond?

Contractor

Owner

Geopolitical
Weather Delay
Scope Definition
Global Hyper Inflation

Labor Availability
Design Allowance
Material Availability
Governance Model
How Deep is Your Risk Pond?

In the same boat?

Contractor  Owner

- Geopolitical
- Weather Delay
- Design Allowance
- Material Availability
- Scope Definition
- Governance Model
- Global Hyper Inflation
- Labor Availability
How Deep is Your Risk Pond?

- Geopolitical
- Weather Delay
- Labor Availability
- Design Allowance
- Global Hyper Inflation
- Governance Model
- Incoming Black Swan
So What is a Black Swan Risk?

1) It lies outside the realm of “regular” expectations
   • Nothing in the past can “convincing” point to its possibility
   • So how do you plan for it or model it?

2) Its impact is extreme

3) After the fact, we concoct explanations for its occurrence
   • Making it explainable and predictable

4) Theoretically its about accepting the randomness of large deviations
Question #1

What risks do you commonly think about today that would have been considered “Black Swan” risks more than 25 years ago?
Why Talk About Risks?

“....No construction project is risk free. Risk can be managed, minimized, shared, transferred [insured] or accepted. It cannot be ignored.”

Sir Michael Latham
Risk Analysis ‘101’

- What is the difference between cause, risk and effect?

  - Cause – The project is in Afghanistan
  - Risk – Skilled labor will be limited
  - Effect – The project will be late
‘Hard’ Benefits of Early Risk Analysis

- Better informed and more believable plans, schedules and budgets
- Increases the likelihood of a project delivering its objectives
- Allows a more meaningful assessment of contingency
- Contributes to the build up of historical information to assist in better management of future projects
- Enables a more objective comparison of alternatives
- Identifies and allocates responsibility to the best risk owner
‘Soft’ Benefits of Early Risk Analysis

- Improves corporate/project experience and communication
- Leads to a common understanding and improved team spirit
- Assists in the distinction between good luck/management and bad luck/management
- Helps develop the ability of the staff to assess risks
- Focuses management attention on the real and most important issues
- Facilitates greater risk taking
### A Spectrum of Risk

<table>
<thead>
<tr>
<th><strong>Tactical</strong></th>
<th><strong>Strategic</strong></th>
<th><strong>Future</strong></th>
<th><strong>“Black Swan”</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity accuracy</td>
<td>Basis of design uncertainty</td>
<td>Foreign exchange</td>
<td>Market crash</td>
</tr>
<tr>
<td>Labor rates</td>
<td>Partner alignment</td>
<td>Hyper-inflation</td>
<td>War</td>
</tr>
<tr>
<td>Productivity</td>
<td>Permitting</td>
<td>Changing regulation</td>
<td>Extreme weather</td>
</tr>
<tr>
<td>Weather</td>
<td></td>
<td></td>
<td>Major scope change</td>
</tr>
<tr>
<td>Margin of error</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Design allowance</td>
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</tbody>
</table>

**Basis of design uncertainty**

**Partner alignment**

**Permitting**

**Foreign exchange**

**Hyper-inflation**

**Changing regulation**

**Market crash**

**War**

**Extreme weather**

**Major scope change**
Risk Translated into Real Impact

**RISK**

- **Project Schedule Impact**
  - Possible Additional Time
  - **Time Equals Money**
    - Liquidated Damages
    - Escalation
    - Staffing Availability
    - Supplier / Vendor Pricing
    - Financing / Investment Models
    - Construction Logistics / Disruption
    - Design Efficiency

- **Project Cost Impact**
  - Possible Additional Costs
  - **Costs Independent of Time**
    - Contracting Strategy
    - Quantities / Contingencies
    - Project Management Team
    - Productivity / Performance
    - Access
    - Safety

**Impacts are Variable**

**Impacts = a Range**
## Risk Spectrum

<table>
<thead>
<tr>
<th>Category</th>
<th>Mild</th>
<th>1 in 10 yr events</th>
<th>1 in 100 yr events</th>
<th>1 in 1000+ yr events</th>
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</thead>
<tbody>
<tr>
<td><strong>Weather</strong></td>
<td>annual events</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>assume “A-team” and</td>
<td>staffing analyzed</td>
<td>staffing and</td>
<td>PM and team</td>
</tr>
<tr>
<td></td>
<td>move on</td>
<td></td>
<td>structure analyzed</td>
<td>composition</td>
</tr>
<tr>
<td><strong>Partners</strong></td>
<td>one client, no</td>
<td>aligned partnership</td>
<td>mis-aligned</td>
<td>new partner</td>
</tr>
<tr>
<td></td>
<td>“partners”</td>
<td></td>
<td>partnership</td>
<td>with mis-aligned</td>
</tr>
<tr>
<td><strong>Political</strong></td>
<td>permit delays</td>
<td>mild protest</td>
<td>NGO shuts down</td>
<td>regulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>project</td>
<td>shift</td>
</tr>
</tbody>
</table>
How Deep is Your Risk Pond?

What do you include and analyze as a Owner/Operator and as a Contractor?
Labor Availability

- **Owner perspective**
  - Ultimate cost of labor

- **Contractor perspective**
  - Organizational structure
  - Productivity and size of peak labor force
  - Strategy – local and journeyman content
  - Execution – minimize site labor
    - *Modularization*
Design Allowance

- **Owner perspective**
  - Included in base estimate, or
  - Not included in base estimate

- **Contractor perspective**
  - Address issues in estimate
  - Revisit at each gate of execution
  - Risk register evaluation - scope
Material Availability

- **Owner perspective**
  - Cost impact
  - Schedule impact

- **Contractor perspective**
  - Schedule impact
  - Cost impact
  - Escalation criteria
Weather Delay

- **Owner perspective**
  - Predictable bad weather included in base cost and schedule
  - Same for 1 in 10 events, near brush with hurricane
  - Extreme events excluded from base cost and schedule

- **Contractor perspective**
  - Typical events in schedule and cost
  - Extreme events excluded
Scope Definition

- **Owner perspective**
  - Minor modifications risked by contractor in **base cost**

- **Contractor perspective**
  - Minor design allowance/development in **base cost**
  - Estimating contingencies addressed at each gate of execution
  - Change management plan established with baseline
Governance Model

- **Owner perspective**
  - High level risked based on scenario planning sometimes used for non-OECD countries

- **Contractor perspective**
  - Changes not implemented without approval
  - Approval cycle built into schedule
  - Inspection authorities built into schedule and cost
Global Hyper-inflation

- **Owner perspective**
  - Have a set corporate escalation rate and a process to grant project specific exceptions based on market analysis

- **Contractor perspective**
  - Do not take unquantifiable risk
    - *If it cannot be defined, exclude it*
  - Escalation curves
    - *Collaborative review of various industry norms*
      - Best scenario for business planning predictability
Geopolitical

- **Owner perspective**
  - Similar to weather....include the ongoing "background noise" (Niger Delta unrest) in base, risk foreseeable events (election outcomes), exclude extreme events (nationalization)

- **Contractor perspective**
  - Build quantifiable risks in schedule and cost
  - Exclude unquantifiable risks
Other Risks

- **Environmental**
  - Contaminated land
  - Pollution liability
  - Nuisances
  - Permissions
  - Public opinion
  - Internal policies
  - Regulation
  - Regulation change

- **Planning**
  - Permission req’ts
  - Policy and practice
  - Land use
  - Socio-economic impacts
  - Public opinion
Other Risks (cont’d)

- **Market**
  - Demand forecasts
  - Competition
  - Obsolescence
  - Customer satisfaction
  - Fashion

- **Economic**
  - Government policy
  - Taxation
  - Cost inflation
  - Interest rates
  - Exchange rates

- **Financial**
  - Bankruptcy
  - Margins
  - Insurance
  - Risk sharing
Question #2

Give us examples of risks that other organizations/companies/industries have handled poorly?
Turning Knowledge of Risks into Action
Considerations When Modeling Risk

- Definition of risk in dollars and/or days
- Frequency
- Probability Rating Scale
  - Optimistic / Likely / Pessimistic
- Combinations
  - Lone wolf or hunting in packs
  - Iterative analysis to determine ranges
- Determine cost effectiveness of risk mitigation
The Four Levels of Risk Assessment

- **Level 1: Sensitivity Analysis**
  - Use of plus/minus percents to “test” a project’s weaknesses
  - Generally uses symmetric ranges (e.g., +10% and -10%)

- **Level 2: Three Point Ranging**
  - Use of continuous distributions on cost estimate line items
  - Generally ignores dependency between similar items

Ranges generated from Levels 1-3 are typically narrow and unskewed. Ranges generated from Level 4 are wider and skewed reflecting observed data.
The Four Levels of Risk Assessment

- **Level 3: Three Point Ranging with Dependencies**
  - Use of continuous distributions with correlation
  - Generally ignores risk events and schedule slips

- **Level 4: Full Cause and Effect Modeling**
  - Use of three point ranges on cost estimate variables coupled with dependencies and risk events including a linked schedule risk

Ranges generated from Levels 1-3 are typically narrow and unskewed
Ranges generated from Level 4 are wider and skewed reflecting observed data
The Future of Risk

- **Identification**
  - How can we cast the risk net even wider?

- **Analysis**
  - More or less?

- **Tolerance**
  - If more analysis, is this an area for investigation

- **Risk Shifting**
  - How will future contracts look?

- **Black Swans…are their more to come?**
Question #3

How do you think risk assessment / analysis will be different in the future?
How do you think risk assessment / analysis will be different in the future?

The focus of the future for risk assessment, analysis and strategy is predictability and transparency.
A Last Thought

- We are hoping you better understand the importance of risk analysis and took away a few tools to think about or use in your real life situations.

- Remember, if the project planning and risk analysis gets too detailed, it can lead to “paralysis by analysis”.
SESSION 9

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Any comments or questions?

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