“Principles for Assessing Financial Risks In Capital Construction Projects”

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Northwest Construction Consumers Council
Seattle, WA

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Introduction

- Risk is the chance that something will happen changing the expected outcome of the project.
  - consequence that are undesirable
  - loss, damage, injuries, failures
  - loss of opportunity (for achieving the project goals and objectives)
Introduction

- Risk types having an effect on the projects
  - safety risks
  - professional liabilities
  - environmental risks
  - contract risks
  - builders risks
  - economic risks
  - security risks

- Financial and cost change
  - manage at best

- time
- cost
- scope definition
Risk and benefits opportunities assessment matrix

Quadrant I: High Risks, Low Benefits
Quadrant II: High Risks, High Benefits
Quadrant III: Low Risks, Low Benefits
Quadrant IV: Low Risks, High Benefits

Introduction
Introduction

- Survey and study of project performance
- Technical capacity exist
- Abundance of processes, plans, tools, and techniques (more available and use today than ever)
- Striking poor performance

40 projects range from $300 million to $8.2 billion
Capital construction budget overruns for U.S. mega-projects

Percent (%) of construction cost overrun above the original baseline budget.

- Transit Facility: 175%
- Commuter Rail Bridge: 155%
- Highway Bridge: 140%
- Rail Expansion: 120%
- New Rail Technology: 89%
- Highway Improvements: 75%

Introduction

no formal risk process
Introduction

Capital construction budget overruns for U.S. mega-projects

- **Highway Improvement**: 40% ($1.2 bil)
- **Bridge Reconstruction**: 25% ($1.2 bil)
- **Highway Improvement**: 20% ($750 mil)
- **Rail Improvement**: 12% ($700 mil)
- **Rail Expansion**: <1% ($450 mil)

Percent (%) of construction cost overrun above the original baseline budget.

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formal risk process
Introduction

- Need for new methods and practices
  - reducing costs
  - improving performance
- Allowing potential risks to go unmanaged or unaddressed
- Identifying, understanding, evaluating and mitigating risks

implement risk management
integrate risk management
<table>
<thead>
<tr>
<th>Risk management principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk planning and management</td>
</tr>
<tr>
<td>Be realistic when making assumptions</td>
</tr>
<tr>
<td>Gather project information and expert judgments</td>
</tr>
<tr>
<td>Understand risk elements and their impacts</td>
</tr>
<tr>
<td>Assess and analyze risks impacts</td>
</tr>
<tr>
<td>Develop mitigation and contingency plans</td>
</tr>
<tr>
<td>Synthesize all risks to determine total impact</td>
</tr>
<tr>
<td>Integrate risk management process</td>
</tr>
<tr>
<td>Seek clear, realistic, and reliable project metrics</td>
</tr>
<tr>
<td>Implement a continuous risk management process</td>
</tr>
</tbody>
</table>
Introduction

Risk management principles

- Risk planning and management
- Be realistic when making assumptions
- Gather project information and expert judgments
- Understand risk elements and their impacts
- Assess and analyze risks impacts
- Develop mitigation plans
- Synthesize all risks
- Integrate risk management process
- Seek clear, realistic, and reliable project metrics
- Implement a continuous risk management process

50 projects studied

$150 billion is total expected cost
Recognize the need for applying risk management processes upfront; during the planning and pre-construction phase of the project development.
Risk Planning

- Initiate the risk management process at the very beginning of the project
- Keep a strategic perspective

1. Focus on the high-risk issues and their impacts

2. Consistently assess the adequacy of the mitigations and contingencies
Overall strategy of the risk management program

**Strategic Risk Process**

**Successful Project**
- Maximize Opportunities
- Minimize Risk Impacts

**Added Benefits**
- Cost Effectiveness
- Schedule Control
- Contingency Management

Employing risk management processes to help attain success and meet expectations.
Risk Planning

- Capital Construction Risk Management Plan
  - summarize key definitions and risk terminology (common language)
  - construct the framework for how the risk management process will work
  - establish program and process policies (organizational structure)
  - document risk identification and mitigation methods through risk allocation
  - clearly identify each stage of the process (uniform and continuous process)

builds confidence
Risk Planning

A continuous process for risk strategy and management

1. Focus on High Risk Issues and their Impacts
2. Assess Adequacy of the Mitigation and Contingencies

An iterative and continuous process for managing risk as it changes and shifts.
Be Realistic When Making Project Assessments and Assumptions

Don’t allow the project assumptions to be interpreted in too idealistic manner; influencing false thinking that everything is going well
Be Realistic in Project Assumptions

- Everything going according to plan (EGAP)
- EGAP characteristically means
  - no major problems to draw management attention
  - no major project technical issues; i.e., geological, environmental, contracts, etc.
  - all political, economic, and administrative commitments and promises are kept
  - no apparent change in achieving the expected results

EGAP – a fatal flaw
Be Realistic in Project Assumptions

- Major causes of known risks
  - design and specification changes
  - geological, natural elements, problems, etc.
  - resource shortages i.e., manpower, material, etc.
  - existing conditions

- Major causes of unidentified risks
  - lack of realism in cost forecast
  - underestimating the impact of risks
  - underestimating the corrections and actions
Gather Risk Information and Expert Judgments

- Gather as much information about the project as feasible. Use experts to help define questionable issues. Remove biased views from assessments and analysis.
Gather Risk Information and Expert Judgment

- **Work sessions to discuss methods of a risk analysis process**
  - discuss methods of a risk analysis process and gain consensus

- **Gather risk information**
  - interviews
  - risk review meetings
  - workshops

- **CII Advanced Planning Risk Analysis**
  - collecting group judgment
  - BOGSAT
Understand Risks Elements and Their Impacts

- Identify and clarify specific risks and their potential impacts early in the project planning and development
Understanding Risks Impacts

**STRATEGIC**
- Means to Execute
- Organization
- Resources
- Viability
- Preconditions

**TECHNICAL**
- Project Execution
- Design
- Engineering
- Construction
- Construction Management

**COST/SCHEDULE**
- Manage Cost/Schedule
- Earned Values
- Contingency
- Schedule Assessment

**RISK REGISTER**

Risk Assessment

Risk Response and Mitigation
## Understanding Risks Impacts

Risk register with risk evaluation criteria and remarks

### Project Risk Management Register

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Changes in design particularly for the Architectural Center - interruption to project schedule and creating cost overruns</td>
<td>/</td>
<td>Client Indecisional/Interference Risk</td>
<td>0</td>
<td>0 Major</td>
<td>Almost Certain</td>
<td>5 - Very High</td>
<td>No</td>
<td>No</td>
<td>Establish configuration control process</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contractual constraints due to the unique design configurations - interruption to project schedule and planning of sequence and phasing</td>
<td>/</td>
<td>Construction/Constructability Risk</td>
<td>0</td>
<td>0 Major</td>
<td>Likely</td>
<td>4 - High</td>
<td>No</td>
<td>No</td>
<td>Value engineering, constructability reviews leading to planned consistency and controlling by configuration management</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Changes in the scope of the Architectural Center because of the integration with adjacent project developments - will impact the planned construction phasing and sequence of execution</td>
<td>/</td>
<td>Client Indecisional/Interference Risk</td>
<td>0</td>
<td>0 Major</td>
<td>Likely</td>
<td>4 - High</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Risk Register

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Risk and Effects</th>
<th>Reference</th>
<th>Identified Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Changes in design particularly for the Architectural Center - interruption to project schedule and creating cost overruns</td>
<td>a1 /</td>
<td>Client Indecision/Interference Risk</td>
</tr>
<tr>
<td>2</td>
<td>Constructability constraints due to the unique design configurations - Interruption to project schedule and planning of sequence and phasing</td>
<td>a2 /</td>
<td>Construction/Constructability Risk</td>
</tr>
<tr>
<td>3</td>
<td>Changes in the scope of the Architectural Center because of the integration with adjacent project developments - will impact the planned construction phasing and sequence of execution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **be specific**
- **be definitive**
### Understanding Risks Impacts

**Risk register with risk evaluation criteria and remarks**

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Risk and Effects</th>
<th>Priority</th>
<th>Unmitigated Exposure</th>
<th>Need Event Cont.</th>
<th>Action Plan Responsible Party</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Changes in design particularly for the Architectural Center - interruption to project schedule and creating cost overruns</td>
<td>Very High</td>
<td>No</td>
<td></td>
<td></td>
<td>Establish configuration control process</td>
</tr>
<tr>
<td>2</td>
<td>Constructability constraints due to the unique design configurations - interruption to project schedule and planning of sequence and phasing</td>
<td>High</td>
<td>No</td>
<td></td>
<td></td>
<td>Value engineering, constructability reviews leading to planned consistency and controlling by configuration management</td>
</tr>
<tr>
<td>3</td>
<td>Changes in the scope of the Architectural Center because of the integration with adjacent project developments - will impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Capture the early thinking**

**First thoughts on mitigation**
Assess and Analyze Risks Impacts

- Evaluate and analyze all risks elements to the point of determining the degree of their impacts on the project goals and objectives
Assess and Analyze Risks Impacts

- Logical way of assessing and measuring potential impacts
  - evaluation of risk events or opportunities
- Two major approaches to logical risk analysis
  - deterministic approach
  - probabilistic analysis

- supported by existing systems
  - statistical analysis and modeling
Performance Measurement

Collecting Information and Data

Risk Register

Risk Analysis Process

Analyzing and Interpreting the Expected Performance

Statistical analysis and modeling

- Variance Analysis
- Performance Indicators
- Trends
- Remaining Duration
- Physical Progress
- Activity Float
- Critical Paths
- Long-Lead Procurements
- Total Costs
- Forecast Expenditures
- Current and Forecasted Commitments
- Work Authorization Commitments
- Expenditures and Commitments
- Material Stored
- Work-In-Place
Assess and Analyze Risks Impacts

- Use risk evaluation scoring to assign values to risks
  - numerical interpretation for analysis
- Risk event status
  - probability of occurrence (likelihood of the event happening)
  - severity of impact (cost or time at stake)

\[
\text{risk event status} = \text{risk probability} \times \text{amount at stake}
\]
Assess and Analyze Risks Impacts

Risk evaluation scoring criteria for the probability of occurrence to the likelihood of occurrence

<table>
<thead>
<tr>
<th>Probability of Occurrence</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% - 10%</td>
<td>1 Rare</td>
</tr>
<tr>
<td>11% - 25%</td>
<td>2 Unlikely</td>
</tr>
<tr>
<td>26% - 75%</td>
<td>3 Possible</td>
</tr>
<tr>
<td>76% - 90%</td>
<td>4 Likely</td>
</tr>
<tr>
<td>91% - 100%</td>
<td>5 Almost Certain</td>
</tr>
</tbody>
</table>

Correlation between qualitative description and the quantitative metric
### Assess and Analyze Risks Impacts

Risk evaluation scoring criteria for financial exposure to severity of impact

<table>
<thead>
<tr>
<th>Financial Exposure</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to $10,000</td>
<td>1</td>
</tr>
<tr>
<td>Up to $250,000</td>
<td>2</td>
</tr>
<tr>
<td>Up to $500,000</td>
<td>3</td>
</tr>
<tr>
<td>Up to $1 million</td>
<td>4</td>
</tr>
<tr>
<td>Over $1 million</td>
<td>5</td>
</tr>
</tbody>
</table>

Associating severity measurements to potential financial impacts or variations
Assess and Analyze Risks Impacts

Risk register with risk evaluation scoring and remarks

<table>
<thead>
<tr>
<th>Identified Risk</th>
<th>Mitigated Exposure</th>
<th>Execution Costs</th>
<th>Severity</th>
<th>Likelihood of Occurrence</th>
<th>Priority</th>
<th>Unmitigated Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Indecision/Interference Risk</td>
<td>0</td>
<td>0 Major</td>
<td>Almost Certain</td>
<td>5 - Very High</td>
<td>Critical</td>
<td></td>
</tr>
</tbody>
</table>

relying on judgment (expert)

risk event status
Assess and Analyze Risks Impacts

Top 10 impact risks priorities – the “Watch” list:

1. Compressed design schedule  
   - Critical
2. Lack of timely decisions and information flow  
   - Critical
3. Changes in design criteria and scope  
   - Major
4. Environmental planning and impacts (NEPA)  
   - Major
5. Very tight security requirements  
   - Major
6. Lack of available resources  
   - Serious
7. Logistics problems  
   - Serious
8. Unique technology and innovative design  
   - Serious
9. Release for property access  
   - Moderate
10. Construction critical path impacts  
    - Moderate
Mitigation and Contingency Planning

- Develop mitigation and contingency plans that are sufficient for the priority or the degree of impact associated with the risk
Risk Management Planning

Risk Identification

Qualitative and Quantitative Risk Analysis

Risk Monitoring and Control
- monitor and evaluate
- revisions, re-baseline, updates
- reporting and communicating

Risk Response and Mitigation Actions
- Avoidance
- Mitigation
- Transfer
- Acceptance

Cost of Risk Management
Develop Mitigation and Contingency Plans

- Risks responses and mitigations strategies include options such as
  - control measures
  - management actions
  - contractual arrangements
  - third party i.e. contractors, insurance, etc.
  - resource provisions
  - contingency and reserve funds

- determine effectiveness in actions
- mitigations actions cost
Contingency is typically an integral part of budget estimating

- an arbitrary value
- when added to the base estimate, or schedule, for unknowns
- when used to offset unclear or unknown issues

contingencies overestimated of underestimated
### Develop Mitigation and Contingency Plans

Risk response strategies and options profile and ledger

<table>
<thead>
<tr>
<th>Identified Risk</th>
<th>Risk and Effects</th>
<th>Priority</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Client Induced Interference Risk</td>
<td>Changes in design particularly for the Architectural Center - interference to project schedule and creating cost overruns</td>
<td>5 - Very High</td>
<td>Retain - Reduce</td>
</tr>
<tr>
<td>2 Constructability Issues</td>
<td>Constructability constraints due to unusual design configurations - Interference to project schedule and planning of sequences and phasing</td>
<td>4 - High</td>
<td>Reduce</td>
</tr>
<tr>
<td>3 Client Induced Interference Risk</td>
<td>Changes in scope of the designs because of the integration with project developments - will impact the planned construction phasing and sequence of execution</td>
<td>4 - High</td>
<td>Retain - Reduce</td>
</tr>
</tbody>
</table>

### Develop Mitigation and Contingency Plans

- Multiple options
- Be specific and realistic

**Project Risk**

- Complete Date: 12-Sep-05
- Proposal Project Manager: R.L. "Rick" Rye
- Risk Representative: 1

**Risk Management Strategies/Options Overview**

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Identified Risk</th>
<th>Risk and Effects</th>
<th>Priority</th>
<th>Strategy</th>
<th>Strategy/Option Overview</th>
<th>Preferred Strategy Options</th>
<th>Action Plan Responsible Party</th>
<th>Action Plan Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Client Induced Interference Risk</td>
<td>Changes in design particularly for the Architectural Center - interference to project schedule and creating cost overruns</td>
<td>5 - Very High</td>
<td>Retain - Reduce</td>
<td>1.1 Process change orders on contract schedule</td>
<td>50</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Constructability Issues</td>
<td>Constructability constraints due to unusual design configurations - Interference to project schedule and planning of sequences and phasing</td>
<td>4 - High</td>
<td>Reduce</td>
<td>2.1 Value engineering, constructability review leading to planned consistency and controlling by configuration management</td>
<td>70</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Client Induced Interference Risk</td>
<td>Changes in scope of the designs because of the integration with project developments - will impact the planned construction phasing and sequence of execution</td>
<td>4 - High</td>
<td>Retain - Reduce</td>
<td>3.1 Process change orders on contract schedule</td>
<td>50</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>
- Risk response actions have a resource value
  - cost (budget or contingency)
  - time (budget or float)

- Not cost effective to mitigate all risks
  - adequate contingencies and reserves

- Logical vehicle for predicting the extent of variations
  - forecasting the best case scenarios and worst case scenarios
Develop Mitigation and Contingency Plans

Probability distribution representing variations of probable occurrence

- @RISK add-ins
- normal distribution
- statistical mean

Expected Values

Probabilities

10%, 25%, 50%, 75%, 90%
Potential Changes to Present Estimate

Labor costs are expected to vary due to changes in quantities, productivity or rates
Develop Mitigation and Contingency Plans

Mitigation model and range estimating with probability

<table>
<thead>
<tr>
<th>Contractor Costs</th>
<th>$7,485</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variance - Cost</strong></td>
<td></td>
</tr>
<tr>
<td>Q = Quantities</td>
<td>$3,100</td>
</tr>
<tr>
<td>P = Productivity</td>
<td></td>
</tr>
<tr>
<td>LR = Labor Rates</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Range Estimate - Cost</strong></th>
<th>Est.</th>
<th>Life</th>
<th>P</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3,100</td>
<td>15%</td>
<td>-$429</td>
<td></td>
<td>$679</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q = Quantities</td>
</tr>
<tr>
<td>U = Unit Prices</td>
</tr>
<tr>
<td>U = Unit Prices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Range Estimate - Cost</strong></th>
<th>Est.</th>
<th>Life</th>
<th>P</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,600</td>
<td>20%</td>
<td>-$232</td>
<td></td>
<td>$336</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q = Quantities</td>
</tr>
<tr>
<td>P = Productivity</td>
</tr>
</tbody>
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<tr>
<th><strong>Range Estimate - Cost</strong></th>
<th>Est.</th>
<th>Life</th>
<th>P</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000</td>
<td>40%</td>
<td>-$183</td>
<td></td>
<td>$278</td>
<td></td>
</tr>
</tbody>
</table>

- budget elements
- event and scope elements
Develop Mitigation and Contingency Plans

Risk Register (Cost/Schedule) → Statistical Analysis (@RISK) → Potential Changes to Present Estimate

Labor costs are expected to vary due to changes in quantities, productivity or rates

Cost Probability Matrix
Develop Mitigation and Contingency Plans

Risk Register (Cost/Schedule) → Statistical Analysis (@RISK) (Crystal Ball) → Cost Probability Matrix

Cost Risks Report

<table>
<thead>
<tr>
<th>Estimated Cost</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.10 M</td>
<td>$2.67 M</td>
<td>$3.78 M</td>
</tr>
</tbody>
</table>

15% confidence level
Develop Mitigation and Contingency Plans

Risk Register (Cost/Schedule)

Schedule Risks Report

<table>
<thead>
<tr>
<th>Estimated Days</th>
<th>P</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>15%</td>
<td>210</td>
<td>240</td>
</tr>
</tbody>
</table>

Simulations (PertMaster)

Schedule Documents

Develop Mitigation and Contingency Plans

Risk Register (Cost/Schedule)

Schedule Risks Report

<table>
<thead>
<tr>
<th>Estimated Days</th>
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<tr>
<td>220</td>
<td>15%</td>
</tr>
</tbody>
</table>

Simulations (PertMaster)

Schedule Documents
Synthesizing all potential project risks and determine the total cumulative effect
Synthesizing the Risks

- Deterministic evaluation has limits
- Develop a logical model for overall project risks measurement to mitigate and manage
- Probabilistic methods for overall statistical model analysis and simulation
  - determine that the mitigation costs is adequate
  - giving expectations that the project will meet objectives
  - help provide confidence in the expected project cost

@RISK analysis
PertMaster
Synthesizing the Risks

Cumulative probability distribution curves
Synthesizing the Risks

Project cost contingency analysis probability of occurrence
Capital Construction Project X

Probability of Underrun (%) vs. Total Project Cost ($000)

P10
P50
P90

$640,000 $660,000 $680,000 $700,000 $720,000 $740,000 $760,000 $780,000


0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Synthesizing the Risks

Project cost contingency analysis probability of occurrence

Capital Construction Project X

actual project budget: $750 M
adequate project budget: $750 M (90% probability of underrun)
Synthesizing the Risks

Project cost contingency analysis probability of occurrence
Capital Construction Project Y

Actual project budget: $400 M
Adequate project budget: $448 M
(90% probability of underrun)
Synthesizing the Risks

Project cost contingency analysis probability of occurrence
Capital Construction Project Z

actual project budget: $187 M
adequate project budget: $189 M
(90% probability of underrun)
Synthesizing the Risks

Project schedule contingency analysis probability of occurrence
Capital Construction Project Z

Probability of Underrun (%)

Scheduled Time (Months)

- project CPM schedule float: 0 months
- adequate schedule float: 5 months (90% probability of underrun)
### Mitigation Cost Profile with Probabilities

<table>
<thead>
<tr>
<th></th>
<th>Project Cost w/o Risk Process</th>
<th>Mitigation Cost and Contingency</th>
<th>Expected Total Project Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Estimate</strong></td>
<td>$1,668.36</td>
<td>$365.59</td>
<td>$2,033.95</td>
</tr>
<tr>
<td>P10</td>
<td>$1,668.36</td>
<td>$178.64</td>
<td>$1,847.00</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$1,668.36</td>
<td>$373.07</td>
<td>$2,041.43</td>
</tr>
<tr>
<td>P90</td>
<td>$1,668.36</td>
<td>$570.84</td>
<td>$2,239.2</td>
</tr>
</tbody>
</table>

Dollar values represent millions ($000)
Benefits of probabilistic contingency models and simulations

- provides explicit information for making informed decisions
- assist in the overall predictability for meeting the owners expectations

measure adequacy of resource contingencies to the best of our judgment
Integrate the Risk Management Process

- Integrate the risk management process with the day-to-day construction project management applications
Integrate the Risks Management Process

- Major objectives of integrated risk management approach
  - integrating mitigation planning before the consequence (feedback)
  - enhancing the identification of resources for project management
  - facilitating continuous monitoring, analysis and communication
Integrate the Risks Management Process

Integrated risk management process

Develop and Execute Risk Management Plan

Performance Measurement

Risk Monitoring and Control

Risk Identification and Analysis

Risk Response and Mitigation Strategy

Total dependency upon the normal performance control system
Rely on Clear and Reliable Project Metrics

- Ensure clear, realistic, and reliable definition of the project performance measurements and metrics
Common problem

Predictable world of cause and effects

Major cause of project variances

- lack of realism in initial planning and definition
- delays underestimated
- contingencies too low
- geological and natural elements not clearly defined
- environmental, safety and existing conditions unclear

Reliable Measurements and Metrics

can’t measure, can’t manage
Implement a Continuous Risk Management Process

- Continuously evaluate the effects of risks through the progress of the project work and intervening when necessary to ensure their mitigation and resolution
A Continuous Risk Process

- Identifying additional risks as the project progresses
- Continuously gathering risk information and conducting reviews as the project progresses
  - reevaluating risks periodically
  - evaluations at the end of each milestone phase
- Continuously assessing the probability of occurrence and potential impact

- increase budget confidence
- increase success confidence
A Continuous Risk Process

Continuing risk analysis with project management

- Appoint Project Risk Manager and Convene Project Risk Team
- Conduct Preliminary Risk Identification and Assessment
- Set-up Risk Register and Break Project Down into Sections
- Perform Qualitative Risk Assessments
- Perform Quantitative Risk Assessments

- Risk Allocation
  - Evaluate Effectiveness of Mitigation Strategies and Actions
  - Performance Measurement
    - Scheduling
    - Cost Reporting
    - Work Authorization
      - Schedule
      - Resources
      - Variances
      - Performance
      - Budgets
      - Costs
      - Progress
      - Costs
      - Funds
      - Equipment
      - Manpower
      - Resources
      - Work
      - Materials
      - Costs
      - Work
- Identify New Risk and Record in Risk Register

Project Execution and Construction
Conclusion

- Risks cannot be eliminated
- Risks can be acknowledged and managed in a better method
  - measured and expressed a great deal better
Conclusion

- Think in terms of the following
  - having a risk management process
  - identify risks elements and determine their effects
  - assign mitigation actions and strategies
  - use as another project management tool kit

- keep watch on top risks
- monitor and track performance results
A Continuous Risk Process

An iterative and continuous measuring and evaluation process

1. Focus on High Risk Issues and Their Impacts

2. Assess Adequacy of the Mitigation and Contingencies

- Establish Project Strategy and Objectives
- Identify and Assess Risks
- Monitor/Review Performance
- Manage Project/ Mitigate Risk
- Analyze Adequacy of Budget/Schedule
- Assess Adequacy of the Mitigation and Contingencies

Mitigate Risk
Identify and Assess Risks
Monitor/Review Performance
Analyze Adequacy of Budget/Schedule
Manage Project/ Mitigate Risk
Conclusion

- Benefits of the risk management process
  - disciplined framework
  - avoided/reduced large losses
  - improved decision making
  - improved allocation of resources
  - increased project confidence

best method for owners interest protected

risks are balanced to adequate mitigation
Questions and Comments

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