CONSTRUCTION PROJECT DELIVERY

Program and Project Management

PROJECT EXECUTION PERIODS

Recognising the Principal Project Phases
RETURN ON INVESTMENT

Recognising the bigger picture

Employer Investment and Return

$\text{m}$

Project Execution
Facility Operation

Payback
Return on Investment

Control/Cost Characteristics

Recognising the importance of the early stages

Employer Control
Employer Cost

Degree of Control

Inception
Design
Construction
Defects Liability

minimizing project and construction risk ...
PROGRAM MANAGEMENT

The identification, development and inception of the Various preliminary elements that will:
- Confirm the Feasibility Study
- Establish the technical parameters
- Establish the commercial parameters
- Establish the financial parameters

It's the Program Manager who provides the final focus for Project commencement

INCEPTION PERIOD

Program Management

- Land Use
- Transportation
- Life Cycle Costing
- Design Standards
- Design Management
- Project Planning and Controls
- Contracts & Packaging
- Project Procedures
- Summary Cost Plan
- Procurement and Facilitation

Setting plans and concepts ...

minimizing project and construction risk ...
PROJECT STRATEGY

The Means of delivering the project

CONTRACTING STRATEGY

Selecting contract packages and payment terms
Determining Contract Type

INVITATION TO TENDER

Specifying the Employer’s Requirements...

minimizing project and construction risk ...
THE PATH TO CONTRACT AWARD

Clarity in Contract execution

minimizing project and construction risk ...

PROJECT MANAGEMENT

The coordination and control of the entire effort required to achieve a defined objective

☑ within the final approved budget
☑ within pre-determined final timescales
☑ to the specified standard and quality

It’s the Employer who defines the objectives and constraints

minimizing project and construction risk ...
The Project Management Triangle

Fixing priorities and getting the balance right

Key Themes

Project control is paramount ...
The Design Management Triangle

Minimise Risk  Maintain Schedule

Value Engineering

Minimise Risk  Maintain Schedule

Project Manager

Design Consultant

Cost Consultant

Satisfy the Project Brief

Meeting the Employer’s Expectations ...

The Value Engineering Technique

Six fundamental phases:

- Investigation
- Speculation
- Evaluation
- Validation
- Presentation
- Implementation

Controlling the Risk of Designing the Project ...
PROJECT LIFECYCLE
FROM ITT TO CONTRACT AWARD

Employer need to maintain control

ITT Issue → Tender Queries & Clarification → Tender Receipt & Evaluation → Post-Tender Clarification → Contract Negotiation → Contract Award

What the Employer requires.... What the Parties agree.....

Resisting the re-introduction of uncertainty

IMPACT OF THE TENDER PROCESS

RISKS
Employer clarifications
Additional Information
Employer changes
Contractor Queries
Contractor Qualifications
Contractor Alternatives
Contractor Omissions

EMPLOYER’S REQUIREMENTS

Remaining faithful to the Business Case

minimizing project and construction risk...
TENDER EVALUATION

Optimum choice on a level playing field

Compliance Alternatives Qualifications

Price

Risk and Reward

QA HSE
Contractor Key Personnel Management Competence Technical Competence Method of Working Programme & Resources Supplementary Information

MAIN CONTRACTOR WORK CYCLE

FROM CONTRACT AWARD TO PRACTICAL COMPLETION

Project Manager control - Employer direction

Detailed Engineering  Procurement  Construction  Pre-Commissioning  Practical Completion

CALCULATIONS  PURCHASE ORDERS  ITEMS  SYSTEMS
SPECIFICATIONS  SUB CONTRACTORS  QUANTITIES  COMPLETE

Identifying deliverables, monitoring performance and acting on shortfalls

minimizing project and construction risk ...
CONTRACT CONTROL PROCEDURES

Providing the means of direction and control

THE PROJECT CONTROL LOOP

Maintain the Plan by Controlling the Changes
A QUALITATIVE LOOK AT PROJECT RISK

Risk Management identifies risks through the progressive use of risk impact matrices (likelihood and impact) for all major packages within a particular project.

Weekly meetings and periodic workshops are scheduled to identify business and project risks, ranging from the translation of the Business Plan into project and design briefs, to procurement strategies for the entire supply chain.

Risk management then links with Value Engineering and Change Management to deliver optimum solutions.

The normal activities associated with Risk Management are:

1. Establish contacts, roles, responsibilities and communication routes
2. Brainstorm & review any existing risk data. Evaluate project procedures and Tender or Contract documents for risk exposure, including design, procurement, delivery & installation schedules
3. Develop bespoke probability-impact matrices and transfer all risks to a comprehensive Master Risk Register
A QUALITATIVE LOOK AT PROJECT RISK

4. Launch the Risk Management Plan, detailing the procedural approach

5. Hold workshops with all involved personnel to review all project requirements

6. Investigate the supply chain, contracts packaging and overall procurement/strategy routes

7. Develop mitigation plans and contingency plans, as necessary

8. Maintain the entire Risk Plan, registers and matrices

RISK ASSESSMENT

- Consider any risk that could potentially affect the project objectives – (i.e. brainstorm & make a list)
- Decide what the risk might affect ... for example ...
  ✓ Time
  ✓ Cost
  ✓ Quality
  ✓ Scope
  ✓ Supply chain
  ✓ Logistics
  ✓ Resources
  ✓ Safety / Environment
  ✓ etc ...

minimizing project and construction risk ...
**RISK ASSESSMENT**

- **External/Strategic/Corporate Business risk** – whatever affects our ability to meet business objectives. These high level risks are managed within the business and cannot be transferred. Such risks include project funding, organizational, political, environmental, cultural, mergers & acquisitions, infrastructure failure, utility Authorities, legislation, changes in marketplace, security, life safety, functionality and business continuity risks.

- It should be possible to mitigate, to a degree, some risks despite being outside our control. These are generally business risks (scope) that could jeopardize the success of the project in terms of viability.

- **Project/Programme/Operational risk** – includes technical, contract, design, market costs, claims, operational issues, schedules/time, resources, quality, procurement; these should be managed by the party best placed to do so. These are project risks that could jeopardize the success of the project in terms of time, cost, quality or safety.

**RISK EVALUATION - QUALITATIVE**

The common approach ...

- Evaluate the probability or likelihood of something happening?
- Evaluate the impact or consequences of something happening?

- A risk is identified as L=Low, M=Medium, H=High, VH= Very High
- ...green = low  Yellow = Medium  Red = high

<table>
<thead>
<tr>
<th>Probability/Impact</th>
<th>Low impact</th>
<th>Medium impact</th>
<th>High impact</th>
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</thead>
<tbody>
<tr>
<td>Hardly likely</td>
<td>Low risk</td>
<td>Low risk</td>
<td>Low risk</td>
</tr>
<tr>
<td>Not likely</td>
<td>Low risk</td>
<td>Low risk</td>
<td>Medium risk</td>
</tr>
<tr>
<td>Maybe</td>
<td>Low risk</td>
<td>Medium risk</td>
<td>Medium/High risk</td>
</tr>
<tr>
<td>Likely</td>
<td>Low risk</td>
<td>Medium/High risk</td>
<td>High risk</td>
</tr>
<tr>
<td>Highly likely</td>
<td>Medium risk</td>
<td>High risk</td>
<td>Very High risk</td>
</tr>
</tbody>
</table>

- BUT now consider impacts separately for time, cost, quality, scope
RISK EVALUATION – QUANTATIVE

The not so common approach ... using refined ranges

- Develop the Probability-Impact ranges i.e. for time & costs
- Probability x Impact = Risk Score
- Highly likely (90%) x high impact (80%) = 0.72 = HIGH risk

<table>
<thead>
<tr>
<th>Probability</th>
<th>Risk Score = P x I</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% (0.9)</td>
<td>0.05   0.09 0.18 0.36 0.72</td>
</tr>
<tr>
<td>70% (0.7)</td>
<td>0.04   0.07 0.14 0.28 0.56</td>
</tr>
<tr>
<td>50% (0.5)</td>
<td>0.03   0.05 0.10 0.20 0.40</td>
</tr>
<tr>
<td>30% (0.3)</td>
<td>0.02   0.03 0.06 0.12 0.24</td>
</tr>
<tr>
<td>10% (0.1)</td>
<td>0.01   0.01 0.02 0.04 0.08</td>
</tr>
</tbody>
</table>

Probability % + Impact % [170] = Probability Impact Rating
(Probability % + Impact %)/2 x (1/weeks to impact) = Initial risk priority rating (severity)

...Thus providing a simple contingency for cost and time risks ...

RISK EVALUATION – REAL OUTPUT

Quantitative MEANINGFUL results:

if cost impact is AED100,000, then cost contingency:
0.9 (Probability) x AED100,000 = AED90,000.

if time impact is 100 man hours, then time contingency:
0.9 (Probability) x 100 hrs = 90 hrs lost time

...Thus providing a simple contingency for cost and time risks ...

minimizing project and construction risk ...
RISK EVALUATION – MANAGEMENT

HOW CAN PROJECT RISK BE MANAGED?

- It can be avoided (i.e. remove from scope)
- It can be accepted (possibly with contingency)
- It can be transferred (i.e. specialist subcontractor)
- It can be mitigated – as in reducing operational uncertainty through the application of Project Procedures

RISK EVALUATION – MANAGEMENT

- When deciding how to manage the risk, consider ...
- What will be done & what is the residual risk?
- Develop contingency options for residual risk?
- Consider secondary risks arising from the contingency options?
- Consider priority and ‘ownership’
- A reiterative process ...
RISK RECORDING

- Ensure ALL project meetings include an agenda item for "Risk Issues"
- Ensure all risks, unknowns & contentious issues, (also opportunities) are recorded on the Master Risk Register
- Obtain all party buy-in
- If possible, the Master Risk Register should be stored in a shared area on the network with ‘view only’ permission

RISK MANAGEMENT BENEFITS

... the Risk process and the Change process:

- Employer & other parties receive an early warning;
- Project Team’s pro-active assessment is made available;
- Project Team’s estimated costs & time impacts are made available;
- Project Team’s mitigation & contingency ideas are made available;
- Risk can be managed by the Team in a timely manner, and...
- ...It satisfies basic obligations for ‘advance notice’ of ‘likely’ delay...
**RISK MANAGEMENT BENEFITS**

Conflict avoidance

- A non-contentious advance warning
- Pro-active management of risks (events) to avoid dispute
- Road map to gain early change consensus and approval
- Part of the Risk Management Process for Change
- Adopting a teamwork approach - spirit of cooperation, trust and mutual respect

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**THE CHANGE CONTROL LOOP**

1. (Start) External Employer Contractor
2. Baseline → Identify Change → Preliminary Evaluation → Employer Review → No Change
3. Implement Change → Employer Review → Detailed Evaluation
4. Refresh the Baseline → Maintain the baseline - Update the Business Case

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*minimizing project and construction risk ...*
PROJECT LIFECYCLE

FROM PRACTICAL COMPLETION TO FINAL ACCOUNT

(DEFECTS LIABILITY PERIOD)

Project Manager Control - Contractor Action

Commissioning ➔ Performance Test ➔ Warranty Period ➔ Final Acceptance ➔ Final Account

Delivered on time?
Performance satisfactory?
Available? Reliable? Maintainable?
Delivered to budget?

PROJECT CLOSURE

PRE CONTRACT ➔ PROJECT EXECUTION ➔ POST EXECUTION

ASSESSMENT ➔ IMPLEMENTATION ➔ RECOVERY ➔ RECOUSE

Identification
Classification
Strategy
Control Method

Convert Uncertainty to Certainty
Identify /Quantify Change
Formalise Price/Time Adjustment
Claims
And
Disputes

Closing Out the Project and Identifying Residual Issues

minimizing project and construction risk …
THE PROJECT BALANCE SHEET

EMPLOYER

Scope fully completed?
Completion Date met?
Quality satisfactory?
Performance satisfactory?
Liquidated damages?
Contractor Guarantees/Bonds?
Operating Revenue?

CONTRACTOR

Final Contract Price?
Final Contract Cost?
Claims for additional costs?
Claims for extension of time?
Cost of Claim recovery?

A Preliminary Look at Apparent Inequities

CLAIM ASSESSMENT

The issues involved
The Contractor’s objectives
The basis of the arguments
The weight of supporting evidence
The legal and contractual foundation
The appropriate relief in the circumstances

Realistic assessment - Appropriate response
CLAIM DEFENCE

- Identify the parties’ duties and obligations
- Identify performance shortfalls
- Establish the link between cause and effect
- Separate Employer and Contractor issues
- Identify counter arguments and claims
- Prepare relevant supporting evidence
- Present professionally in writing and pictures

Professional approach ....

SUMMARY

Program Management: The overview function

Project Management: Project(s) control & delivery

The right people doing the right things!

Thank you ... any questions please ...