CONTRACTUAL ARRANGEMENT

17 June 2015
<table>
<thead>
<tr>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduction</td>
</tr>
<tr>
<td>• Traditional (Sequential)</td>
</tr>
<tr>
<td>• Design and Build</td>
</tr>
<tr>
<td>• Management Contracting</td>
</tr>
<tr>
<td>• Construction Management</td>
</tr>
<tr>
<td>• Choice of Procurement Routes</td>
</tr>
<tr>
<td>• Choice of Contract</td>
</tr>
<tr>
<td>• Questions and Answers</td>
</tr>
</tbody>
</table>
Introduction
Importance of Procurement Strategy

- The strategy developed should result from an objective assessment of the needs of Employer and the project characteristics
- No single procurement strategy is suitable for all projects and all Employers
- A mismatch/inappropriate strategy can result in failure to achieve Employer’s objectives
- The selection process should therefore provide a best-fit solution based upon good judgement, which is acceptable in terms of the identified criteria and acceptable distribution of risk
Procurement Strategy - Decision

- The Employer may require the project to be completed quickly (time)
- The Employer may require cost certainty on day one with limited exposure to cost increases (cost)
- The Employer may require a high quality building irrespective of cost (quality)
- The project may involve complicated buildability issues which may benefit from having a contractor involved in the design stage (quality)
Procurement Strategy - Development

Three basic project objectives:

- Optimum balance between

  Time  Cost  Quality  and ...  Employer Satisfaction
Types of Procurement Routes

Procurement Models

- Traditional (Sequential)
- Management Oriented
  - Management Contracting
  - Construction Management
- Integrated
  - Design and Build
Traditional (Sequential)
Traditional (Sequential)

- Employer
- Architect /Engineer
- Other Consultants
- Quantity Surveyor
- Main Contractor
- Sub-contractor
- Sub-contractor
- Sub-contractor
Traditional (Sequential)

- Traditional open / selective tendering
- Design completed by Consultants before tendering for the project, successful contractor carries out construction
- Consultants + Contractor + Subcontractors (Nominated/Direct/Named)
Traditional (Sequential)

- Direct contractual relationship with design team - Employer can influence the development of design to meet his requirements
- Single contractual relationship with Contractor - Employer can influence the construction process
Advantages:

- Well understood process
- Design led, facilitating high level of quality of design
- Employer and Consultants are fully in control over design and quality of the project
- Usually more competitive on tender prices
- Reasonable level of cost certainty at award
- Changes easy to evaluate and value
- Better cost control
Disadvantages:

- Relies upon full design information prior to tender, resulting in long time pre-contract preparation.
- Open to abuse if any attempt is made to tender before the design is complete, resulting in less certainty.
- Design liability rests on Consultants.
- No design / buildability input from Contractor.
- No or little overlap between design and construction.
- Usually lowest bid wins the contract, quality of management is put at risk.
- Result in adversarial relationship.
Design and Build
Design and Build

- Employer
- Main Contractor
- Architect / Engineer
- Quantity Surveyor
- Other Consultants
Design and Build

- Simple tender document, mainly Employer requirements
- Planning, design and construction undertaken by one single contractor
- Single point of contractual responsibility for all aspects of design and construction
- Success depends largely on the adequacy of the Employer’s brief and the absence of later changes
Design and Build

➢ A fast-track strategy as Contractor can start before all detailed design is completed

➢ Any Employer requirement which is not directly specified in the tender documents will constitute a change or variation to contract

➢ Changes are usually more expensive to introduce after the contract has been let
Design and Build

Advantages:

- Lesser project management input from Employer
- Fast track construction compared to design-tender-build
- Employer deals with one contractor (single point responsibility)
- Management of Consultants diverted
- Design team works together with Contractor
- Construction can start before all detailed design is complete (Contractor’s risk)
Design and Build

Advantages: (Cont’d)

- Benefits of Contractor’s expertise on “buildable” design and detailing at early stage of the design process and Contractor’s expertise in constructability at the construction stage
- Flexibility on level of design in the Employer’s Brief
- Cost certainty at award of contract (subject to any variations)
- Programme certainly at award of contract
Design and Build

Disadvantages:

- Longer tender evaluation period ensuring Contractors’ Proposals to meet Employer’s Requirements
- Employer’s requirements need to be clearly defined at outset to ensure certainty in cost and time
- Employer may lose control over design if brief not developed
- High cost risks if the Employer changes his requirements
- High risks to Contractor to be reflected in the tender prices
- High cost of tendering to be reflected in the tender prices
Design and Build

Disadvantages (Cont’d):

- Difficulty in comparing and assessing tenders since each design, programme and cost will vary
- Maximum competition is difficult to obtain as design is not fully developed at tender stage
- Unlikely that the best consultants are found in the Contractor
- No design review unless separate consultants are employed for supervision of quality (Independent design checker)
- Usually experienced Employers use this, knowledge of required brief
- Compromise of Employer’s control on the final product
Design and Build
Discussion 1

- Piling Design: Pros / cons related to use of design-and-build based on loading schedules compared with Engineer’s design
Discussion 1

Pros:

- Use of contractor’s expertise, specialisation and special plant
- Contractor taking the risk and benefits of alternative design
- Contractor’s design less conservative than Engineer’s design

Cons:

- Price competition may force the safety or risks margin in Contractor’s design to an reasonably low level
- Contractor may cut cost if their less conservative design proves to be inadequate
- Early tendering to allow time for Government submission
- Variations more difficult to evaluate
- High tendering cost for tenderers
Discussion 2

- Employer has built a building before
- Procurement Method: Lump sum contract with specification and drawings
- New building, design similar to the existing
- Tender drawings completed
- Employer wants "financial certainty"
- Suggested use Design and Build
- Possible?
Discussion 2

- Design at advance stage
- Tender drawings complete
- Financial certainty

- Abortive Works
- Extra time to start over for a new design
- Brief is very clear and specific

Design and Build not a favourable procurement
Discussion 3

What would be the criteria for selecting a Design and Build contractor in addition to those applicable to a Build Only contract?
Discussion 3

- Suitable design – preliminary design proposals
- Good environmental impact – sun shading, visual impact, traffic impact, energy impact, pollution impact
- Reasonable programme – design, statutory submission and construction times and inter-relationship
- Reasonable construction methodology
- Adequate construction plant
- Competent design and project management team - design team, project and construction management teams
Discussion 3

- Financially capable – audited accounts and bank statements
- Good track records – job references and performance appraisals
- Competitive price
- Sustainable – life cycle cost plans and maintenance and repair requirements and cycles
- Good marketability – sales, lease or use
- Area efficiency, energy efficiency, green features
- Other information - site safety plan, quality plan, environmental plan, waste management plan, past performance records
Management Contracting
Management Contracting

- Design by Employer’s consultants and construction overlap
- The selection of the contractual system was largely conditioned by the complexity of the project
- A Management Contractor is appointed to manage the planning and construction of a project and in which the construction work is executed by sub-contractors working under him, selected and appointed as the job proceeds
Management Contracting

- Management Contractor appointed early to lets elements of work progressively by trade / work package contracts
- Management Contractor prepares the programme, decides on the contents of each package to be sub-contracted, organises and manages the construction of all works which are undertaken by sub-contractors, each selected by competition
Management Contracting

- Management Contractor bear responsibility for the construction works without actually carrying out any of the works.

- Usually the Management Contractor is paid a pre-agreed lump sum for his pre-construction services, then he is either paid on a prime cost or lump sum basis for his management, supervision and the like, plus a fee either on a percentage or lump sum basis during construction.
Management Contracting

- All design work will not be completed before the first works contractor start work although the design necessary for those packages must be completed.

- As design is completed subsequent packages of work are tendered and let.

- Cost certainly is not achieved until all works contractors have been appointed.
Management Contracting

- Quantity Surveyor will produce a Cost Plan and is used as the cost control document
- Substantial and continuous coordination of sub-contractors by Management Contractor are needed for both design and construction
- Management Contractor and Consultants are members of the project team directly responsible to Employer to handle design and planning processes
Management Contracting

- Management Contractor responsible for construction management, assessment of buildability, formulation and monitoring of master programme, cost estimation and budget planning, cost monitoring and preparation of progress report etc.

- Successful management contracts can achieve time saving and high quality in design and construction
Management Contracting

Advantages:

- Overlapping of design and construction to achieve early commencement of construction for multi-phase projects
- Buildability advice maximised / input from contractors / subcontractors
- Parallel working is inherent
- Shorten project duration and phase completion to achieve “fast track”
- Work packages let competitively
- Early participation of the Management Contractor in the planning process
Management Contracting

Advantages : (Cont’d)

- Greater adaptability and flexibility for the Employer to defer decisions on other trades and to deal with changes in the Employer’s requirements, as the later trades are tendered for well after the start on site.

- Management Contractor to handle all delay, default on every disputes causing by Subcontractors.

- Changes can be accommodated provided packages affected have not been let and there is little or no impact on those already let.
Management Contracting

Disadvantages:

- Poor certainty of price
- Higher overall cost of construction
- Final cost is dependent on quantity surveyor’s estimates until after completion
- Lower degree of cost control as design less advanced at commencement
Disadvantages : (Cont’d)

- Variation to earlier packages may be substantial due to insufficient design development
- Returned tender price may be high due to time is rush and limited members of tenderer
- Less pressure on consultants to control effectively their design pace and quality at an early date; design process is inevitably very close to construction process making delay particularly damaging
Management Contracting
Discussion

Employer Requirements for shopping centre renovation:

- Allow commencement of works on site well before design is completed
- Minimal disruption of existing tenants
- Certainty of cost
- Ease of evaluating variations
- Maintain high quality
- Management Contracting vs Design and Build
Discussion

Management Contracting

Design and Build
## Discussion

<table>
<thead>
<tr>
<th>Factor</th>
<th>MC</th>
<th>D&amp;B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early start on site</td>
<td>😊</td>
<td>😞</td>
</tr>
<tr>
<td>Minimal disruption of existing tenants</td>
<td>😊</td>
<td>😞</td>
</tr>
<tr>
<td>Maintain high quality</td>
<td>😊</td>
<td>😞</td>
</tr>
<tr>
<td>Flexibility in overall planning and design</td>
<td>😊</td>
<td>😞</td>
</tr>
<tr>
<td>Certainty of cost</td>
<td>😞</td>
<td>😞</td>
</tr>
<tr>
<td>Valuation of variations</td>
<td>😊</td>
<td>😞</td>
</tr>
</tbody>
</table>
Discussion

Management Contracting 😊
- Overlapping of design and construction
- Allow early contractor’s input on programme, buildability and work packaging
- Any change in design can be incorporated in forthcoming work packages
- All works packages are tendered and procured competitively

Design and Build 😊
- Single point of responsibility
- Quick start on site
- Risk related to statutory approval are shifted to the contractor
- Adopt contractor’s specialist design if works involve specialised systems
Discussion

Management Contracting 😞
- Overall cost is not known until the work packages are fully awarded
- Fixed or percentage fee paid to contractor and thus less incentive to be cost effective

Design and Build 😞
- Employer require to decide what is required before invited tender
- Well defined design at early stage
- Inflexibility in design changes or Employer’s requirements after awarded contract
- Difficult to quantity cost of variations
Discussion

Adopt Management Contracting by introducing target cost or guarantee maximum price to obtain a better degree of certainty on price.
Construction Management
Construction Management

- A contract to manage rather than a contract to construct
- Construction Manager as part of the consultant team
- A fee earning construction manager defines and manages the work packages
- Construction Manager advises on construction techniques and methods to improve buildability
Construction Management

- Construction Manager is usually the lead consultant, therefore duties of Architect are reduced and there is a much greater Employer involvement.
- Construction Manager has a more positive role than Management Contractor and is not expected to sit back and use the default of others as an excuse for non-performance.
Construction Management

- On appointment, Construction Manager will take over any preliminary schedule and costing information already prepared and draw up a detailed programme of pre-construction activities.

- Employer assess the recommendation of Construction Manager.

- A ‘fast-track’ strategy as design and construction overlap.
Construction Management

- Construction work is carried out by Trade Contractors through direct contracts with the Employer for distinct trade or work packages.
- Construction Manager manages Trade Contractors but does not contract with or pay them.
- Financial liability not known until last packages have been let.
- Large scale and complicated project.
Construction Management

Advantages:

- Tendering process is interactive allowing overlapping with design, thereby allowing greater completion of design work for each Trade Contract prior to tendering out, result in time saving / flexibility

- Buildability advice maximised / input from contractors

- Changes easy to accommodate without premium provided relevant packages have not been let or don’t impact on others already let

- Competitive tendering maintained at all stages
Advantages: (Cont’d)

- Employer has direct contract, pays direct, could result in lower price, improved performance, direct contractual and payment relationship
- Parallel working
- Smaller packages should reduce risk
- Allows early procurement
- Greater control of design and flexibility to revise design
Construction Management

Disadvantages:

- Price uncertain until last packages let
- More Trade Contract packages create more paperwork / administration
- Additional expense of engaging the Construction Manager (usually more than offsetting the trade preliminaries costs)
- No single point of accountability
- Construction Manager has no contractual hold over Trade Contractors
- Relies heavily on management capability of the Construction Manager
Choice of Procurement Routes
## Use of Procurement Routes

<table>
<thead>
<tr>
<th>Factor</th>
<th>Objectives</th>
<th>Trad</th>
<th>D&amp;B</th>
<th>CM</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Early Completion</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>Cost</td>
<td>Price certainty before construction start</td>
<td>😊</td>
<td>😞</td>
<td>😞</td>
<td>😞</td>
</tr>
<tr>
<td>Quality</td>
<td>Prestige level in design and construction</td>
<td>😊</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>Variation</td>
<td>Avoid prohibitive cost of change</td>
<td>😊</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>Complexity</td>
<td>Technically advanced or highly complex building</td>
<td>😞</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
</tr>
</tbody>
</table>
## Use of Procurement Routes

<table>
<thead>
<tr>
<th>Factor</th>
<th>Objectives</th>
<th>Trad</th>
<th>D&amp;B</th>
<th>CM</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility</td>
<td>Single contractual link for project execution</td>
<td>😞</td>
<td>😊</td>
<td>😞</td>
<td>😞</td>
</tr>
<tr>
<td>Professional Responsibility</td>
<td>Need for design team to report to Employer</td>
<td>😊</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>Risk Avoidance</td>
<td>Desire to transfer complete risk</td>
<td>😞</td>
<td>😊</td>
<td>😞</td>
<td>😞</td>
</tr>
<tr>
<td>Buildability</td>
<td>Contractor input to economic construction</td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
<td>😊</td>
</tr>
</tbody>
</table>
Conclusion

Selected strategy should:

- **Consider** – All the influences which affect procurement
- **Strike the Correct Balance** – Between Cost, Time and Quality
- **Be Suitable** - In light of the Employer’s needs, project type and Employer’s exposure to and ability to manage risk
- **Secure** – Buy-in from Employer and project team that it addresses all of their relevant issues
Choice of Contract
Lump Sum Contract

Without quantities

- Based on drawings and specification
- Use where full extent and nature of work can be clearly defined
- Fairly fully design
Lump Sum Contract

With quantities

- Based on drawings and Bills of Quantities
- Use where design is sufficiently advanced to prepare the bills of quantities
- Almost fully design
Lump Sum Contract - Without Quantities

Advantages:
- Employer saves lot of works on taking-off quantities
- Providing a bills of quantities to the tenderer gives a more fair basis for competition

Disadvantages:
- Cost to the tenderer of producing their own quantities will be reflected in the tender prices
- Tenderer prices the tender based on his own quantities makes comparison of tender difficult or even meaningless
- As tenderer is responsible for any errors he makes in taking off from the drawings, he is likely to include high contingency factors in his prices
- Difficult to reach agreement between the Contractor and Employer due to variations if there is no breakdown of tender
Lump Sum Contract - With Quantities

Advantages:
- Quantities and unit rates serve as basis for assessing variations
- Provide a good cost analysis information

Disadvantage:
- Takes quite a long time for quantity surveyors to prepare bills of quantities
Remeasurement Contract

Schedule of Rates

- Works carried out are measured and priced at schedule of rates
- Use where works have not been fully detailed but will carry out within a given period (e.g. maintenance contract)
Remeasurement Contract

Bills of Approximate Quantities

- Based on remeasurement of quantities
- Use where an earlier than normal start on site is required
- Design be sufficiently advanced to allow significant items to be measured
- Items and quantities must bear reasonable resemblance to the work to be executed
Advantages:

- Standard priced schedules can be used and Contractor tenders on basis of percentage additions and commissions
- Use at a basis for similar work at different times or in different locations
- Standard contract available

Disadvantage:

- Difficult in obtaining realistic prices and establishing final cost of works at the outset
Remeasurement Contract – Bills of Approx. Quantities

Advantages:

- Design and construction time overlap result in a reduced overall project time
- Although quantities are approximate, they also share the general advantage of firm quantities
- Standard contract available

Disadvantages:

- Less certainty of cost at the outset than with firm bills of quantities
- Encourage design to put off to tomorrow what could well and better be decided today
- Not help cost control
Cost Reimbursement Contract

- Use when time is of essence
- Special requirements or conditions
- Employer pays Contractor the actual cost of the work (Prime cost) plus either a percentage or a fixed fee to cover his establishment and profit
- However, such arrangement provides no price commitment by Contractor and little or no incentive for efficiency, so ........
Cost Reimbursement Contract

Prime Cost

No incentive for the Contractor to control cost

Target Cost

Share of Profit/Loss between Employer and Contractor
Prime Cost ⇒ Target Cost

- Actual cost are checked against a target cost
- Difference between actual cost and target cost can be treated in a number of ways:
  - Whether above or below is shared between Employer and Contractor in pre-agreed proportions
  - Share between Employer and Contractor in pre-agreed proportions if below the target and is all borne by Contractor if above target (‘Guarantee Maximum Price’)


Target Cost Illustration

Gain Share Mechanism

Target Cost Illustration

- Target
  - Margin
  - Cost control

- Gainshare
  - Contractor’s share
  - Actual Cost

Tender
Completion
Target Cost Illustration

Pain Share Mechanism

- Target
- Painshare
- Actual Cost
- Tender
- Completion
- Contractor’s share
- Margin
- Cost

- Painshare
- Actual Cost
Cost Reimbursement Contract

Advantages:

- Reduce overall programme if Contractor is chosen from outset
- Design and construction proceed in parallel
- Immediate commencement on site
- Employer bears all cost risks
- Require large project management input from Employer
Cost Reimbursement Contract

Disadvantages:

- Cost monitoring difficult and costly and disputes are expected
- No financial incentive for Contractor to work economically
- No price commitment by the Contractor and Employer or no incentives for efficiency

[Use of Target Cost]
Choice of Contract
Discussion 1

Employer Requirements:

- Allow commencement of works on site well before design is completed
- Allow the Employer to retain the right to select the contractors for major specialist trades, e.g. M&E, curtain wall, etc.
- Tight budget
Discussion 1

- Lump sum Contract
- Remeasurement Contract
- Cost Reimbursement Contract
- Design and Build
- Management Contracting
- Construction Management

- No - Fairly design
- Yes – Sch. of Rates, Bills of Approx. Quantities
- No - Cost monitoring difficult
- No - Major trades control
- No - Expensive
- No - Price not certain
Discussion 2

- The project is originally be tendered out as a lump sum contract based on bills of quantities.

- Due to the tight time frame, the Employer asks whether the tender shall be invited based on drawing and specification instead of bills of quantities.

- You resist such idea because ......
Discussion 2

- Quantity surveyor loss chance to spot out errors or discrepancies in drawings and specification
- Tenderer need to take off their own quantities
- More costly to tenderers
- More likely to contain errors
- More likely to end up with lowest tenderer being lowest because of inadequate quantities
- Realistic comparison of tenders difficult
- More time in checking tenders
Discussion 3

- Employer owns a large portfolio of buildings which require routine repairs and major renovations.
- The Estate Management Department propose the use of one of the following contractual arrangements for repairs and renovation works:
  - Lump sum contract
  - Remeasurement contract
  - Use of in-house staff
  - Calling Quotations
- Which one will you choose?
Discussion 3

- Lump sum contract – not recommended due to the indefinite nature of maintenance work
- In house labour – not recommended as it would involve long term staffing costs which may not be flexible enough to adjust in line with fluctuations in workload
- Calling quotation – not recommended due to time consuming and administrative ineffective in working with different contractors

Therefore, remeasurement contract based on pre-priced schedule of rates is recommended because maintenance works are ......
Discussion 3

- Recurring over time
- Size of each batch of work is small
- Exact scope and quantities of each batch work cannot be identified or quantified at the time of tender
- Exact time of each batch of work cannot be predetermined at time of tender
- Each batch of work requires commencement at short notice
- Work normally is repair in nature requiring little element of new design
THE END

and

Q & A