NATIONAL DIPLOMA IN QUANTITY SURVEYING

TENDERING AND ESTIMATING I

COURSE CODE: QUS 209

YEAR 2- SEMESTER 1

THEORY

Version 1: December 2008
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WEEK 1: TENDERING (1.0)

1.1 Definition
Tendering is the administrative procedure of sending out drawing and bills of quantities or specifications to contractors for them to state their prices for all the items of one contract. Besides the contractors price, other considerations include his competence and financial standing.

1.2 Types of Tendering
1.2.1 Open Tendering:
An advert is placed in the press to invite any firm that wishes to do so to submit a tender for a project, the advert will give a brief description of the works to be undertaken. Interested firms apply for the tender document, collect them, upon payment of money deposit which are usually non-refundable in Nigeria the deposit covers the cost of documents and discourages the non-serious bidders.

Advantages
1. It gives the opportunity for all firms including relatively unknown but capable ones to tender.
2. Since there is no restriction, they can be no change of favourism in drawing up a list of tenders
3. The prevent firms in area from forming an exclusive clique to keep up prices.
4. Above all, open tendering should secure maximum competition and therefore the lowest process.

Disadvantages
1. The system result in increased cost of tendering arising from a great number of firms likely to be involved in tendering and only one of them succeeding.
2. Also, a lot of time is taken up and lost through the placing of notices in the press, the preparation of drawings, bills or specification, sending out and receiving the same volume back to be sorted and checked.
3. The lowest tender may not necessary be competent to handle the project. Although, most organization stipulate that they are not bound to accept the lowest tender. One would need some justification for by-passing or rejecting the lowest tender particularly with regards
to the spending of public funds. There is always the likelihood of involving a charge of favouritism.

4. Many good contracting firms avoid open tendering, while others resort to this only times of dire need. The chances of selecting the irony contractor is therefore high.

1.2.2 Selective Tendering

This procedure as its name implies is to select a limited number of firms and invite them to submit tenders. A short list of between 5 – 8 competent contractors is usually drawn up with one or two reserve firms to replace any on the original list who fails to accept the invitation to tender.

The criteria for drawing up the list of tenderers would depend on the character of the project and size.

The following points however have to be considered

(i) The standard of workmanship required
(ii) The equipment such as plant and workshops owned by the firm
(iii) The business records and standards of the firm e.g whether completion dates were met on previous jobs, the project were brought in within budget, claims policy of the firm etc.
(iv) The financial stability and length of time in business
(v) The capacity available in relation to the firms current work load.
(vi) The local history in respect of labour relations
(vii) The real willingness to tender

The short list is usually prepared from the client’s approved list of contractors. Otherwise an adhoc list of contractors with established schemes, integrity, responsibility and proven competence for work of the character and size contemplated.

Selective tendering makes good many of the deficiencies of open tendering and provides a restricted but adequate list of technical suitable firms and of comparable standing.

However, selective tendering might mean higher quotations than are obtainable by open tendering partly because there is less competition and also because the standards of firms and that of their workmanship and performance may be higher than the others.
There is also the possibility on tenderers being rigged and inflated by collusion if the firms get to know the probable limit of the list of tenderers in an area. The only remedy to this is to periodically change the selected list either entirely or in part.

In some cases, such firms are not interested in a particular job, but do not consider it politic to decline an invitation to tender, they put in high tenders so as to put them out of the race, or so high to ensure that should they win the contract it would be on very attractive terms. This restricts the number of firms going really competitive tenders, therefore the lowest tenders if often higher than it might have been with open tendering.

1.2.3 Negotiation

There may be times when the client has a satisfactory association with a particular firm and is prepared to give them the contact on the recommendation that their price is reasonable. Also in cases where the work is of a specialized nature or requires a special skill which is possessed by a particular agreement with that particular firm without involving other firms.

In such cases, a BOQ may be prepared in the normal way, and sent to the builder to price. When priced, it is returned to the Q.S for examination and reporting. Further classifications may be required to determine whether pricing is reasonable. This is the simplest type known as single stage negotiations.

An alternative type known as two-stage negotiations starts with a first stage involving limited selective competition. All firms concerned are given a fair warning of what is intended to follow. The competition may aim to reducing the field to one firm or at least to a manageable number. The basis of selection will be factors such as:

1. General basis of pricing
2. A construction programme or method statement
3. A design offer especially in the case of system building

The client or his consultant will carryout the first stage with various firms until one firm is chosen. The second stage negotiation will proceed with this one firm until an agreement is reached and the contract awarded.
**Advantages**

1. The procedure is often time saving since the two parties are able to take shut-cuts
2. more factors can be discussed in detail between the parties during negotiations, including matters of construction method and procedure.
3. competition no longer depends on price alone but also on competence

**Disadvantage**

1. Negotiation contract tend to have higher prices than where agreements are reached through competitive means
2. Conditions for public accountability are rarely satisfied when negotiation is used.
2.1 Estimating Department:
The estimating department carries out technical functions within the building/commercial field. Basically they are responsible for the preparation of estimate, which transform to a tender.

As soon as full tender documents are available, the estimating department initiates action and articulate a lot of factor towards the realization of the firms objectives. Useful information are collected especially by paying attention on

1) The preliminaries ascertained if
   (a) Standard condition of contract apply and the likely effect(s) of any amendment(s) therein.
   (b) The starting and completion dates
   (c) Stated time limit for completion time for the certification of final account and the limit of the retention funds
   (d) Stated defects liable period
   (e) The nature of contract: fixed price or fluctuating.

2) The trade preambles so as to:
   (a) Check that all the stated materials are available and assurance from suppliers of non-interference with completion dates
   (b) Arrange for handling / storage facilities
   (c) Ensure the availability of labour / expertise to be involved in the projects

3) The drawing and technical report with a view to:
   (a) Assessing the likely requirement for mechanical plant and scaffolding
   (b) Assessing the relationship between the value of new work and works in alteration
   (c) Check access and working space for plant
   (d) Assessing requirements for huts, welfare facilities, toilet and temporary roads.
   (e) Assessing the competence of the drawings, bill of quantities and the existence of any discrepancy(s)
   (f) The consideration of other technical reports before visiting the site, for instance, engineer’s report on soil condition.

4) Project Appreciation which includes
(a) Visit site ascertain the position of site vis-à-vis transport facilities, locality, topographical details of site, facilities for disposal of soil, services (water, electricity etc), labour situation, weather condition among others

(b) Determination of construction method by discussion with the likely stake holders who will be responsible for managing the construction and for providing plant and other services on successful tender.

(c) Pre-tender construction programme which comprises a comprehensive pre-tender construction methods, strength of labour force, type of plant and sources of materials.

2.2 Establishment of All-in-rate

Onwusonye (2000) defines rates as ingredients of labour, plants, materials, overhead and profit synthesized for the purpose of inserting against each item of work in a given project so as to arrive at a tender figure.

2.2.1 Labour

This refers to contractor’s men operating on site. They include tested and non-tested artisans, appearances, foremen and general labourers. All these men are paid and the resultant cost will be the labour cost for the given unit of work.

In calculation of all-in-rate for labour, considerations are given to the prevailing basic wage rate; statutory approved allowances. Allowances such as holidays, wet weather, annual leave, absenteeism, sick leave are Saturdays/Sundays are consideration so as to arrive at effective working days in a year.

2.2.2 Material

Material in the building industry as opined by Owunsonye (2000) refers to varying components delivered to site which when articulated or appropriately combined result to functional element of a building project.

The calculation for materials cost usually consider the cost delivered to site; cost of unloading the transportation to site; pilfering and waste due to breakage, cutting, depreciation / deterioration, bulk, compaction, and loss of bulk.
2.2.3 Plant

Plant is equipment employed on a building site in order to save money, labour or time, or combination of all.

According to Owunsonye (2000), plant elements involve mechanical and non-mechanical items. Mechanical items include; lorries, bulldozer, concrete mixers, hoist, vibrator, cranes, dumpers, et-cetera, while the non-mechanical includes: tools, workbenches, water tanks, pulley, resharpening tool et-cetera. The cost involved in the non-mechanized tools are taken care of in the preliminaries and are normally calculated on a percentage basis. The cost of items in the mechanical lumpsum or in the unit of work item in the section of work to be executed needing such plant. Consideration is usually given to hiring, running cost, depreciation, insurance and licenses among others in arriving at the cost to be inserted.

2.3 Calculation of Unit Rates

Unit rates involve the major items in the bills which consist of element of labour plant and materials. Each element is estimated separately so that total element cost for labour, plant and material can be provided for further action by management.

2.4 Projects Overhead and Profit

Projects Overhead is the total cost incurred in a given project less prime cost and include such cost as office salaries (Head office administration), rent/rates, office expenses such as telephone, stationary, insurance policies of the office, advertisement, maintenance and depreciation of office equipment. Each item of project overhead cost should be estimated separately.

The report sent to management for further action usually incorporate such information as:
(a) A brief description of the project
(b) A description of the method of construction
(c) Note of any usual risks which are inherent in the project and which are not adequately covered by the conditions of contract or bills.
(d) Any unresolved technical or contractual problems.
(e) An assessment of the state of the design process
(f) Note of any major assumption made in the preparation of the estimate
(g) Assessment of the profitability of the project
(h) Any pertinent information concerning market and industrial conditions
(i) Any need for qualification of the tender or for an explanatory letter
(j) The terms of the quotation from our sub-contractors which have been included in the estimate
(k) The time for which the tender is to remain open for acceptance.

2.5 Management Decision to Tender

The following factors forms the basis of consideration during adjudication of an estimate to produce a tender by the management. These include:

(a) All substantive items in the project reports
(b) The condition of contract
(c) Contractual risks (including the firm price tender risk where applicable)
(d) The terms of quotations for own sub-contractors
(e) The capital required for the project
(f) Technical and managerial manpower requirements
(g) Work load
(h) The market conditions
(i) Reputations of the client and the consultants.

In addition to the above factors, management also put into consideration the company tendering policy.

The additional cost which management now adds to the estimate to arrive at tender figure are costs associated with risk, general overheads including additional administrative costs due to introduction of VAT, the financial implication of items mentioned above (a-i) and profit which may be on a percentage, lumpsum or a combination of both.

The general summary of the bills of quantities is now accordingly totaled producing a TENDER FIGURE. The tender figure is now reflected at the appropriate section of the priced bill of quantities including the FORM OF TENDER and ARTICLES OF AGREEMENT, which together with other relevant tendering documents are sent to client for consideration.

A specimen of a typical layout of such representation is as follows:

Tender for:
Date Due:
Date of Completion:
Net Value of firm Own Work:
Gross Labour Rate:
Craftsman:
Labourer:
Preliminaries:
Labour:
Materials:
Plant:
Add for Overhead:
Add for Profit:
Approved Subcontractor:
Add for Profit:
Nominated Supplier:
Provisional Sum:
Week 3: Stages In Tendering (3.0)

3.1 Tender Documents
Depending on the form of contract and the contract arrangement, tender document are as follows:

3.1.1 Contract with Quantities
(1) Complete set of drawings
(2) The bill of quantities
(3) Form of tender
(4) Articles of agreement and conditions of contract
(5) Form of performance bond
(6) Schedule of basic prices of a labour, material and plant charges and daywork
(7) Resources questionnaire
   - Personnel
   - Plant
   - Details of jobs previously completed
(8) Specially marked envelops for
   (a) Submission of priced bill of quantities
   (b) Submission of form of tender containing the tender sum.

Items 4 -7 are usually bound together with the bills of quantities in one document. The contractor put a price to each of the terms listed in the BOQ and totals them.

3.1.2 Contract without Quantities
(1) Complete set of drawings
(2) Form of tender
(3) Detailed specification
(4) Articles of agreement
(5) Specially marked envelop for return of form of tender

The contractor will have to measure quantities to arrive at his tender figure.

3.3 Preparation of Tender Documents:
- Done by consultants after detailed design of the project.
- Usually includes drawings and bill of quantities (B.O.Q).
Where B.O.Q is not provided (which is not advisable) all contractors prepare their own.

**B.O.Q contains the following:**
- Instructions to tenders.
- Forms of tender
- Preambles (Specifications)
- Conditions of contracts
- Preliminaries
- Measured works
- List of basic labour and material prices

### 3.3 Prequalification:
To prevent unqualified firms from tendering, prequalification exercise now come before actual tendering in most projects of significant value. It is sometimes called *Expression of Interest*

<table>
<thead>
<tr>
<th>Prequalification</th>
<th>Actual Tender</th>
<th>Successful Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many Contractors</td>
<td></td>
<td>Fewer Contractors</td>
</tr>
</tbody>
</table>

- Advert is placed for prequalification.
- Interested contractors submit particulars of their technical and financial capabilities and legal status for assessment.
- All contractors who meet the minimum requirements are shortlisted for tender.

Documents usually required from contractors include:
- Certificate of business registration or corporation
- Tax clearance certificate
- VAT registration certificate
- Certificate as contractor.
- Personnel available
- Plants and equipments available
- List of previous and ongoing projects
- Financial Audit report
- Evidence of financial capability
3.4 Invitation to Tender

Modality depends on the type of tendering.

- Open tendering - usually through adverts in media newspaper, technical journals like the tender journal, sometimes through radio, T.V and websites.
- Selective tendering and negotiation - usually by letters of invitation, sometimes through the media informing short listed.

3.10 Collection of Tender Documents:

Tenderers may be required to pay a non-refundable tender fees before collecting the tender documents (This is to discourage unserious ones)

3.11 Preparation of Tenders:

Each tendering contractor will estimate the prime or net cost of the project then add profit and overheads to arrive at the tender sum.

3.12 Submission of Tender:

Time and place of submission usually stated in instruction to tenders in the B.O.Q or in the advert or letter of invitation

- Late submission will be rejected
- Tenders submitted in sealed envelopes
- Tenderers may be required to submit tender with bid bond which is a bond from a bank or insurance company to guarantee that the tenderer will accept the contract if awarded. This is to guard against ridiculously low tenders.

3.13 Opening of Tender

- Tenderers usually invited to witness the opening.
- Tenders sums, completion periods and any special conditions given in any tender should be publicly announced, recorded and signed by client, consultants and tenderers representatives.
4.1 The Activities of a Contractor During the Tender Process are Summarized in Flow Chart.
4.2 Decision to Tender:

Factors to be considered by a contractor:

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>ISSUE TO ASSESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing workload</td>
<td>How busy now?</td>
</tr>
<tr>
<td>Anticipated workload</td>
<td>High hopes in already tendered projects?</td>
</tr>
<tr>
<td>Type of project</td>
<td>Reputation of client</td>
</tr>
<tr>
<td>Location of project</td>
<td>Logistics and security. How strategic is the project location.</td>
</tr>
<tr>
<td>Size and complexity of project</td>
<td>Technical, financial and managerial competence</td>
</tr>
<tr>
<td>Caliber of other tenderers</td>
<td>Who are the competitors</td>
</tr>
</tbody>
</table>

After assessing the factors, a decision to or not to tender is taken. If the decision is positive, the tender documents will be collected.

After collecting the tender documents, a lot of activities are involved before a contractor aims at his final tender sum. These activities are shown in table below:

<table>
<thead>
<tr>
<th>ACTIVITIES</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination of tender documents</td>
<td>To note details and any ambiguity</td>
</tr>
<tr>
<td>Visit to proposed project site</td>
<td>To get necessary information</td>
</tr>
<tr>
<td>Pretender meeting</td>
<td>For estimation</td>
</tr>
<tr>
<td>Preparation of estimates</td>
<td>To arrive at total project cost</td>
</tr>
<tr>
<td>Adjudication of tender</td>
<td>To arrive at final tender sum to be submitted</td>
</tr>
</tbody>
</table>

After adjudication, the tender is sealed and submitted to the specified location BEFORE the slated submission deadlines.

4.3 Examination of Tender Documents:

- Note detailed conditions
- Any ambiguities
- Get clarifications from client or consultant
Prepare B.O.Q if not provided
Possible front loading of bill items

Site Visit:
Once it has been decided to proceed with the tender preparation, and the estimator has become familiar with the documentation, then a visit to the site should be undertaken. This may be done in conjunction with a contracts manager, who will be able to advise on the practical working conditions that might be encountered. This may also be required in order to price the works on site or spot items, normally associated with alterations and extensions projects. A comprehensive report should be produced on a standard format. This will seek to establish more clearly, the following aspects:
- Topography of the site and ground conditions
- Availability of existing site services
- Need for temporary roads and any site access difficulties
- Security needs such as fencing the perimeter, hoarding, security guards, etc.
- Nature and use of any adjacent buildings
- Any demolition work requirements
- Site accommodation and material storage locations
- General availability of labour and materials
- Special difficulties, such as restrictions that might be imposed, for example, on the use of tower cranes and other similar mechanical plant

4.4 Project Appreciation
Once a contractor has decided to submit a tender the following will need to be established.
- What type of contract conditions are being used and have been altered in any way?
- Are there restrictions on the way that the work is to performed, such as access to the site, sectional completion, evening or weekend restrictions?
- Are there financial disincentive concerned with insurance, period of payments, retention, liquidated damages or guaranteed bond?
- How much of the work can the firm undertake and how much will need to be done by subcontractors?
- What proportion of the project are prime cost sums, perhaps indicating more of the management role for the contractor and little work for the contractor’s own employees?
- Are there any apparent inconsistence in the document?

4.5 Pretender Meeting:
Agenda is to decide on: -
- Construction method
- Plant requirement
- Major material sources
- Level of profit required
- Attendance by relevant staff
- For minor projects, estimator can take all decisions

4.6 Operational Estimating
Operational estimating is a method that is based essentially on an analysis of the work content of a project on the basis of how costs are incurred. It is claimed at each identifiable site operation can be performed by a gang of men and materials without interruption from other operations. For example, the cost of reinforced concrete suspended floor are an amalgamation of the formwork, reinforcement and concrete items. An in situ concrete staircase that is to be cast at the same time can also be part of this same operation. Instead of attempting to separate the costs and allocating these to the individual measured items, the cost of the entire operation only is calculated. Operational estimating, to be effective, really requires the use of operational bills, since the layout of traditional bills is unsuitable for this form of estimating. The development of operational estimating largely arose out of criticism of the traditional unit rate estimating applied to bills of quantities as described above, for the following reasons.

- The unit rate provided in a bill of quantities does not segregate labour, materials and plant. This is an essential requirement for future cost control purpose.
- The unit rates are not reliable principally because of individual locations e.g second lift of brickwork, are not separately classified.
- The costs, for example, of excavation are likely to be as much as related to overall plant usage as the depth of excavation.
- The representation of unit quantities does not allow for opportunity to estimate in an organized manner.
- The calculation of the unit rate is time consuming and expensive, it is important that as much as possible of this information can be reused throughout the project. Unit rate do not allow this.
- The application of unit rate variations can give misleading results to both the contractor and the client.
However, whilst the above points are valid, the difficulty still remains of capturing the site feedback data, both economically and in a manner that allows their useful reuse in the future estimating process.

### 4.7 Tender Adjudication

The conservation of the estimate to the tender is the responsibility of management. This is a separate commercial function using the estimate and the supporting documentation as a basis. The main purpose now is to consider the financial and other implications that any business would need to assess. Whilst the estimator may work within a narrow project framework, it is management’s function to look at the submission of the tender more broadly. The various matters to be considered include:

- **Project type:** consultant, client
- **Management:** method statement, contract programme, manpower
- **Contractual:** contract conditions, contract period, damages, insurances
- **Financial:** fixed price, payments, retention, bond, cash flow
- **Mark-up:** profit, return, risk, overheads, discounts
- **Cost estimate:** analysis
- **Competition:** work load, other work, past performance
- **Allowance:** to be added in the case of firm price tenders.

The meeting may recommend that the all-in-rates used in the cost estimate should be changed. This should not be done without realistic expectations of changes in performance. The use of computer aided estimating has now allowed the different computations to be easily performed and their effects on cost quickly calculated.
5.1 A Typical Tender Analysis of proposes classroom block for the Federal Polytechnic, Kaduna

5.1.1 Introduction

Scope of Work
The work comprises the erection/completion of a storey block complex containing ten classrooms and associated ancillaries facilities.

5.2 Tender Action

5.2.1 Preliminary Invitation/Enquiry to Tender

A total of six (6) contractors were short-listed by the Polytechnic to indicate their willingness to tender for the project. This exercise was however based on the Polytechnic previous knowledge of the levels of performance and capability of the contractor. It was therefore assumed that each of the contractors. It was therefore assumed that each of the tenderers was capable of executing the proposed project.

5.2.2 Invitation to Tender

The tendering process witness five (5) tenderers only that indicated their willingness to tender by collecting all the document associated with tendering. Tenderers were instructed to submit completed tender documents to the Polytechnic on or before Wednesday, November 29, 2000. Only three (3) tenders were received subsequently. However, none of the tenderers complained of time constraint or want of any information.

5.3 Tender Result

5.3.1 Tender received

The following tenders were received and opened by the management of the polytechnic and the project quantity surveyor on December 1, 2000. the tender documents were later handed over to the project quantity surveyor on December 1, 2000 for analysis on report.

The official record of the tenders were as follows
## TENDER RECEIVED

<table>
<thead>
<tr>
<th>s/no</th>
<th>Tenderers</th>
<th>Tender figure</th>
<th>Completion period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC Engineering Ltd</td>
<td>56,080,690.00</td>
<td>Not stated</td>
</tr>
<tr>
<td>2</td>
<td>Newton &amp; John Ltd</td>
<td>53,950,000.00</td>
<td>12 months</td>
</tr>
<tr>
<td>3</td>
<td>Sijang Turnkey Ltd</td>
<td>59,430,280</td>
<td>Not stated</td>
</tr>
<tr>
<td>4</td>
<td>Project Quantity Surveyor’s estimate</td>
<td>53,558,987.57</td>
<td>9 months</td>
</tr>
</tbody>
</table>

### 5.3.2 BREAKDOWN OF TENDERS RECEIVED

**Table 1**

<table>
<thead>
<tr>
<th>s/no</th>
<th>Tenderers</th>
<th>Preliminaries</th>
<th>Contingencies &amp; insurance</th>
<th>Main building</th>
<th>External works</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC Engineering Ltd</td>
<td>6,953,500.00</td>
<td>3,300,000.00</td>
<td>43,769,275.00</td>
<td>2,057,915.00</td>
</tr>
<tr>
<td>2</td>
<td>Newton John Ltd.</td>
<td>2,498,750.00</td>
<td>3,300,000.00</td>
<td>46,345,418.00</td>
<td>1,805,832.00</td>
</tr>
<tr>
<td>3</td>
<td>Sijang Turkey Ltd.</td>
<td>2,276,874.00</td>
<td>3,300,000.00</td>
<td>52,045,556</td>
<td>1,797,850.00</td>
</tr>
<tr>
<td>4</td>
<td>Project Q.S’s Estimate</td>
<td>4,320,000.00</td>
<td>3,300,000.00</td>
<td>44,151,419.87</td>
<td>1,787,567.76</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>s/no</th>
<th>Tenderers</th>
<th>Tender figure</th>
<th>Pc &amp; Provisional Sum</th>
<th>Contingencies &amp; insurance</th>
<th>Preliminaries</th>
<th>Total Builder’s work</th>
<th>% of builders work from tender figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC Eng Ltd</td>
<td>56,080,690</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>6,953,500</td>
<td>31,652,190</td>
<td>56.44</td>
</tr>
<tr>
<td>2</td>
<td>Newton &amp; John Ltd</td>
<td>53,950,000</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>2,498,750</td>
<td>33,976,250</td>
<td>62.98</td>
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<tr>
<td>3</td>
<td>Sijang Turnkey Ltd</td>
<td>59,420,280</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>2,276,874</td>
<td>52,045,556</td>
<td>66.76</td>
</tr>
<tr>
<td>4</td>
<td>Project Q.S’s Estimate</td>
<td>53,558,987.57</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>4,320,000</td>
<td>59,358,987.57</td>
<td>59.31</td>
</tr>
</tbody>
</table>

**Table 3**

(Using corrected tender figure)

<table>
<thead>
<tr>
<th>s/no</th>
<th>Tenderers</th>
<th>Tender figure</th>
<th>Pc &amp; Provisional Sum</th>
<th>Contingencies &amp; insurance</th>
<th>Preliminaries</th>
<th>Total Builder’s work</th>
<th>% of builders work from tender figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC Eng</td>
<td>55,796,276</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>6,953,500</td>
<td>31,367,776</td>
<td>56.22</td>
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<tr>
<td></td>
<td>Tenderer</td>
<td>Tender figure</td>
<td>Corrected tender figure</td>
<td>Arithmetical errors</td>
<td>Percentage errors</td>
<td>Project quantity surveyor’s estimate</td>
<td>Percentage BELOW/ABOVE Estimate</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------</td>
<td>---------------</td>
<td>-------------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td>--------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>Newton &amp; John Ltd</td>
<td>54,154,870</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>2,498,750</td>
<td>34,181,120</td>
<td>63.12</td>
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<tr>
<td>3</td>
<td>Sijang Turnkey Ltd</td>
<td>59,729,986</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>2,276,874</td>
<td>39,978,112</td>
<td>66.93</td>
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<tr>
<td>4</td>
<td>Project Q.S’s Estimate</td>
<td>53,558,987.57</td>
<td>14,175,000</td>
<td>3,300,000</td>
<td>4,320,000</td>
<td>1,787,567</td>
<td>59.31</td>
</tr>
</tbody>
</table>

### 5.4 Analysis/Comments on Tender

#### 5.4.1 Tenderer: Messrs ABC Engineering Ltd

<table>
<thead>
<tr>
<th>Tender figure</th>
<th>N56,080,690</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected tender figure</td>
<td>N55,796,276.00</td>
</tr>
<tr>
<td>Arithmetical errors</td>
<td>- N284,414.00</td>
</tr>
<tr>
<td>Percentage errors</td>
<td>0.15%</td>
</tr>
<tr>
<td>Project quantity surveyor’s estimate</td>
<td>N53,558,987.57</td>
</tr>
<tr>
<td>Percentage BELOW/ABOVE Estimate (corrected tender figure)</td>
<td>4.18% ABOVE</td>
</tr>
<tr>
<td>Completion period</td>
<td>not stated</td>
</tr>
<tr>
<td>Project quantity surveyor’s estimate</td>
<td>N53,558,987.57</td>
</tr>
<tr>
<td>Recommendation award range</td>
<td>±5% of estimate i.e N50,881,037.57 N56,236,936.57</td>
</tr>
</tbody>
</table>

#### 5.4.1.2 Comments

The tender figure is quite on high side and lacks competitiveness. The rates are not evenly distributed. The rates for concrete, reinforcement and decoration are on the high side while that of finishing is considered low. This appears to be a deliberate effort of “Front loading”. Furthermore, the tender contains a huge arithmetical error, indiscriminately spread and this is no credit. Actually, the tender is within ±5% of the project Quantity Surveyors Estimate but did not state completion period. This is serious. The tender lacks primary ingredients required for consideration for an award.

#### 5.4.2 Tenderer: Messrs Newton and John Ltd

| Tender figure | N53,950,000.00 |
Corrected tender figure | N54,154,870.00  
Arithmetical errors | +N204,870.00  
Percentage errors | 0.38%  
Project quantity surveyor’s estimate | N53,558,987.57  
Percentage BELOW/ABOVE Estimate (corrected tender figure) | 1.11% ABOVE  
Completion period | 12 months  
Recommendation award range | ±5% of estimate i.e  
| N50,881,037.57  
| N56,236,936.57

5.4.2.1 Comments
This is well priced tender with negligible errors. A few cases or inconsistency in pricing and extension/totaling errors were observed. This situation has been brought to the knowledge of the tenderer and they have confirmed that they will abide by the corrected tender figure and its subsequent implications. The corrected tender figure is 1.11% above is within the range recommended for consideration for an award. Their completion time of 12 months is feasible. This tender can be considered for an award.

5.4.3 Tenderer: Messrs Sijan Turnkey Ltd

| Tender figure | N56,420,280.00  
Corrected tender figure | N59,729,986.00  
Arithmetical errors | +N309,706.00  
Percentage errors | 0.52%  
Project quantity surveyor’s estimate | N53,558,987.57  
Percentage BELOW/ABOVE Estimate (corrected tender figure) | 11.52% ABOVE  
Completion period | not stated  
Recommendation award range | ±5% of estimate i.e  
| N50,881,037.57  
| N56,236,936.57

5.4.3.1 Comments
The rates of this tender has been thoroughly scrutinized and found to be consistent but not competitive though some are quite high, hence the comparative high tender figure. This tender lacks very important information regarding BASIC RATES for labour and materials including source(s) of supply. This is dangerous and may likely expose project administration to frustration leading to cost overrun and project abandonment. Furthermore, the tender has left most of the items unpriced including not starting project completion period thereby generating doubts. This tender is 11.52% ABOVE the project quantity surveyor’s estimate and therefore well outside the range for consideration for an award.

5.5 General remark / recommendations

The tenders received are very wide apart to be considered as competitive. The difference between the highest and the lowest tender is N5,570,280.00 (five million, five hundred and seventy thousand, two hundred and eighty naira)

From the yardstick recommended as the award range, the following tenderers qualify for consideration

(1) Messrs Newton and John Ltd

(2) Messrs ABC Engineering Ltd.

It will be remarked that these tenders received are above the project quantity surveyor’s estimates of N53.56 million. However, the total PC and provisional sums included in the bills amount to N14,175,000.00 (fourteen million, one hundred and seventy five thousand naira only) excluding insurance and contingencies (see breakdown of tenders received)

It is our hope that desired savings could be made from the PC and provisional sums thereby finally erasing whatever difference between considered tender and project quantity surveyor’s estimate.

We also inclined to recommend that Messrs. Newton & John Ltd. be considered for the award as their corrected tender is not only lowest but reasonable and realistic.
**WEEK 6: TENDER REPORT (6.0)**

**6.1 Report on Tenders**

When the client and his advisers are considering the tenders received, factors other than price may be of importance. The time required to carry out the work, if stated as a requirement on the form of tender, may be compared. Time is frequently an important matter to the client. Although there may be reasonable excuses for failing to keep to time agreed, and even justification for avoiding liquidated damages provided for by the contract, the time stated by a reputable contractor may be taken as a reasonable estimate, having regard to the prevailing circumstances.

If the contract is subject to adjustment of the materials, the schedule of basic rates of materials must also be considered. The question should be asked. ‘Has the tender assume reasonable basic prices for materials?’, If they are too low there can be an excessive increased cost on a rising market or too little in reduced costs on a falling market. Where tenders are very close, the schedules of basic rates may be compared, since the lower tenderer may have less favourable price. Only a preliminary examination will be made at this stage to ascertain which tender or tenders should be considered for acceptance. The quantity surveyor will write a report for the client or committee concerned, setting out clearly the arguments in favour of acceptance of one tender or another.

**6.2 Contractor Selection and Appointment**

There are essentially two ways of selecting a contractor: through competition or by negotiation. This will apply to any working arrangement, including strategic partnering, which is the first instance requires the appointment of a contractor partner. Competition may be restricted to a few selected firms or open to almost any firm that wishes to submit a tender. The contract options described later are used in conjunction with one of these methods of contractor selection.

European legislation imposes restriction on tendering arrangements for the procurement of public goods and works. Where government related expenditure is involved above a prescribed contract value, it is necessary tenders from member states by advertising the project in the official journal of European committee. The subdivision of contract value, it is necessary to invite with the intent of falling within the threshold value is not allowed. At present, it seems that this European initiative is not having a major effect upon competition.
for construction work in the UK. It does, however, impact significant on securing publicly funded projects. The Construction Industry Board (CIB) has developed a code of Practice for the selection of main contractor. This replaces the previous Code of Tendering Procedure issued by the National Joint Consultative Committee and suggested good practice on the selection of contractors and the awarding of construction contracts. With reference to the CIB document, the key principles of good practice to be adopted when appointing contractors in competition (either by single or two-stage tendering) are:

- Clear procedure should be followed that ensure fair and transparent competition in single round of tendering consisting of one or more stages.
- The tender process should ensure receipt of compliant, competitive tenders where contractors feel it necessary to attach conditions to tender submissions due to their inability to fully comply with the tender documents, tender evaluation becomes more complex.
- Tender list should be compiled systematically from a number of qualified contractors. As stated, it may be necessary to consider European procurement law when compiling lists of tenders. Considerations to be made when selecting the preliminary list of firms include: the firm’s financial standing and record; its recent experience of building over similar contract periods; the general experience and reputation of the firm for similar building types of adequacy of its management; and its capacity to undertake the project. Although in some respects, the inclusion of some tenderers may appear to be automatic due to their size and previous record, consideration differ from the national or another regional standing, resources and reputation which may differ from national or another regional position. General, with a pre-qualified list of tenderers, there should be no doubt as to the ability of any of the tenderers to satisfactorily complete the contract.
- Tender list should be as short as possible. While the rational for this guidance is not in doubt, in practice, client must consider the possibility of collusion and breaches in confidentiality. The risk of this are increased here the list of tenders is very small.
- Condition should be the same for all tenderers’
- Confidentiality should be respected by all parties
- Sufficient time should be given for the preparation and evaluation of tenders’
- Sufficient information should be provided to enable the preparation of tenders’
- Tenders should be assessed and accepted on quality as well as price
- Practice that avoid or discourage collusion should be followed
- Tender prices should not change on an unaltered scope of works’
- Suites of contract and standard un-amended forms of contract from recognized bodies should be used where they are available

- There should be a commitment to teamwork from all parties. This is very much the essence of the way ahead for improving the construction industry, central to the partnering approach and desired in all forms of contracting.

**6.3 Signing of contract:**

The contract agreement usually included as part of the B.O.Q is signed between the client and the contractor.

After signing the contract, construction work commences on site until completion in accordance with the signed agreement. This period is known as the “Construction period”
7.1 Traditional Types of Contract

There are three main traditional types of contracts:

1. Fixed price contract
2. Cost reimbursable contract
3. Package deal

7.1.1 Fixed Price Contract

May be of three types:

(a) Bill of Quantities Contract

This type of contract is preferred by both consultant and clients. In this type of contract, the tender drawings which makes it easier for him to estimate his tender figure. The BOQ contains every item of cost required to complete a project and the contractor is expected to fix his price against each of the item listed. Contractors have precise information for tendency or less work to do to make up their tender than with unbilled contracts. Consultants also find it easier to compare tenders from different contractors. The priced billed item from the basis for valuation of variations which may occur during the contract and also for stage or interim payment. To date, the majority of building contracts are let on this basis.

(b) Lumpsum Contract:

There, the contractor agrees to carryout work out for a fixed sum of money. He is provided with drawings and specifications and with these, he calculates his tender figure. BOQ are not usually provided. This type of contract is only used for small projects especially when the bulk of the work is above ground and well detailed. Although, in theory, the contractor will carryout the whole of the work for a fixed sum, provision id usually made in the contract conditions for the valuation of any variations made in the design by the architect or engineer.

(c) Schedule Contract:

These may be in one or two forms:
(i) The contractors tendering for the project are supplied with a list of description of work to be undertaken with no quantities. Against each item is appended a unit (i.e a figure in N and K) Each contractor will indicate whether he is prepared to do the work at the stated rate or not, the amount (usually stated as percentage) he requires to be added or deducted from the figure shown. The contractors return their list to the employer, and the Q.S on his behalf, examines the rates and recommend which rate should be accepted. The contractor recommended is awarded the contract. All work done by the contractor will be measured on the site and valued at the agreed unit rates.

(ii) Alternatively

(iii) And more often, the contractors append the unit rates they require against the items of work listed, thereafter, the procedure is just as described in (a) above. This type of contract is listed mainly for maintenance contracts where accurate quantities of work cannot be measures. It is very difficult to assess which contractor’s rates are most favourable. Approximate quantities of the various items of work can facilitate the choosing of the contractor.

7.1.3 Cost Reimbursable Contract

These are sometimes known as cost plus contract or “prime cost” contract. Prime cost of a project is the net cost of materials, labour, plant and other preliminary items expended on the project and in addition a fee to the contractor to cover his profit and overheads. The price cost is ascertained by the contractor submitting material invoices, labour hiring invoices and plant hiring charges for claims, the fees paid to the contractor is usually calculated on a previously agreed method which gives rise to a number of forms of cost reimbursement contracts.

(a) Cost Plus Percentage Fee:

Under this type of contract, the net cost of labour, material, plant etc. expended on a project are ascertained and percentage added to cover the contractors profit and overheads. The percentage is agreed on before the contract is signed and may be subjected to completion i.e several contractors submit the percentage addition they require on the net cost of the various element. The main advantage of this type of contract is that a contractor can be selected and work started with the minimum delays. It is ideal therefore for emergency situations possible before bill of quantities can be
prepared or when there is insufficient information for a bill of quantities to not prepared.

The disadvantage is that almost invariably the final cost of the project will be much higher than say a BOQ contract. There is no mean time for the contractor to economize, the longer it takes him to complete the work and the higher the level of wastage, than the higher the net cost of the project and as a result his profit will be higher. It sometimes help to have an agreed contract period for such contract.

(b) Cost Plus Fixed Fee
The net cost of labour material and plant is ascertained on completion of the project. This total is paid to the contractor in addition to a fixed fee to cover his profit and overheads. The fee is fixed and agreed between the parties before the contract is agreed.

Much more information is required at this stage because reasonable accurate estimate of the work is required before a fixed fee can be agreed on. It is a better type of contract than the previous one because there is a slight incentive for the contractor to economize time-wise and earn his fee as soon as possible. However, there is no incentive to reduce waste since his fee is not affected either way.

(c) Cost plus fluctuation fee:
This is an improvement on the last type of contract described in that the contractors fee is increased by an agreed, usually on a sliding scale basis, should the final cost be below the estimated cost.

(d) Target Cost with Variable Fee:
Further development on the described form of contract. A target estimate is agreed between the parties to the contract. Should the final cost of the project be less than the target estimate, the contractors fee will be increased by an agreed percentage of the saving on the other hand, if the cost exceeds the target estimate, the contractor’s fee will be reduced by an agreed percentage of the over-expenditure. Thus the contractors has a considerable incentive to economize, since the greater the saving on the target estimate, the higher will be his fees and vise-versa.
Package deal or all-in service contract

This is a system of contracting which originated from the states of America. With this arrangement, a contractor agrees with his client to take full responsibility for design and construction. This eliminates some of the delays involved in co-operation with consultants but it increases the risk to the client of unsuitable construction.

The client gives the brief directly to the contractor of his choice, who then submit a proposal in terms drawings, specifications, cost and completion time. If his terms are acceptable, a formal agreement is signed and the contractor undertakes all the works of the consultant using his in-house staff or by commissioning outside consultant and also carries out the construction of the project.

It is also possible to go into package deal contract by notifying a number of qualified contractors to submit independent proposals after which one is chosen. This provides a measure of competition and ensures that the client gets value for money. To further protect the interest of the client, a team of independent consultants may be appointed to supervise the post-contract work to ensure that the contractor keeps to specification and maintaining standards.

Package deal contract tends to have higher final accounts particularly when there is limited or no competition. Secondly, because this system is based on a lumpsum price without quantities, it is quite difficult to secure a basis for valuation of variations. Again, the conditions for public accountability are not met since these is not enough evidence to convince people that the cost are justified.

In addition to these, there are other developments that have worked for complex projects. These include
- Turnkey
- Management contracting
- Project management etc.
7.2 Design and Build

Building Contracts

The desirable benefits of early contract participation might be brought about when the contractor is appointed directly by the client and made responsible for the whole process from initial briefing to the production of the finished building, this occurs in the design building contract and here the contractor effectively takes on the role of the leader of the team.

Here the client deals directly with the contractor for the complete building and it is the contractor who is not only responsible for but also co-ordinates the separate design and construction processes including engagement of the design team who are therefore contractually linked with the contractor and not the client. The construction process is wide linked, is still separate from the design process leaving the consultant free to concentrate on their own role. The contractor may also be committed to performance specification for the project and so take on much greater responsibility in a normal contracting situation. The client may however, directly appoint either in-house staff or a separate consultant to check that the product the contractor is providing is value for money and that the content and quality are satisfactory.

In a design build contract, the contractors manager is responsible for co-ordinating all members of the design team and for the construction process. Management of the contract is separated from the management of each design function, leaving design consultants. Free to concentrate on their own design role.
Advantages
(1) Design and construction are undertaken by one organization
(2) Past experience should be blended into current design. Since these is competition over the design as well as the construction, the design build service may achieve a result which is cheaper per unit of accommodation provided.
(3) The arrangement is most useful for building with a family single form or function
(4) Design build services is often quite quick from initial brief of handling over of the finish building.

Disadvantages
(1) Very often the design service remove the element of competition entirely.
(2) The client may find that he is not getting what he imagine he might get
(3) In this method, the design may revolve around the contractors own favorite method of construction as a result, the building may suffer in its function arrangement or aesthetics quality.
(4) It may not be cheap to operate or it may have high maintenance cost.
(5) Because the method is based upon a lumpsum price with quantities, it is not more difficult to secure a basis of valuation.
7.3 Management Contract

The management contract is a contract procurement method in which a management contractor provides management expertise on a construction project in return for a fee. The management construction is appointed at the feasibility study.

In this role the management contractor who may be a general contractor in other situations is appointed by the building owner to work alongside his professional consultant. The management contractor is appointed on a similar professional basis as the consultant to enable him give a construction management service in return for reimbursement on a fees basic.

The management contractor unlike the design build contractor does not carryout any of the construction and each element of the work is let out on a competitive basis to a number of specialist subcontractors. In most cases, the management contractor is responsible for the setting up of overall site establishment and general backup of services for the use of various specialist subcontractors. The underlined philosophy of the approach is to allow the contractor to become part of the client’s team and for the total management function to be carried out in partnership with the members of the design team to the overall benefit of the client.

The essential difference from a design build contract is that a contractor while co-ordinating design with the construction of the project does not directly carryout the role of designer or contractor and is concern strictly with management. He also reimburse on a fee and prime cost basis rather that on variable profit
Fig 8.2 management contract

Advantages
(1) The management contractor can advice on the design implications and cost
(2) He co-ordinate the work on site very efficiently
(3) He controls the tendering procedure and contractual arrangement for the work elements
(4) The total time frame from brief to commissioning is reduced
(5) Cost monitoring is instituted

Disadvantages
(1) The management contractor will require to be paid for his pre-contract work if the project does not go ahead as scheduled
(2) If the contract is let late, little or no time will be available for negotiating cost reduction of the overall project.
(3) Detailed bill of quantities is necessary for costing variations
(4) Work starts on the site while the scheme is yet to be fully design architecturally and structurally, this affects the eventual cost of the project.
WEEK 9: MODERN METHODS OF PROCUREMENT (9.0)

9.1 Types of Procurement
We have two major types of procurements, they are partnering and public private partnership

9.2 Partnering
- **Background**
  - US car industry in response to Japanese efficiency
  - In UK engineering and construction – North Sea oil & gas
- **Definitions**
  - Being closely involved with someone in someway (Cambridge online)
  - Sharing an activity with someone (Encarta)
  - Associates working towards a common goal (Wordnet)
  - “Long-term agreements between companies to cooperate to an unusually high degree to achieve separate yet complimentary objectives”
  - “Variety of managerial practices and organisational designs that enhance and maintain collaboration”
- **In Construction - can be long-term or project-based**
- **Includes**
  - “the concepts of teamwork between supplier and client, and of total continuous improvement”
  - Identifying problems and risks at outset & strategies to manage and resolve them
- **Requires**
  - Openness between parties
  - Ready acceptance of new ideas
  - Trust
  - Perceived mutual benefit
  - Time and commitment
- **When**
  - Traditional method not suitable
  - Efficiency improvement
  - Cost reduction
  - Promote organisational learning
  - Enable supply chain management
– Encourage innovation

How

BENEFITS

● Improves capacity to innovate
  – Process and product
● Enables organisational learning
  – Continuity
  – Feedback and feed forward
  – Continuous improvement
● Faster decision making
  – Shorter lead times
● Supports sustainable development
● Improved productivity
● Greater consistency in delivery – time, cost, quality
● Mutual benefits
  – Shared vision
  – Monetary
  – Risk
  – Knowledge exchange and transfer
  – Cultural alignment
  – Dispute resolution
● Increases certainty of workload & profit margins for suppliers

CONSTRAINTS

● Tensions and conflicts between partners
  – Objectives
  – Strategy
● Transfer of knowledge (or lack)
  – Communication
● Absorptive capacity of partners
  – Quality
  – Knowledge retention and distribution
● Absence of champions
● Mistrust
● Organisational culture
• Retaining competition

9.3 Public Private Partnerships (PPP)

- PFI
- Corporate PFI
- LIFT

• Where the private sector works with or for the public sector in order to help provide a public service
• E.g.
  - project to build and run a new facility such as a school or hospital
  - A long-term outsourcing contract to run services

• A PPP refers to any alliance between public bodies, local authorities or central government, and private companies. PPPs typically involve the joint ownership of a special purpose vehicle established under company law.

**TYPES**

1. Asset sales
2. Financially free-standing contracts – services which are self-financing over a period of time e.g. Road tolls
3. Joint Ventures (JV) – partnerships between public and private sector
4. Local Education Partnership (LEP) – contracts to improve standard of secondary school property & services
5. Local Improvement Finance Trust (LIFT) – contracts to improve provision of primary care services in NHS
   1. There are 42 LIFT schemes underway in England, representing £1bn
6. Partnership companies – e.g. NATS
7. Partnership investments
8. Policy partnerships
9. Private Finance Initiative (PFI)
   1. Variants
      - Design Build Operate (DBO)
      - Design Build Finance (DBF)
      - Design Construct Manage Finance (DCMF)
10. Sales of business (by floatation or trade sale) e.g. BNFL & CDC
11. Wider markets
9.3.1 PFI

- Government’s initiative to enable public sector works to be undertaken using input from private sector
- Inception – November 1992 by Norman Lamont
- Alternative route for to procure facilities & services without immediate effect on Public Sector Borrowing Requirement (PSBR)
- Bates review endorsed its use after the change of government
  - 29 recommendations for change made
- Usually a consortium (SPV) will be responsible for providing an integrated approach to the design and construction and also the ongoing maintenance and facilities services over a contract period of 25 to 35 years.
- Traditional over budget 73%; Projects late 70%
- PFI Projects over budget 20%; Projects late 24%
  - The PFI report found that where there were cost overruns, these were generally the result of changes to the project instigated by the client and not the contractor.

**BENEFITS & DISBENEFITS**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Disbenefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>There can be greater price certainty. The department and contractor agree the annual unitary payment for the services to be provided. This should usually only change as a result of agreed circumstances.</td>
<td>The department is tied into a long-term contract (often around 30 years). Business needs change over time so there is the risk that the contract may become unsuitable for these changing needs during the contract life.</td>
</tr>
<tr>
<td>Responsibility for assets is transferred to the contractor. The department is not involved in providing services which may not be part of its core business.</td>
<td>Variations may be needed as the department's business needs change. Management of these may require renegotiation of contract terms and prices.</td>
</tr>
<tr>
<td>PFI brings the scope for innovation in service delivery. The contractor has incentives to introduce innovative ways to meet the department's needs.</td>
<td>There could be disbenefits, for example, if innovative methods of service delivery lead to a decrease in the level or quality of service.</td>
</tr>
</tbody>
</table>
Often, the unitary payment will not start until, for example, the building is operational, so the contractor has incentives to encourage timely delivery of quality service. The unitary payment will include charges for the contractor's acceptance of risks, such as construction and service delivery risks, which may not materialise.

The contract provides greater incentives to manage risks over the life of the contract than under traditional procurement. A reduced level or quality of service would lead to compensation paid to the department.

There is the possibility that the contractor may not manage transferred risks well. Or departments may believe they have transferred core business risks, which ultimately remain with them.

A long-term PFI contract encourages the contractor and the department to consider costs over the whole life of the contract, rather than considering the construction and operational periods separately. This can lead to efficiencies through synergies between design and construction and its later operation and maintenance. The contractor takes the risk of getting the design and construction wrong.

The whole life costs will be paid through the unitary payment, which will be based on the contractor arranging financing at commercial rates which tend to be higher than government borrowing rates.

**OTHER BENEFITS**

- Enhance government’s capacity to develop integrated solutions
- Facilitate creative & innovative approaches
- Reduce the cost to implement the project
- Reduce the time to implement the project
- Transfer certain risks to the private sector partner
- Attract larger, potentially more sophisticated bidders to the project
- Access skills, experience and technology
### 9.4 Key Differences between Traditional Public Sector Procurement and PFI

<table>
<thead>
<tr>
<th>Area of Consideration</th>
<th>Characteristics of traditional public sector procurement (generalised)</th>
<th>Characteristics of PFI (generalised)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of private sector involvement in the project</td>
<td>Until construction of facility is compete (plus the defects liability period)</td>
<td>Normally for at least 25 years for construction related PFI projects</td>
</tr>
<tr>
<td>Specific company involvement</td>
<td>Appointed by the public sector client on an individual basis for the supply of specific skills</td>
<td>Involved as part of a concessionaire consortium with all the skills necessary or taking a key supply contracting role, being appointed by the bidding firm or concessionaire</td>
</tr>
<tr>
<td>Private sector risks</td>
<td>Specific to the area of involvement and limited to defect liabilities</td>
<td>Wide ranging and long term</td>
</tr>
<tr>
<td>Remuneration</td>
<td>Lump sum or percentage fee</td>
<td>Annualised payment</td>
</tr>
<tr>
<td>Opportunity for private sector to suggest improvements</td>
<td>Limited</td>
<td>Considerable</td>
</tr>
<tr>
<td>Key financial consideration for the private sector company</td>
<td>Maintaining a positive cash flow and margins</td>
<td>Having an adequate asset base and debt facility</td>
</tr>
<tr>
<td>Attitude required of the</td>
<td>Reactive</td>
<td>Proactive</td>
</tr>
<tr>
<td>private sector from the public sector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**10.1 Definition:**

Estimating according to Seely, involves both calculation and assessment, and both technical data and human judgment of circumstances and probabilities must be brought together in its production. Therefore, estimating is defined as the technical process of predicting cost of construction.

**10.2 Types of Estimating**

**10.2.1 Approximate Estimate**

1. **Unit Method:** This method produces total single price for the project and is based on cost per unit or person to be accommodated. This technique is between the cost of the construction and the number of functional unit its accommodate. Examples are

<table>
<thead>
<tr>
<th>Type of Project</th>
<th>Unit Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools</td>
<td>cost/ student place</td>
</tr>
<tr>
<td>Hospital accommodation</td>
<td>cost/ bed space</td>
</tr>
<tr>
<td>Hostel</td>
<td>cost/ bed space</td>
</tr>
<tr>
<td>Cinema</td>
<td>cost/ sit</td>
</tr>
<tr>
<td>Hotel</td>
<td>cost/ room</td>
</tr>
<tr>
<td>Stadium</td>
<td>cost/ sit</td>
</tr>
<tr>
<td>Mosque</td>
<td>cost/ space</td>
</tr>
</tbody>
</table>

Total estimate cost is equal to no of functional unit multiply by unit rate. A lot of skills are required in selecting an appropriate rate. Rate can be obtained by careful analysis of the number of recently completed projects of similar types, size and constructional method. However, adjustment would need to be made to account for

1. Varying site condition
2. Specification changes
3. Market condition

**Advantage**

(1) It is simple and quick to use

**Disadvantage**
(1) Lack of precision
(2) It is advisable to express cost within a range of prices

10.2.2 Cube Method

This method was used extensively between the World War I and World War II. But it is not in common used anymore. Rules of must as defined by Royal Institute of British Architect (RIBA) are external plan area of a building is multiply by a height to get the volume of the building. The height is measured from the top of concrete foundation to half way of the roof if pitched or to 600mm above the roof if flat. If the roof space is occupied the height is taken up to ¾ (0.75) way up the roof. If the flat roof has a parapet, the height is taken up to the top of the parapet or 600mm whichever is greater.

Total estimated cost is equal to cubic content/m³ multiply by cost/m³

All projections such as porches, steps, domes, bays are measures and added to the cubic content of the building. Where parts of the building vary substantially in constructional method or quantity of finish then it is preferable to calculate separate volume and to apply different rate.

Advantage
(1) It is useful in estimating the cost of heating and air conditioning

Disadvantages
(1) Building cost could relate better in floor area than with volume
(2) It does not give the client an indication of the amount of the usable floor area
(3) It takes no account of number of stories or plan shape which is known to affect cost.
(4) It produces a large cubic quantity that will increase the possibility of further inaccuracy in estimating.
(5) Large amount of variation have been known to occur in case rate of building of the same type

10.2.3 Superficial or Floor Area Method

This is probably the most popular method of cost prediction during the early stages of a project once the general outline drawings are been prepared, the method relate a unit cost to floor area and is more readily appreciated. The area of each of the floor is measured
and then multiply by cost/m\(^2\) by the convention the superficial area is measured between the inside faces of the external wall and no deduction are made for partitions, stairs, Lift and etc. It should be borne in mind that if the client expresses his requirement in term of usable space, it is necessary to add to this area, circulation and other non-usable space to make the building function correct. The rate to be used is usually obtained from cost analysis of previously completed building of similar plan shape, storey height level of finish and method of construction, certain rules must be applied.

(1) if the building is made up of parts that varies substantially in terms of quality of finish and construction method, it is preferable to price it independently using rates appropriate for each part. Items of work which cannot be related to the floor area will need to be priced at separate rate or using different methods and added items such as piling, heating and air conditioning, lift installation and external work. Allowances should be made for site condition, construction method, materials, quality of finish and number and quality of fittings. Total estimated cost equal to gross floor area multiply by cost/m\(^2\)

**Advantage**
(1) Ease of calculation
(2) Cost are expressed in a way which is readily understood by the average building client
(3) Rates are readily available from may sources and also can be very easily calculated from existing project.
(4) Majority of items in the building and the cost impact are related more to floor area than the volume

**Disadvantages**
(1) Does not directly take account in changes in plan shape or total height of the building which also have a cost impact.
(2) Adjusting from the variables mention is not easy

**10.3 Approximate Quantities**
This method is probably the most favoured by quantity surveyor because it used idea which are similar to those used in preparing bill of quantities. It provides a more detailed estimate than the other method described. Quantities are measured from the drawings and similar omnibus description is given to this measurement. The description will include all items which are associated with that drawing e.g a floor slab will include the stripping of
vegetable soil, reduced level excavation, hardcore filling under the floor, concrete bed and reinforcement. An upper floor will include the ceiling finish and painting of the surface of the slab, the floor construction, the floor screed and floor finish.

Using approximate quantities: the strip foundation as 1m depth level and compacting, dieldrex anti-termite treatment. Back filling, disposal of surplus material from site, concrete (1:3:6) in foundation 225mm thick, 225mm hollow sandcrete blockwall in cement mortar (1:4) filled solid with weak concrete.

The item is then given a composite price to include every unit in this omnibus description. Special paper is printed for this form of estimating. It has dimension column on the left and the usual billing price column on the right.

With a multi rate system, it is essential to allow for preliminary and contingency in addition to the actual cost of work in pricing also care must be taken to include for all the items ion the description and make any necessary allowance for minor work or labour covered by the overall measurement and prices, accuracy of this method is high, changes in design shape and specification can be allow for both the preparation and calculation is lengthy and labourous.

**Advantages**

1. It is reliable and give a more detail estimate than any other method
2. In practice only major items that are of course important are measured

**Disadvantages**

1. It required more time and effort than any other method
2. More detail information is required from the designer and with other method

**10.4 Introduction to Unit Rate**

To analyse something is to break it down into its constituent parts and study each part in detail. Therefore analytical estimating involves the analysis and costing of construction resources to produce an estimate.

The production of an estimate normally involves the calculation of unit rates i.e. the cost of an individual measured item for example a square metre of brickwork, a cubic metre of concrete or a metre of skirting. As found in a Bill of Quantities.

Analytical estimating is therefore the most accurate form of estimating as each resource and unit rate is analysed and costed individually. This form of estimating is used for pricing
contracts with bills of quantities, specifications and drawings or where the contractor has measured and prepared their own quantities of work.


**11.1 Elements of a Unit Rate**

Unit Rate = Labour + Materials + Plant

- Overheads
- Profit

**11.2 Calculation of Unit Rates**

Unit Rates maybe calculated in one of two ways:

- Net Rate – (Excludes Overheads and Profit)
- Gross Rate – (Includes Overheads and Profit)

In our industry most estimators will calculate costs based on net rates these will then be enhanced later to include overheads and profit. Gross rates are sometimes referred to as *all-in rates*.

The Resources which compromise a unit rate are labour, materials and plant.

In the construction industry labour is often employed in two main ways, these are:

1. Direct –
   Often referred to as ‘cards in’, the employer pays all the costs of employment including for example national insurance and sick pay amongst others.
2. In-Direct –
These workers are self employed or referred to in industry as ‘on the lump’ these are often labour only sub-contractors without the normal costs of employment along with the other legal protections such as redundancy, sick pay and minimum notice periods. Labour may be paid for on an hourly, daily, weekly or piecework basis. Directly employed operatives are usually paid in accordance with a working rule agreement which will specify the rates and allowances to be paid. However, some contractors are trying to move away from the national wage bargaining and introduce local wage rates. Ultimately the actual rates paid for labour will depend on market forces.

11.2.1 Materials

Several factors affect the cost contractors pay for materials. In the box below highlight the factors you think impact on the price a contractor pays.

In the material element of a unit rate, in addition to the actual cost of the material the estimator must also consider:

- Transportation costs
- Unloading and Stacking costs
- Materials movement on site
- Extra Materials to compensate for:
  - Wastage
  - Allowance for materials being measured net in B o Q
  - Loss in consolidation, shrinkage etc

Note: Where prices of materials are described by suppliers as ‘ex works’ this means the price at the factory and delivery costs will have to be added.

11.2.2 Plant

Plant may be divided into two main categories, the costs of which can be allocated to contracts in differing ways.

Non-Mechanical Plant

Basic items of plant including – barrows, hosepipes, spades, trestles, scaffolding, small powered hand tools etc.

With the exception of scaffolding and one or two other items it is virtually impossible to allocate the cost of non-mechanical plant items to a contract, let alone to a specific unit rate e.g. a wheelbarrow may be used on several contracts in its lifetime.
The cost may be included in overhead charges as a percentage, as a lump sum in the preliminaries bill or, more accurately, on longer contracts a list of non-mechanical plant items is prepared, costed and included in the contract sum.

**Mechanical Plant**

Mechanical plant such as excavators, lorries, dumpers, mixers etc require a more complex approach. Mechanical plant can be very expensive. Contractors may buy, hire or lease plant. The purchase of plant must be viewed as an investment on which a return is required. Only detailed analysis will show whether it is in the contractor’s interest to buy, hire or lease mechanical plant.

**11.2.3 Overheads**

Overheads may be defined as the cost of maintaining (running) the contractors organisation. There are two types of overheads:

1. **Head Office**

   Annual cost of staff salaries, expenses, rents, rates, gas, water, electricity, telephones, office equipment, postage, insurance, maintenance of buildings and equipment etc. The cost of these items is expressed as a percentage of a company’s turnover and included in the tender.

2. **Project or Site**

   Project site costs including non – productive (manual) site staff, site office costs, storage facilities and other preliminary / site organisation costs. Items are priced as individual items and may be fixed or time related costs or a mix of fixed and time related costs. The costs of these items are included in the tender.

**11.2.4 Profit**

The amount of profit that a contractor can make is determined by a number of factors largely outside the remit of an estimator. However, in larger companies the senior or managing estimator may be a member of the management team and in smaller companies / firms the estimator may be a director or the managing director. In both cases they may be party to, or may have to make commercial decisions regarding profit margins. Factors affecting profit levels are:

- Market forces of supply and demand
- Amount of competition
• Who the competitor are
• Size / Value of contract
• Risk involved in contract
• Interest rates.

**Student Questions**
1. Define analytical estimating
2. Explain the difference between net and gross unit rates
3. List the elements of a unit rate
4. Identify the organizations, which produce working rule agreements
5. Define non-productive time and holiday credits.
12.1 Cost of Labour

Cost of labour seeks to consider the recognized basic wage rate for both skilled and unskilled operatives, including appropriate allowances, employer’s statutory payments and other payments relating to voluntary or trade agreement.

According to Seely (1993), the cost of labour is aimed at arriving at a labour rate per hour which is realistic and which reflects the actual cost of labour to the contractors including plus rates and guaranteed bonus. The following items as presented by Davis (1992), required the combination of all or some in arriving at the ‘all-in’ labour rate.

1. Basic wage rates and guaranteed bonus
2. Traveling time, fares and subsistence allowances (sometimes contained in project overheads as it is a variable item)
3. Holiday with pay scheme covering public holidays and annual holidays
4. Tool allowance
5. Sick pay
6. Employer’s national Health Insurance contributions
7. Employer’s liability and third party insurances
8. Construction industry Training board levy

However, if the project is of firm contract, additional allowances are added to take care of possible increase in labour rate by recognizing the size and likely duration of the contract.

12.2 Calculation of All-in-rate of Labour

12.2.1 Labour

Unskilled Labour

Cost of unskilled labour per year:

12480 x 12 = N149,760
Add 2% for gang leadership = N2995.00
Add for pension of gratuity 2 ½% = N3744.00
Add for compensation insurance 1 ½% = N2246.00
Add for transport allowance 5% = N7488.00
Add for housing allowance 40% = N59904.00
Add for leave allowances 10% = N14976.00

**N241,111.40**

Effective working day in a year i.e 365 days

Less

(a) Saturdays and Sundays (52 x 2) = 104
(b) Wet weather say = 20
(c) Annual leave say = 14
(d) Public holidays say = 10
(e) Absenteeism and sick leave say = 10

158

365 days – 158 = 207 days
Hence, the effective working days = 207

Cost of labourer to employer per day:

\[
\frac{241,111.40}{207} = N1,165.00
\]

The sum of N1,165.00 is therefore the all-in-rate payable for a labour by the employer.

Furthermore, considering the legally approved eight (8) working hours; then the hourly rate is

\[
\frac{1,165.00}{8} = N145.63
\]

**Skilled Labour (trades’ men or craftsmen)**

Assume basic pay per month = N16,700.00
Cost of mason per year = N200,400.00
Add 2% for gang leadership = N4,008.00
Add 3% for pension and gratuity = N6,012.00
Add workman insurance competition 2% = N4,008.00
Add tools allowance say N50.00 weekly i.e 50 x 4 x 12 yearly = N10,020.00
Add transport allowance 5% = N80,160.00
Add housing allowance 10% = N20,040.00

N20040.00

Cost per day = \[
\frac{329448}{207} = N1,591.50
\]
Hourly rate $= \frac{1,591.50}{8} = N198.94$

### 12.2.2 Cost of Materials

Material in the building industry refers to varying components delivered to site which when articulated or appropriately combined, result to functional element of a building project. Materials cost affect the estimate greatly and this depends on the source of supply and the competitiveness of quotation received by the estimating department.

The estimating department does send out enquiries to suppliers of materials with a view to obtaining a more realistic and workable information. The CIOB code of estimating practice outlined this information to include:

(a) Title and location of the work  
(b) Specification, class and quality of the material  
(c) Quality of material required  
(d) Likely delivery programme and special delivery requirements  
(e) Access to site and any restrictions  
(f) Date by which the quotation is required  
(g) Period for which the quotation is to remain open  
(h) Whether a fluctuation or firm price required  
(i) Discount required and  
(j) Person in the contractor’s organization to be contacted when queries arise.

The code recommended a further check on the obtained information so as ascertain that the following criteria are satisfied:

(1) The material comply with the specification  
(2) The material will be available insufficient quantities to meet the requirements of the construction programme  
(3) The supplier has imposed no special delivery conditions  
(4) The method and rate of delivery complies with the contractors requirement(s)  
(5) The condition contained a counter offer, which is at variance with the terms and conditions of the enquiry.  
(6) The quotation is valid for the required period
(7) Prices are given for small quantities where applicable
(8) Discount conform to the requirements of the enquiry
(9) Requirement concerning fixed or fluctuating prices are satisfied.

The next line of action for estimating department is the calculation of the unit rates for material.
Farrow (1979), recommend that when building up the unit rates, for material, that prices should include the basic price, less discounts retained by the contractor, allowance for waste, unloading, stacking, storing, disturbing around the site and the return of crates or packings where appropriate.

12.2.3 Cost of Plants

Plant element according to Owunonye (2000) comprises mechanical items employed on a building site in order to save money, labour or time, or a combination of all.
The cost associated with the items in the mechanical are accommodated in the bills of quantities as an item, or as a lumpsum or in the unit of work item in the section of work t be executed needing such plant.

The costs involved in the non-mechanized tools are taken care of in the preliminaries and are normally calculated on a percentage basis.

For any given project, the estimate department obtains information on plant to be required from the method statement and the programme while the period of requirement is found from the tender programme.

Basically, plants to be used categorized.
The CIOB of estimating practice category includes:
(1) Mechanical plant with operator
(2) Mechanical plant without operator; and
(3) Non-mechanical plant

A further factor which affects the costs of plant is the source of provision. According to the code of Estimating practice, a contracting firm has three alternatives to make a choice and these are.
(1) Purchase plant for the contract
(2) Hiring existing company owned plant; and
(3) Hiring plant for external sources

The purchase of plant by a contracting firm for any given project is a function of many variables including the nature of the contract, the size of the project, the type of the client, the location and complexity of the project.

Oftentimes, contracting firms resort to hiring plant from external sources. This action has relatively proved to be cheaper. However, reasonable carefulness is usually required to ensure that quotations obtained are for plants, which will meet the contractor’s requirements including the job specification(s). Articulating these requirements the code of estimating practice posit that clarification should be that:

(1) The plant complies with the specifications
(2) It is available to meet the needs of the construction programme
(3) Delivery and collection charges can be identified
(4) Where appropriate all operator costs are included and that operators will conform to the intended working hours of the site;
(5) Any attendance or supplies to be provided by the contractor are clearly identified
(6) Maintenance responsibilities, charges and liabilities are identified
(7) The quotation conforms to the terms and conditions of the enquiry and does not represent a counteroffer; and
(8) Requirements concerning fixed or fluctuating prices are met.

If the contracting firm chose hiring existing company owned plant for the proposed project, then action shifts to the calculation of the associated costs. In the building-up of costs of plant, contracting firm normally create two divisions. These divisions according to Langdon and Spon (1992); include

(1) Small plant and tools which are the subject of a direct charge to contracts and for estimating purposes, are normally allowed for as a percentage of the labour costs in site on cost.
(2) Power driven plant and major items of non-mechanical plant such as steel trestles, scaffolding and gantries. Such plant is normally charged to the contract on a rental basis, except in the case of plant specially made or purchased for a specific operation. The letter
plant is normally charged in full to contracts and allowance made for disposal on completion, often at scrap value.

Calculation of Unit Rate for Mechanical Plant
It is desire of the estimating department to build-up unit rate to be inserted in the bills using a tractor and scraper belonging to the contracting firm for excavation.

Assuming that the capacity of the tractor and scraper = 4m³
Capital cost = N15,000,000.00
Replacement = after 5 years
Replacement every year = 20%
Cost of capital = 25%
Repairs and maintenance = 20%
Total annual cost = 65% of 15,000,000 = N9,750,000.00
Considering usage = 160 days in a year
Cost per day = $ \frac{9,750,000}{160} = N160,937.50$

**Labour Operating**
Assistant to driver = N145.63 per hour rate
2 labourer (2 x 145.63) = N291.26 per hour rate
Driver = N198.94 per hour rate
Hence cost per day = 635.83 x 8 = N5,086.64

**Fuel cost**
Assume fuel, petrol etc. at say N3500/day

**Summary**
Plant = N60,957.50
Labour = N5,086.64
Fuel = N3,500.00
Considering that the plant turns 5 times per day hour
- Capacity per hour = 5 x 4 = 20\text{m}^3
Capacity per day = 20 x 8 = 160\text{m}^3
Therefore, 160\text{m}^3 cost N69,544.14

\[
1\text{m}^3 \text{ will cost } \frac{69544.14}{160} = \text{N}434.65
\]

Add for profit and overhead say 25% 

\[
25\% \text{ of } 434.65 = \text{N}108.66
\]
Cost per m3 = \textbf{N}543.31

Cost per unit rate = \textbf{N}543.31
13.1 Subcontractors

Subcontractors derive their definition from the mode of selection including the type of service they are required to render in a given project. The college of Estate Management (1985) generally defined subcontractor as individuals or firms who enter into a legal contract with the main contractor to complete an agreed part of the contract.

Furthermore, this definition is divided thus:

1. **Domestic**: and this is referred to as the main contractor’s own subcontractors
2. **Nominated**: which arises where the design team/client requires control in the selection of a specialist
3. **Labour only**: which exists where the main contractor employs people on a labour only cost, supplying the materials and plant
4. **Listed**: which goes to exhibit a compromise requiring a limited control of the selection including naming a number of firms (1-3) in the tender documents for a particular section of work. The eventual contract arrangement is that they become domestic subcontractors.
5. **Designated or named**: is similar to listed subcontractor and only vary the fact that only one name is given in the tender documents.

In order to arrive at the likely cost of items consider to be undertaken by the domestic subcontractor, the estimating department abstract from the bills items applicable to each trade including the trade preamble. Thereafter, inquires are sent with a view to obtaining subcontractors’ bills of quantities from selected number of tenderers. The sent out inquiries usually contain conditions of the main contract and the date by which the tenders are to be submitted to enable the main contractor determine the rates to be inserted in the tendering bills. The main contractor adjust rates obtained from the subcontractors by adding to the most competitive subcontractors rates, a percentage to accommodate profit and attendance before inserting in the tendering bills of quantities.

Nominated subcontractors undertake works included in the bills as provisional or prime cost sums.

According to Atton (1971), the main contractor is allowed to add an amount of money or percentage to cover any profits he may require on such work. He is also required to provide
general attendance on nominated subcontractors and to allow the use of general facilities such as standing scaffolding, mess-room and sanitary accommodation, welfare facilities, storage for plant and material, provision of water and electricity and clearing away of rubbish. It is usual for such attendance to be described in the bills and the main contractor is allowed to add an amount of money or percentage to cover the cost involved.

13.2 Nominated Suppliers
Nominated suppliers are involved when goods and materials expected to be used in a given project are covered by the inclusion of a provisional or prime cost sums in the bills. Under the arrangement, the main contractor is allowed to add an amount of money or a percentage to cover any profit he may require on such items.

Atton (1971), posits that the cost of fixing goods and materials which are obtained from a nominated supplier is measured and the unit items are priced in accordance with the trade involved. The cost of unloading, storing, hoisting the goods/materials and returning packing cases etc, to the nominated supplier, carriage paid and obtaining credits therefore, is included with the item of fixing.

13.3 Provisional and Prime Cost (PC) Sums
In a typical bill of quantities where the contract is with quantities and specification where contract is without quantities, some parts of the work remain unmeasured and/or specified in details. Lumpsums are usually appropriate included to take care of this shortfall.

A prime cost sum according to JCT Practice note 23 (1987); is a sum provided for work or services to be executed by nominated subcontractor, a statutory authority or a public undertaking or for materials or goods to be obtained from a nominated supplier.

Furthermore, a provisional sum is a sum provided for either defined or undertaken work. It is defined when work is not completely designed at the time of tender documents are issued but for which certain specified information can be given. On the other hand, undefined related to work for which such information cannot be given.

In either case of prime cost and provisional sums, Seely (1993) posits that elementary precaution should be taken of, checking to ensure that the sums of money included in the text are extended into the pricing column. Following each prime cost item there will provisional
for addition of profit and attendance. Profit is normally calculated on a percentage basis while attendance will be assessed on the cost of the services to be provided and entered as a lumpsum.

### 13.4 Profit and Overheads

Milne (1980), has defined profit as the difference between the contract sum and that required to pay for overheads site costs, labour, plant and materials to complete the contract.

The amount or percentage allowable as profit is a function of many variables.

Onwusonye (2000); posit these variables as the form of contract, the size and nature of the contracting firm, the organization of the contracting firm, the client and even the disposition of the project consultants.

In addition, the risks associated with the project also affect the nature of the profit allowable. These risk according to Milne (1980); include

(a) Contractual risks. These are risks stemming from the contract documents and the necessary arrangements for work to be done by subcontractors and/or deliveries from suppliers of materials or components. Also included would be the firm price tender risk.

(b) Technical risks. These risks revolve around the form of construction (whether traditional or non-traditional) and the ease of otherwise of executing the work, previous experience of erecting buildings of similar construction and the problems of programming and plant utilization.

Basically, the greater the risk involved the higher the profit requirement and vise versa.

In practice however, the following allowances provided by most contracting firms to accommodate the much cherished profit.

1. Builders work (10 – 15%)
2. Subcontractors and suppliers (contractor’s own) 5 – 10%
3. Nominated subcontractors (2 ½ - 7 ½ %)
4. Nominated suppliers (5 – 10%)
Overhead have been variously defined. According to Owunsonye (2000); overheads in the construction industry and to a contractor is the additional cost of labour, plant and materials required for the execution of the contract. It includes cost associated with the followings.

(a) Salaries of principal heads of section and supervisors
(b) Office salaries (administrative staff)
(c) Rents and rates
(d) Office expenses (printing, stationery, telephone etc)
(e) Insurance policies
(f) Advertising
(g) Maintenance and depreciation of office equipment

Contributing, Harrison (1981); defined overheads as those costs incurred in the operation of a business which are not directly related to individual items of production. There are two main groups of overheads:

1. Site overheads which include such costs as site supervisory staff, site building, temporary roads and services; and
2. head office overheads which cover the costs incurred in operating the business in its entirety and cannot be related directly to an individual contract, and include head office staff and buildings.

The techniques and methods applicable in the calculation of overheads revolve on the policy of the contracting firm and the type of overhead involved.

According to Seely (1993); with site overheads each contract will have will have a calculated allowance in the tender, but head office overheads as a percentage of budget turnovers and to apply this to all contracts.

Similarly, Farrow (1976); described how most contractors use systems which record past and present overheads, the projection of overheads for the future, and rate at which overheads are being recovered. An important part of a contractor’s general overheads is the cost of financing construction works in advance of payment, which needs to be calculated and included in the tender.
The appropriate addition for head office overheads according to Langdon and Spon (1992); varies with the extent of centrally provided services and the size of organization, but could be in the range of 4 to 8% of turnover.
WEEK 14: E-TENDRING (14.0)

14.1 Key Points
E-Tendering can provide for:

- Faster better exchange of information;
- Increased security and integrity of tendering;
- Automation of the evaluation process;

MOD encourages the use of e-Tendering for some competitions, but the ability to do so is not yet widespread throughout the Department or Industry;
MOD aspires to introduce a corporate capability to undertake e-Tendering, which ideally will be a Government-wide system or.

14.2 What is E-Tendering?
The exchange of information by digital files and electronic communications has been normal practice within the Defence Sector for some time, indeed tender documentation has often been supported by the use of floppy disks, CD-ROMs or even, in some cases, e-Mails.
However e-Tendering is more fundamental. It is the conduct of the complete tendering exercise from the advertising of the requirement through to the placing of the contract, including the exchange of all relevant documentation all by electronic communication. Ultimately, contract management and the monitoring of contract performance will be conducted by electronic communications – which we’ll now call “electronically”.

14.3 The Benefits of E-Tendering
In addition to supporting the Governments’ revised targets for conducting business by electronic communications, there are business benefits for both the MOD and Industry in doing so. The range of benefits continue to expand as business processes are changed to maximise the opportunities that electronic tendering can deliver and detailed below are the most notable:

- Making the Government easier for Industry to do business with;
- Opportunities to stimulate increased interest in the market, by reducing the burden that Tendering to Government can be;
- Efficient and effective electronic interfaces between Industry and the MOD leading to reduced costs and timesaving on both sides;
• Quick and accurate pre-qualification and evaluation which enables the automatic rejection of Industry partners that fail to meet stipulated fixed criteria;
• Opportunity for the transmission of quality information to and from Industry to enable a clearer understanding of the requirements and proposals;
• Opportunity to respond quickly to any questions and points of clarification during the tender period
• Reductions in the traditionally labour intensive tasks of receipt, recording and distribution of tender submissions.
• Reducing the paper trail on tendering exercises, reducing costs to the MOD and Industry alike and supporting ‘green’ issues;
• Providing a clearer audit trail demonstrating integrity;
• Provision of quality management information;
• Improved opportunity for like for like comparisons of qualitative and quantitative information resulting in a faster more accurate evaluation of tenders;

However, in doing so it is vital that current principles commonly applied in procurement in the Defence Sector are maintained, namely those of confidentiality, fairness and equity. However care must also be taken to ensure that we do not unintentionally inhibit competition by moving ahead of the ability of our supplier base to operate using e-Tendering

14.4 What Tendering Tasks Can be Done Electronically

With the improved capability across some areas of the MOD and Industry, it is now possible to enable the electronic conduct of competitive and single tender responses, as well as acceptances and declines. However, this is subject to the following conditions being satisfied:

• Electronic signatures for documents originating from Industry are created and managed by a Public Key Infrastructure (PKI), backed by a commercial provider that has been approved by the MOD PKI Policy Management Authority;
• Electronic signatures for documents originating from the MOD and created and managed by a Public Key Infrastructure managed or authorised by the MOD PKI Policy Management Authority;
• The security and operating procedures of MOD and Industry internal information systems (IS) are maintained;
The current principles, and not the entire practice, of the MOD Tender Board are fully replicated, by the use of a “virtual” tender box which restricts access to tenders until after the due date and time for receipt;

- The integrity of stored tender documentation is maintained through the use of an appropriate technical infrastructure.

If these conditions are fully met, the requirement for a paper “master copy” is no longer necessary as there is no legal requirement for paper documentation, provided that electronic information is sufficiently robust to enable it to be produced as evidence. However, discretion should be exercised and factors such as the tender value, familiarity of those involved and experience of e-Tendering should be given due consideration. The requirement for a paper master copy of contracts is likely to remain until confidence in an electronic repository for contracts has been developed.

**14.5 The Future for Electronic Tendering**

It is the MOD’s aspiration to introduce an e-Tendering solution that will encompass the end-to-end tendering process, including Pre-Qualification Questionnaire, the invitation to tender, managing the tender process through to Contract award, contract management and performance monitoring. MOD is currently developing a User Requirement Document and business case to introduce a facility which, it is hoped, might be provided via a pan-Departamental solution being developed by the OGC.

**14.6 Key Principles to Consider When Conducting e-Tendering**

Until corporate solutions become available, the key principles which should be considered when conducting e-Tendering are as follows:

- Security
- Confidentiality
- Integrity
- Authentication
- Flexible Process
- Future Proofing
- Audit trail
- Affordability
• Equity/ Transparency
• Compatibility/ Interoperability

• Liability
• Firewalls

• Trust
• Scalability

• Business Benefits
• Reliability/ Availability

• Portability of Data

Whilst it is intended to deploy corporate e-Tendering solutions in the future, e-Tendering may already be undertaken where the local capability exists to do so as described above. However, it remains as important as ever to ensure that all the necessary procedures are followed and a robust audit trail created.
WEEK 15: PRACTICE QUESTIONS FOR TUTORIAL CLASS (15.0)

15.1 Questions

(1) Building A is a proposed 100 bed private hospital while building B is a similar 75 bed hospital which was completed in 2005, the tender of building B less external works and contingency and adapted to current day price level is N128,325,982

Design information

<table>
<thead>
<tr>
<th>Design features</th>
<th>Building A</th>
<th>Building B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement floor</td>
<td>350m²</td>
<td>304m²</td>
</tr>
<tr>
<td>Ground floor</td>
<td>800m²</td>
<td>790m²</td>
</tr>
<tr>
<td>1st, 2nd floor</td>
<td>2445m²</td>
<td>-</td>
</tr>
<tr>
<td>1st – 4th floor</td>
<td>-</td>
<td>3,180m²</td>
</tr>
<tr>
<td>Floors</td>
<td>3,595m²</td>
<td>4,274m²</td>
</tr>
<tr>
<td>Roof area</td>
<td>910m²</td>
<td>888m²</td>
</tr>
</tbody>
</table>

Storey height

<table>
<thead>
<tr>
<th>Storey height</th>
<th>Building A</th>
<th>Building B</th>
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</thead>
<tbody>
<tr>
<td>Below ground level</td>
<td>2.7m</td>
<td>2.7m</td>
</tr>
<tr>
<td>At ground level</td>
<td>3.40m</td>
<td>3.50m</td>
</tr>
<tr>
<td>1st – 3rd floor</td>
<td>3.00m</td>
<td>3.40m</td>
</tr>
<tr>
<td>Volume</td>
<td>12,966m³</td>
<td>17,819m³</td>
</tr>
</tbody>
</table>

External wall area

<table>
<thead>
<tr>
<th>External wall area</th>
<th>Building A</th>
<th>Building B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>278</td>
<td>304</td>
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<tr>
<td>Ground floor</td>
<td>800</td>
<td>1027</td>
</tr>
<tr>
<td>1st – 3rd floor</td>
<td>2160</td>
<td>-</td>
</tr>
<tr>
<td>1st – 4th floor</td>
<td>-</td>
<td>3.40m</td>
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<tr>
<td></td>
<td>3238</td>
<td>5147</td>
</tr>
</tbody>
</table>

Calculate the cost of building B using:

(a) Unit method
(b) Cubic method
(c) Superficial method
(2) The choice and/or application of any type of contractual arrangement is a function of certain factors. Comment

(3) The Vice-chancellor of Samuelson University, Oweri, proposes to undertake repairs and maintenance of the University library. As a commissioned consultant Quantity Surveyor to the project, advise him on the best type of contract suitable and explain your decision.

(4) Profit is the main motivator to a tender. Discuss. What are the factors that affect the net profit of a contractor.

(5) General overheads to a profit is allowed. As a quantity surveyor, proffer explanation(s) to your client. Illustrate how to apportion overheads for a project construction company whose total labour cost is N9m, turnover is N350m and overheads is N3m

(6) (a) Certain items are important in “all-in” labour rate calculation. Comment
   (b) Calculate the all –in-hourly rate craftsmen considering
      Basic monthly = N3000.00
      5% for gang leadership and pension
      Insurance 3%
      Tools and transport 8%
      Housing and leave 50%

(7) Profit and overhead appear to be more important to the contractor that any other items of the unit rate. Explain stating the factors that affect their allowances.

(8) Why allow certain percentages for profit and attendance for the builder (main contractor) for work undertaken in electrical installations?

(9) What are the implication of prime cost sums on the efficient delivery of construction projects.