SBQ 2423

# Introduction to Cost Studies

**FARA DIVA MUSTAPA**

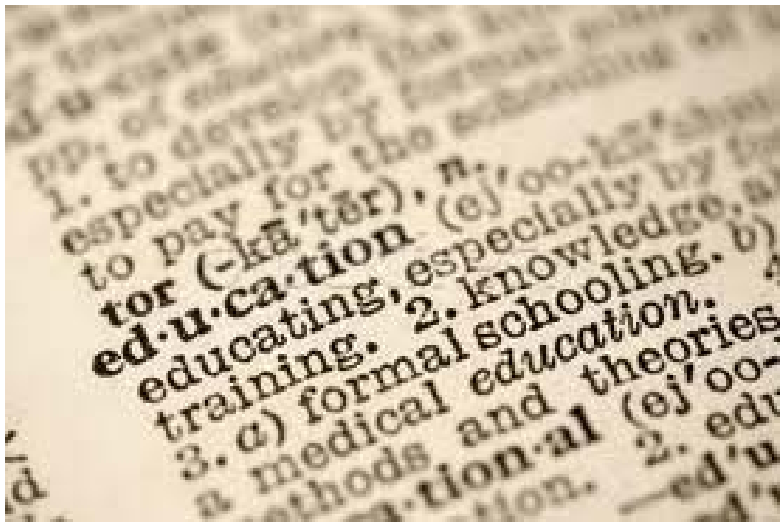
DEPARTMENT OF QUANTITY SURVEYING, FACULTY OF BUILT ENVIRONMENT

# Definition of Cost Estimation

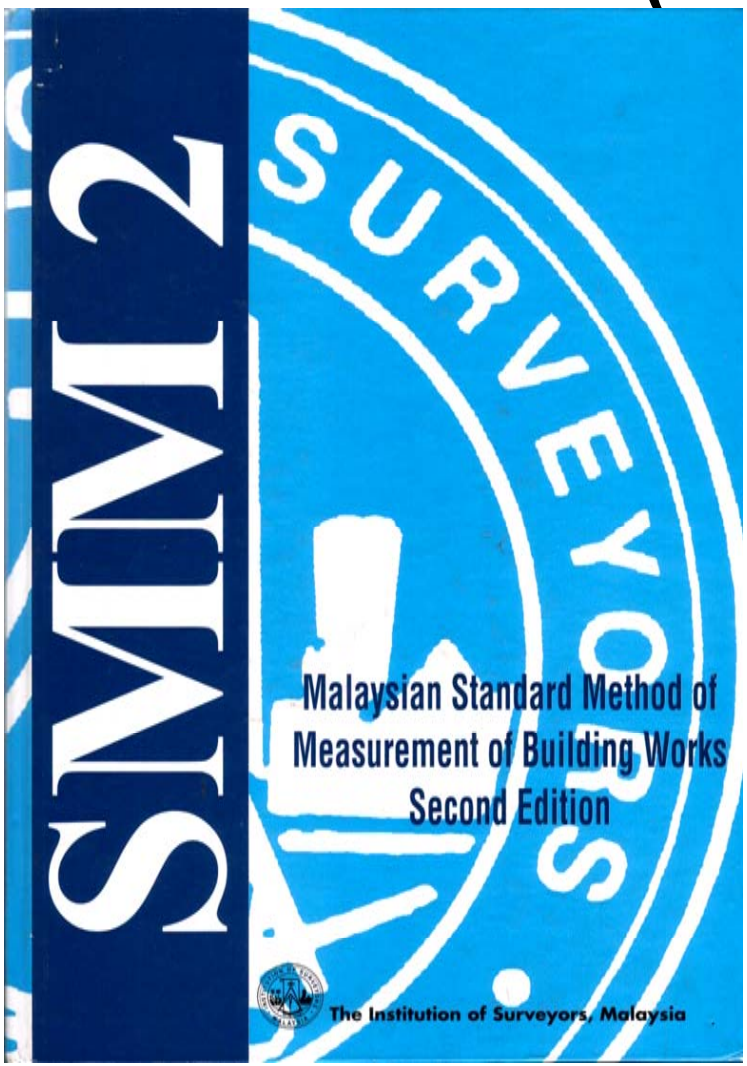
- Estimation requires knowledge of construction, common sense and judgment. Therefore it is not an exact science (Peurifoy,R.L and Oberlander, G.D, 2002).
- Cost estimating is a technical process in order to predict construction cost for a proposed building. It can be done for either the whole building, building components or construction item for each measured work (Abdullah, 2006).

# Definition of Cost Estimation (cont'd)

- A technical process to predcit the consturction costs (Enterkin & Reynolds 1978)
- A technical process to calculate the costs for construction through the preparation of build-up rate of each construction item in a tender (Ashworth 1996)



# Introduction to Standard Method of Measurement 2 (SMM2)



# Introduction to SMM2 (Cont'd)

- The usage of standard method of measurement in lieu with the preparation of construction cost is to ensure that similar platform is used utilising the same standard construction measuring approved by professional bodies.
- In Malaysia, the Royal Institution of Chartered Surveyors is responsible in preparing the standard method for both building and civil engineering work measurement.

# Introduction to SMM2 (Cont'd)

- The Malaysian Standard Method of Measurement of Building Works (Second Edition) is an important document for Quantity Surveyors in Malaysia.

- It is a document prepared and published by the Institution of Surveyors Malaysia in May 2000.

# Introduction to SMM2 (Cont'd)

- It is **a document** that contain definition of principles that is aimed at providing uniform method of measurement, quantification and billing of building works for use by quantity surveyors.

- It is not an inflexible document as such quantity surveyors are expected to use their discretion and provide more information where necessary.

# What does SMM do?

1. How to itemise the various building work items
2. How to describe the various building items
3. How to measure the various work items
4. What is the unit of measurement or billing for the various work items
5. and to a certain extent, define how a bills of quantities should be prepared and formatted

# Content of SMM2

- **Section A General Rules**
- Section B Preliminaries
- Section C Demolition
- **Section D Excavation and Earthwork**
- Section E Piling and Diaphragm Walling
- Section F Concrete work
- Section G Brickwork and Block work
- Section H Underpinning
- Section J Masonry
- Section K Waterproofing and Asphalt Work
- Section L Roofing

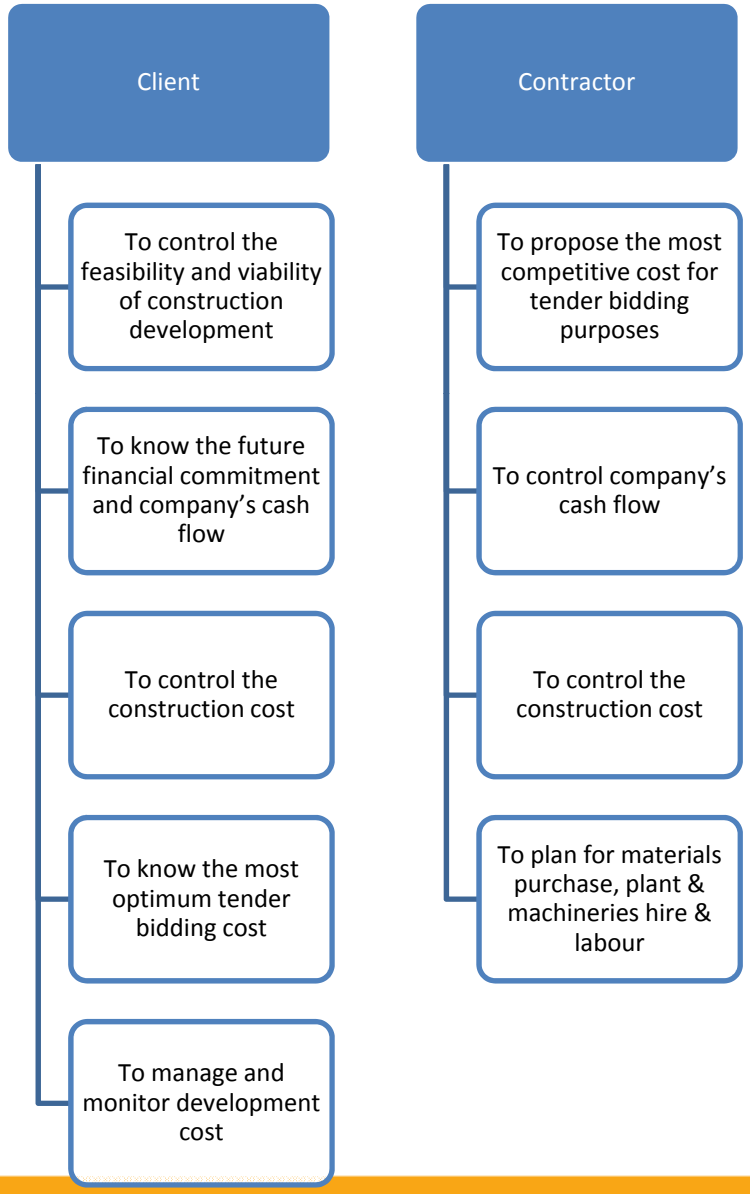
# Content of SMM2 (cont'd)

- **Section M Woodwork**
- **Section N Structural steelwork**
- **Section P Metalwork**
- **Section Q Plumbing and Mechanical Engineering Work**
- **Section R Electrical Installation**
- **Section S Floor, Wall and Ceiling Finishes**
- **Section T Glazing**
- **Section U Painting and Decorating**
- **Section V Drainage**
- **Section W Fencing, Turfing and Planting**

# The Importance of Cost Study

- There are several types of estimates – eg. Consultant’s estimates, developer’s estimates, contractor's, sub-contractors etc.
- These estimation are different in terms of name, function and usage
- For example, an estimation between a client and a contractor are different in terms of;

# The Importance of Cost Study (cont'd)



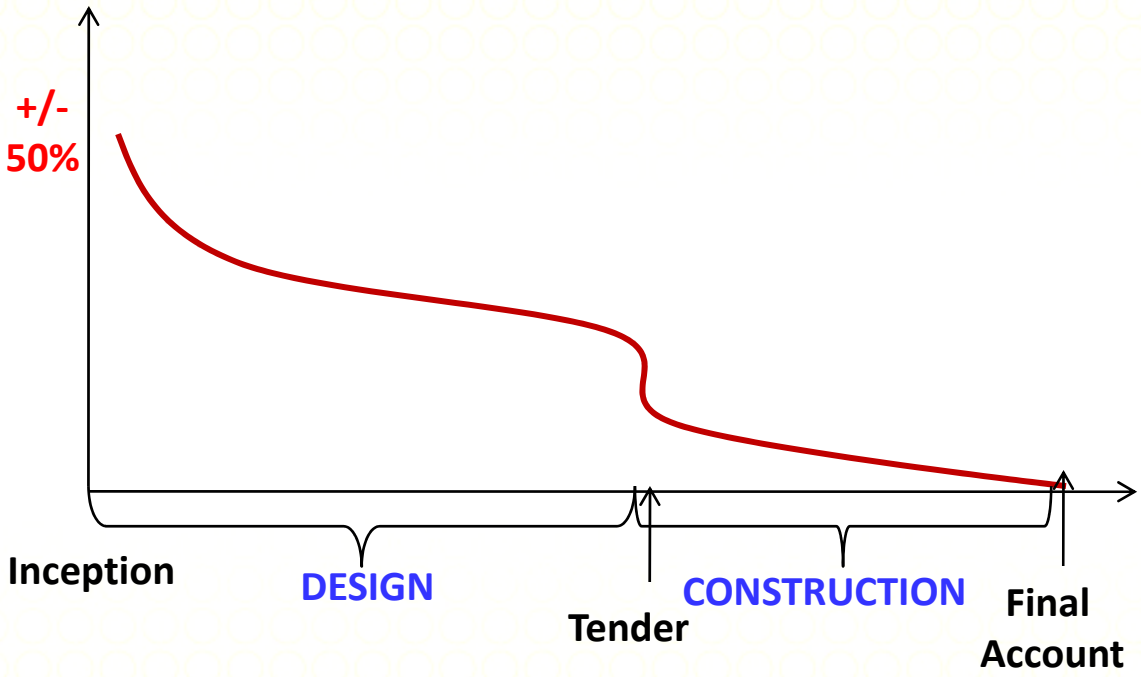
# The importance of cost studies


*Researches indicate that future running costs can constitute more than 2/3 of total cost of an asset.*

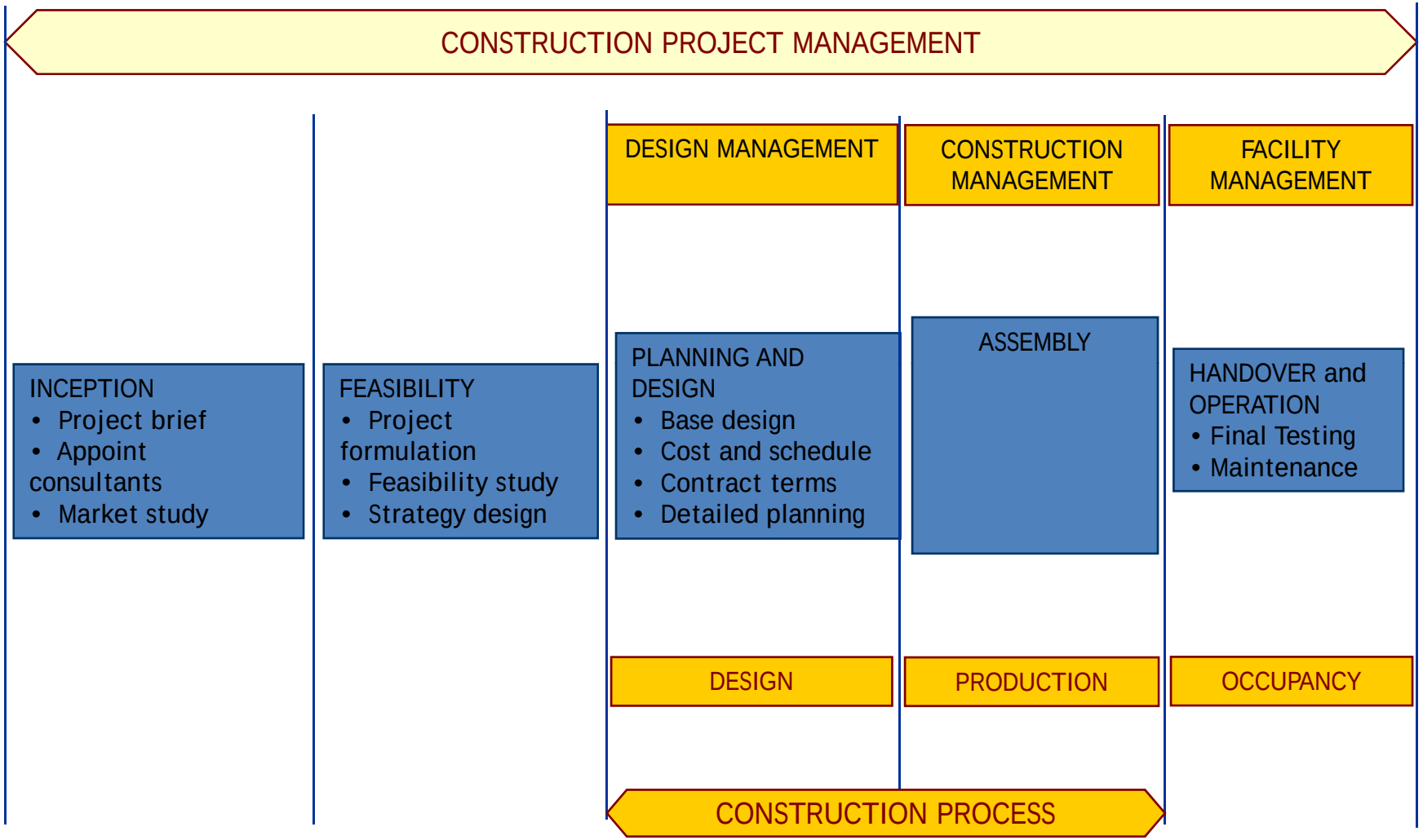
Preparing a detail and accurate construction cost will help to execute and complete the construction project successfully.

# Use of Cost Estimating in Construction Development Process

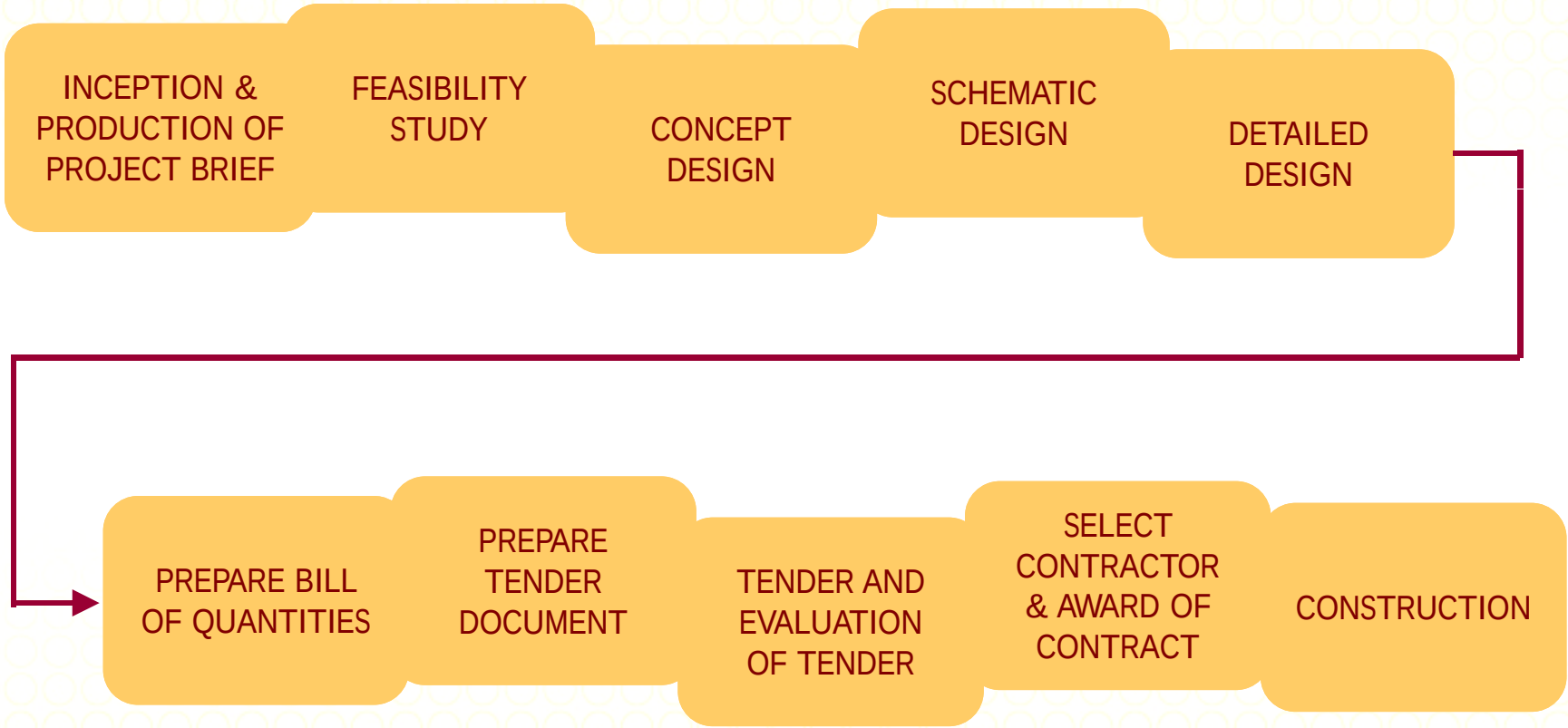
**Estimating Accuracy on a Construction Project**



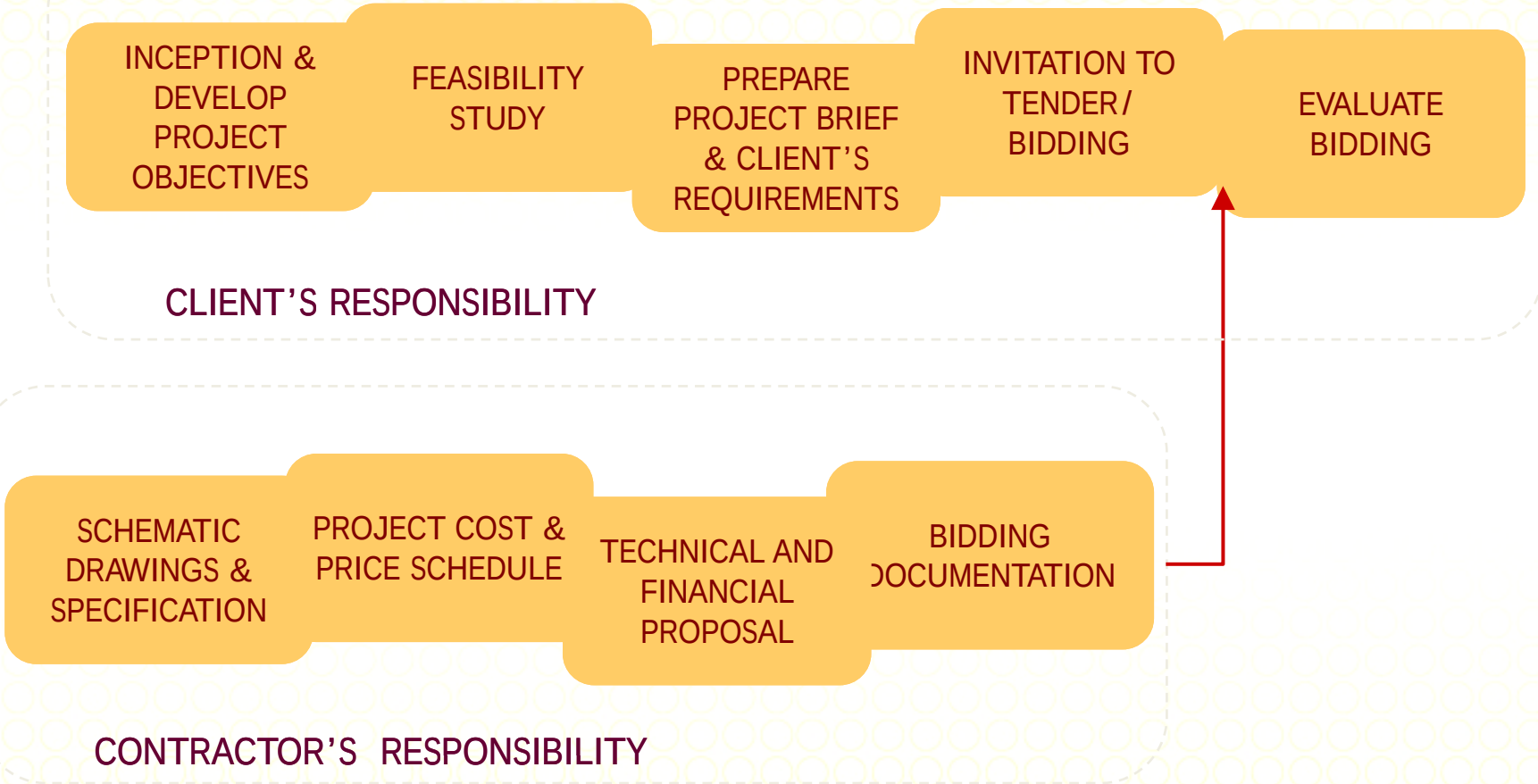

| | TECHNIQUES |
|---|---|
| PRE 60s | Bill of Quantities<br>Approximate Estimate |
| 60s | Cost Planning<br>Cost Analysis<br>Elemental Bills |
| 70s | Cost Modelling<br>Cost-In-Use<br>Formulae (Price Adjustments) |
| 80s | Life-Cycle Costing<br>Cost Data<br>Value Engineering<br>Cost Engineering<br>Accuracy in Forecasting |
| 90s | Expert Systems |
| | Quality Systems |
| | |


CONSTRUCTION PROJECT MANAGEMENT
DESIGN MANAGEMENT
CONSTRUCTION MANAGEMENT
FACILITY MANAGEMENT
INCEPTION
• Project brief
• Appoint consultants
• Market study
FEASIBILITY
• Project formulation
• Feasibility study
• Strategy design
PLANNING AND DESIGN
• Base design
• Cost and schedule
• Contract terms
• Detailed planning
ASSEMBLY
HANDOVER and OPERATION
• Final Testing
• Maintenance
DESIGN
PRODUCTION
OCCUPANCY
CONSTRUCTION PROCESS

# Traditional Approach



# Design and Build Approach



# Factors that might influence cost accuracy

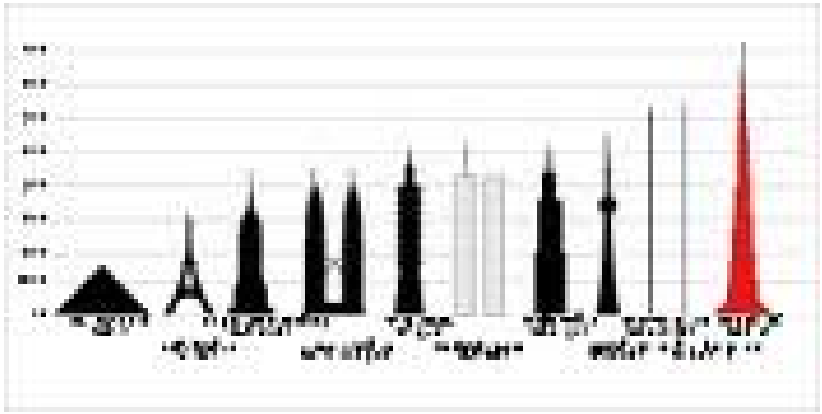
- Economy – changes in construction materials' & labour costs, changes in supply and demand of construction output; changes in government policies/banking institutions


# Factors that might influence cost accuracy (cont'd)

- Project- Project type (government, private), size, project duration, contract size, site

# Factors that might influence cost accuracy (cont'd)

- Project design – size, heights, structure, specification, build ability (complexity of constr)

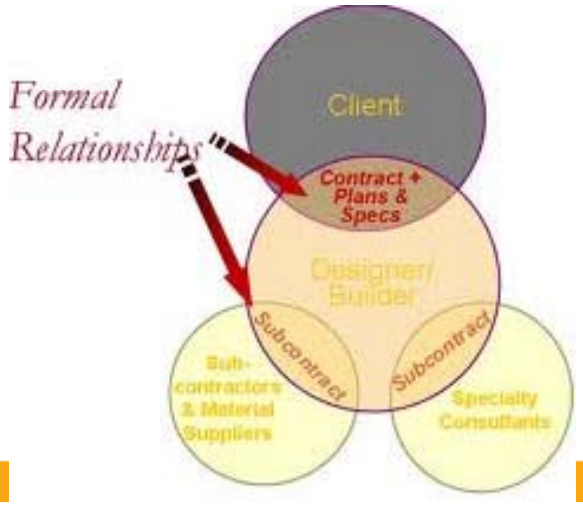


# Factors that might influence cost accuracy (cont'd)

- Management – procurement/contractual arrangement; site manageme resource management

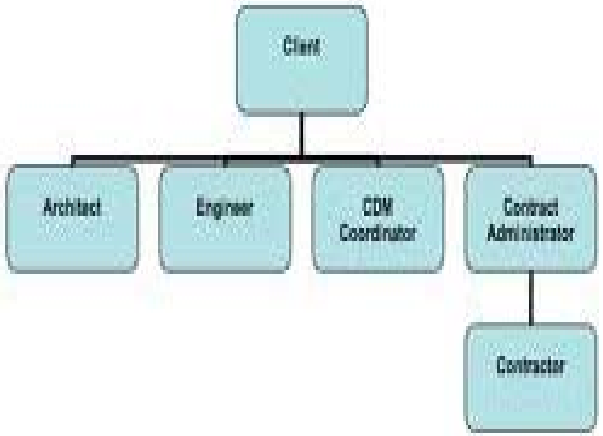

**Fig. 2: Four key factors determine who takes most of the risk**

| | Lump sum | Unit price | Time & material | Reimbursable |
|---|---|---|---|---|
| Quantities & quantity measurement | Contractor | Company | Company | Company |
| Workmanship & quality | | Contractor | | |
| Schedule & Productivity | | | | |
| Cost of labor & equipment | | | Contractor | |



# Factors that might influence cost accuracy (cont'd)

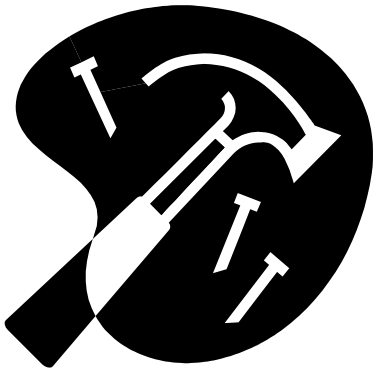
- Management – procurement/contractual arrangement; site management; human resource management

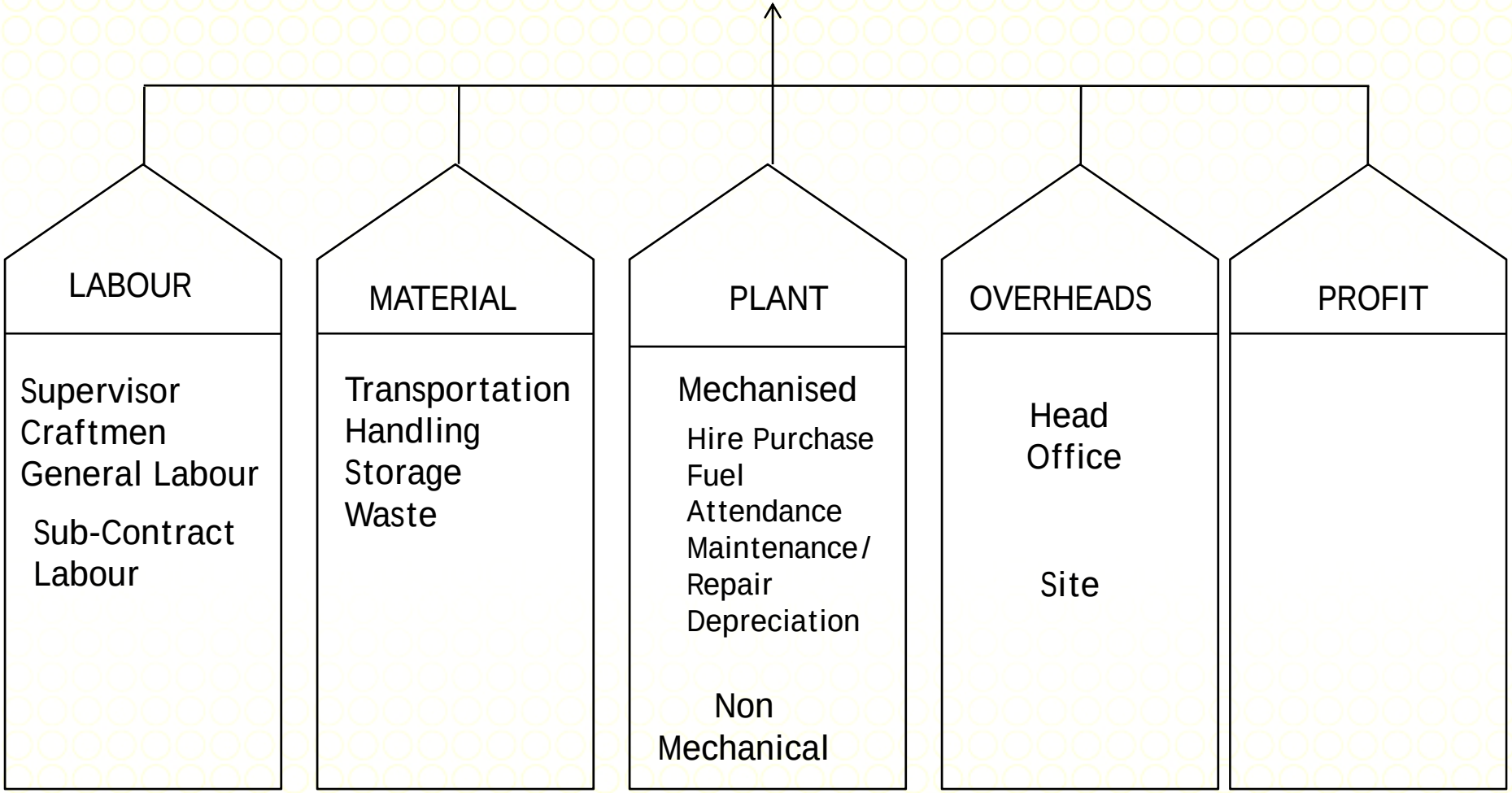
# Activity 1 – Break it down

- What constitutes a construction cost?
- Elaborate and gives actual example

- Duration: 5 minutes



# Components of Unit Rate



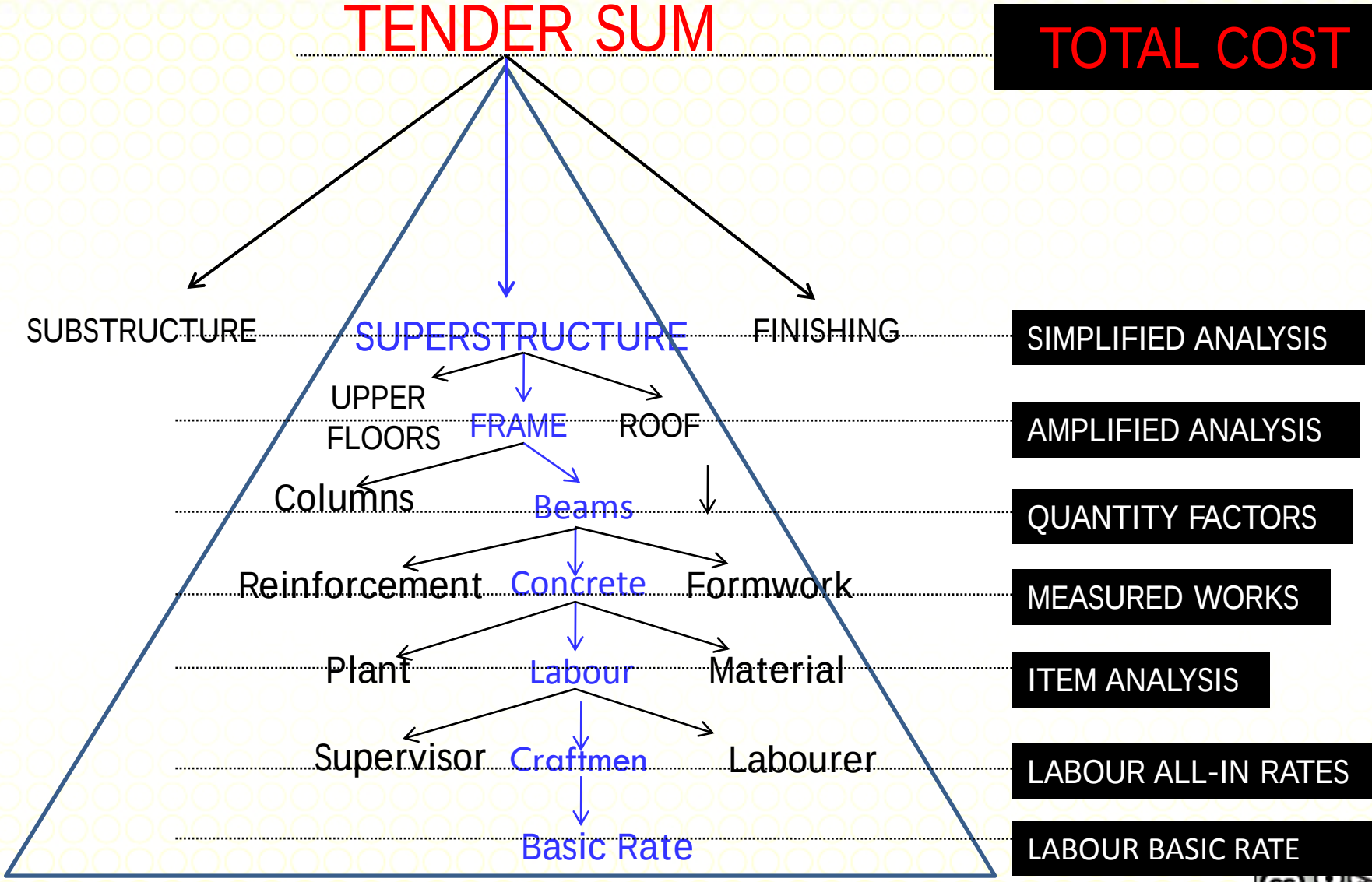
# Components of Unit Rate (cont'd)

- The costs of overhead and profits varies from each of construction firms. This is due to different strategy adopted by them.

# Relationship of Construction Cost Estimation with Tender Price

- The next figure will explain the relationship between the construction cost estimation and Tender Price.
- Tender price is the cost accumulation from each of the construction work items listed in the Bills of Quantities (BQ).

# COST : HIERARCHICAL STRUCTURE



# HOW DO WE MEASURE COST?

| | COST METRICS | |
|---|---|---|
| COST | UNIT OF FINANCE | UNIT OF MEASUREMENT |
| | | AREA |
| | | |
| | | VOLUME |
| | | LINEAR |
| | RM | No. |
| | UNIT RATE | |

| | Description | Unit | Rate | Amount |
|---|---|---|---|---|
| 1 | 1264 Gallons Pressed Steel Tank Hot Dipped Galvanised c/w Water level indicator, plinth, cat ladder, cover, overflow pipe, drain pipe and valve | No.1 | 750 | |
| 2 | Galvanised BRC no 28 and approved welded fabric and fixing | MS | 4.50 | |
| 3 | Reinforced Concrete (1:2:4) in extended pile cast on site | Cu.M | 18.50 | |

# Concluding remarks

- Cost studies is one of the core knowledge should be attained by a quantity surveyor.
- It helps the quantity surveyor to estimate the costs for a future projects based on several information.
- Cost studies is also useful and crucial among the construction firms/contractors to prepare the most competitive unit rate and eventually total construction costs for tender bidding purposes.

# Reference and further readings.


- Ahamad Abdullah – Anggaran Kos Kerja Bangunan,2nd Edition, Pearson Prentice Hall, 2011.
- Edition,Peurifoy,R.L and Oberlander, G.D. – Estimating Construction Costs, 5th Edition Mc-Graw-Hill, 2002.
- Popescu, C.M, Phaobunjong, K, Ovararin, N – Estimating Building Costs, Marcel DekkerInc 2003.
- Rosli Abdul Rashid – Introduction to Building Measurement, Lecture Note, 2006.