SBQ 2423

Estimating the Costs of Construction Materials

FARA DIVA MUSTAPA

DEPARTMENT OF QUANTITY SURVEYING, FACULTY OF BUILT ENVIRONMENT

- Estimating the Cost of Materials

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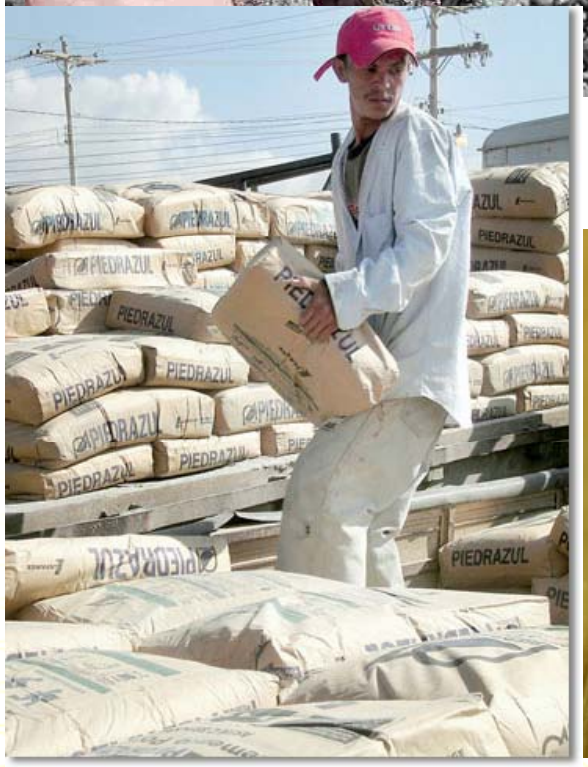
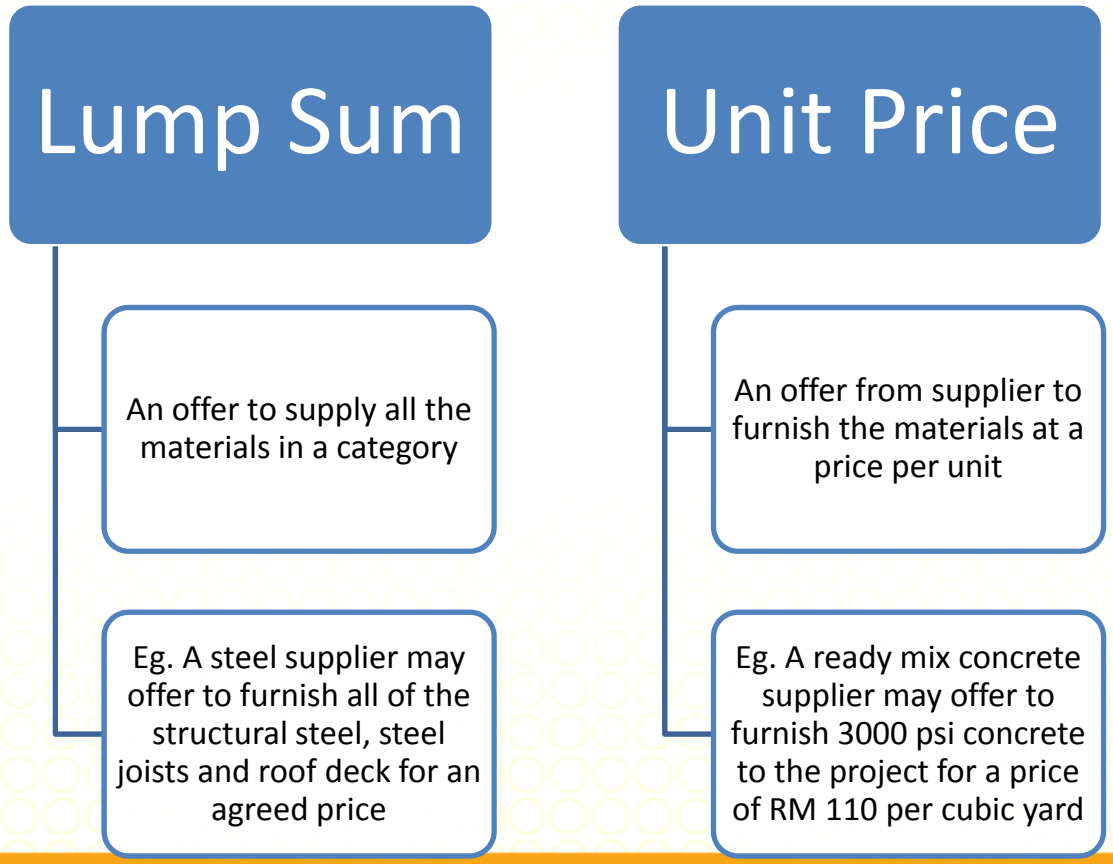


Material Pricing

- The price of the materials is generated in two ways:



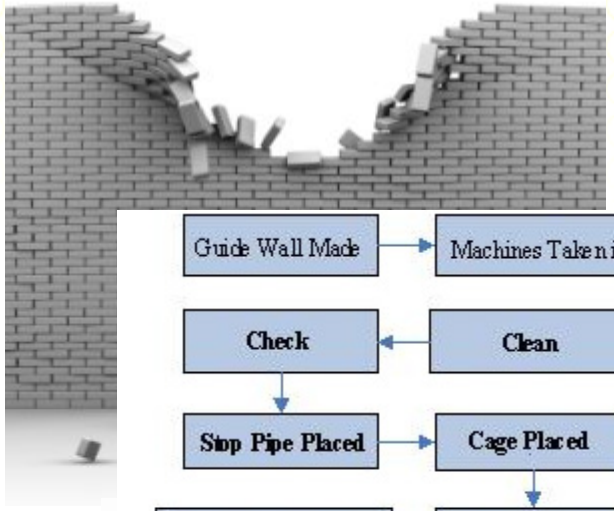
Quantity Take Off

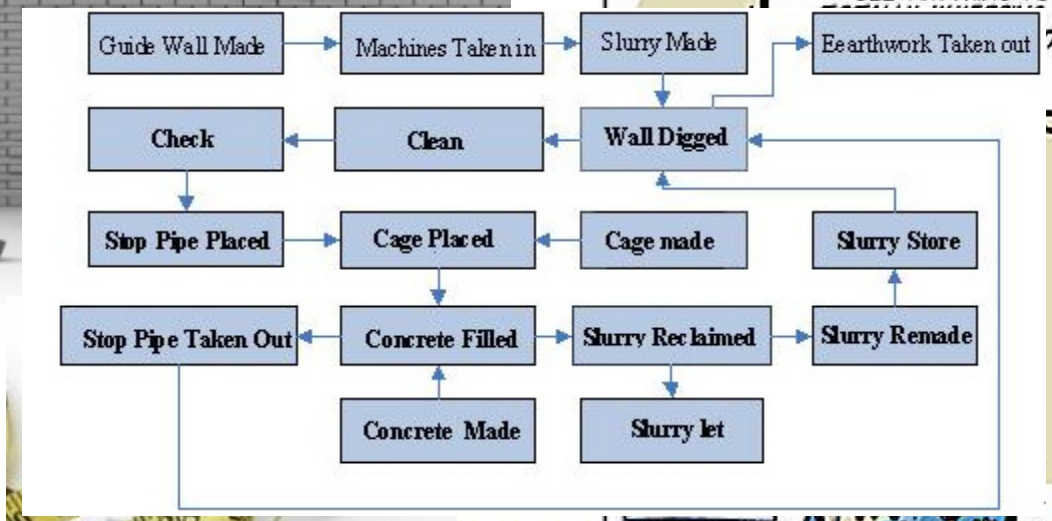
- It is a tedious process in determining the required construction quantities
- Can be broken down into:
  - Determination of the quantities of work
  - Computation of the prices associated with those quantities

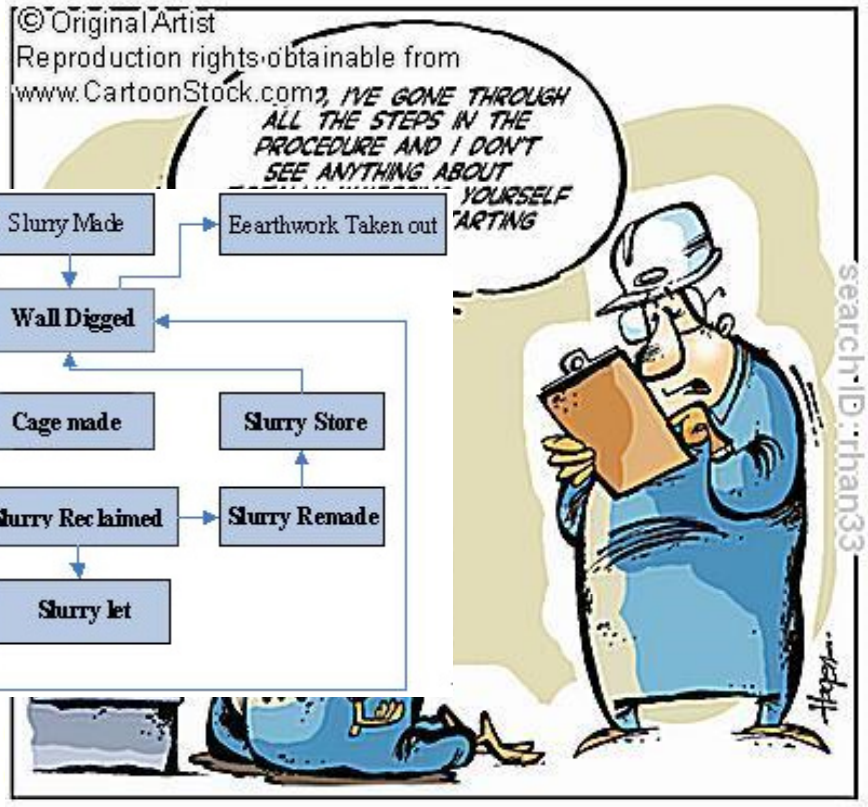
Quantity Take Off Procedures

- Identification of work item – eg. Brick wall section or concrete footing
- Calculation of quantity – linear, area, volume and unit
- Upon measuring the material take-off, estimator should understand the actual field procedure. Eg. Concrete take-off should starts from volume for footings, grade beams, slabs & slabs for ground floor etc.

Quantity Take Off Procedures (cont'd)







Quantity Take Off Procedures (cont'd)

- Usually quantity take-off is facilitated by the use of forms. The purpose of the forms is to standardize the worksheets by providing properly assigned areas where specific information is to be written to allow follow-up so that checking can be easily performed.

Example of quantity take-off form

Code	Description	Quantity	Dimension			Unit	Total
			L	W	H		
	Concrete for Pad Footing	2	7.7	0.9	0.3	M3	4.158
	Lean Concrete	2	7.7	0.9	0.05	M3	0.693

Material waste factors

- Waste factor is used to increase material quantity to ensure that enough material is procured to realistically complete the work and allow bulk discount purchase.
- Nature of Waste Factors
  - Refers to spoilage of materials that result as parts of the construction process. It usually derived from 2 main factors:
    - Industrial standards
    - Materials handling and installation

Activity

- Discuss the type of wastage usually derived from construction materials.

- Duration: 5 minutes

Material waste factors (cont'd)

- Waste due to industrial standards
  - Some of the construction materials come in standard sizes such as:
    - Plywood – 1200mm X 2400mm X 16mm
    - Standard brick – 90mm X 57 mm X 190mm

    Materials delivered in standard sizes need to be cut and fabricated to fit specific parts of construction project. However, the quantity of wastage derived from industrial standard is relatively easy compared to that derived from handling and installations.

Material waste factors (cont'd)

- Waste due to Handling and Installation
  - Quantifying waste due to material handling and installation is more difficult and more subjective.
  - It is usually influenced by the following factors;
    - Pace of work – a rush job = more waste
    - Site organisation factors – degree of congestion, orderliness and general site management
    - Availability and suitability of equipment and tools to handle and install materials
    - Workers' skills and attitudes -
    - Types of packing of materials, and
    - Storage facilities – protection from theft

Construction Materials Waste

keen on green
DISPOSAL & RECYCLING

Material waste factors (cont'd)

- Waste due to Handling and Installation (cont'd)
  - Wastage from material handling and installation will vary from project to project.
  - Good recordkeeping on previous work performance and by systematically comparing the current situation with similar performance in the past, a probable outcome can be predicted.

Material waste factors (cont'd)

- Waste due for Building Construction
  - Usually listed by percentage of the actual quantity of material left in place. Eg. Quantity of concrete required is 100m3 and the waste factor is 5%. So the total amount should be additional 105m3.

Material waste factors (cont'd)

- Maintenance Stock
- Additional amount of materials retained by the contractor and passed to the owner's maintenance personal and usually specified in the contract.
- Usually finishing items. Eg. Sealing tiles, carpets, stone tiles, ceramic tiles atc.
- In general, the architect will specify that 2% - 3 % maintenance stock of specific materials.

Type of waste

Direct Waste

- Refers to physical loss of purchased materials due several reasons

Indirect Waste

- Refers to failure to claim under full reimbursement under contract term but does not include physical loss

Type of waste (cont'd)

Direct Waste

- Materials damaged prior to delivery
- Materials damaged or lost in unloading, hadnling, storing
- Theft
- Vandalism
- Damages caused by other trade
- Non-standard sizes

Indirect Waste

- Materials wrongly specified resulting in the purchase of better quality of materials than required
- Over-ordering materials due to careless
- Surplus of materials left over at the end of particualr operations whilst such surplus may be salvaged for future use

Pricing Materials

- A process of assigning a RM value to a work item based on a given Specification and Pre-determined Quantity required.

- $ ⟶ 

- Eg. Unplasticised rigid polyvinyl chloride pipework to B.S. 3505 and fittings including jointing in accordance with the manufacturer's instruction

Pricing Materials

- Once the quantification of materials completed, the next step is determining the cost of materials
- The pricing of each work item should include the cost of each of these subcomponents:
  - Permanent and temporary materials to be procured
  - Labour required for installing the materials
  - Equipment required for moving and installing materials
  - Other consumables, eg. Fuel and tools

Material costs

- Generally,

  the > the amount of purchase = the < the unit price,

Known as quantity discount.

Freight cost must be considered and added to the direct cost of the materials. This can be a big portion should the site location is very far from nearest supplier.

Material costs

- Other considerations for material procurement:
  - Quantity discount
  - Interest rate
  - Escalation
  - Holding cost
  - Credit facility
  - Allowance for method of measurement of measurement of the bill item

Material Pricing Sources

- The pricing of materials is generally much easier than the pricing of labour and equipment.
- Sources of pricing information:
  - Published resources – Building Cost Indices
  - Company Cost records – an inhouse database from proper documenting and compiling company cost from previous jobs
  - Vendor catalogues and quotations – prices obtained directly from vendors through catalogues or indirect inquiries

Material Pricing Sources (cont'd)

- Upon compiling prices from vendor, few considerations must be made as follows:
  - Payment requirements – cash, credit, credit term
  - Delivery charges
  - Lead time, product availability
  - Price guarantee
  - Quantity discount information
  - Price escalation clause

References:

- Estimating Building Costs – Calin M. Popescu, Kan Phaobunjong, Nuntapong Ovararin (2003), Marcel Dekker Inc.
- Estimating and Tendering for building work – R.C. Smith, 1986, Longman

The End

- Thank you