ESTIMATING AND COSTING

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Estimate:

- An Estimate gives probable cost of work.
- Estimate is determined by theoretical calculations based on plans, drawings and current rates.

- The working out of the exact quantities of various item of work is known as **Quantity Surveying**.
- Requirement of Estimates: Fully dimensioned drawing, detailed specification and schedule of rates.

Measurement units:

- Concrete work(RCC, PCC), Brick work, excavation, Rubble masonry, Supply of (sand, aggregate, brick ballast, stone ballast), Wood work in (window frame, beams, roof truss) – Cu. m
- Form work, DPC work, half brick wall, honey comb brick wall, Jungle clearance, painting, roofing, doors and windows shutter, glass panels, surface dressing and levelling, soling, turfing – sq. m
- Cornice, coping, expansion or contraction joints, pile driving, pipes, railing, supply of electric wire – r. m
- Cutting of trees, fixing of glass panes, supply of bricks, supply of (water tank, commode), wiring in building for all types of points- no.
- Steel Reinforcement, Iron works – Quintal
- Supply of cement –bags
- Supply of paint, varnish, oil - litre

General Rule for Measurement of Works for Payment:

- Masonry work: No deduction for opening less than 0.1 m^2, bearing of floor and roof slab; Full deduction for other openings
- RCC work: Volume of steel may be taken 0.6% to 1%. No deduction for steel is made for determination of volume of concrete.
- Plastering and painting: No deduction for opening less than 0.5 m^2 ; One face deduction for opening area between 0.5 m^2 to 3 m^2 .
- When not specified, 4 hold fast for window and six hold fast for door is used. Wt. of one hold fast is considered 1 kg.
- Painting in doors and windows: Outer dimension is considered for calculating areas.

Types of Estimates:

1. Preliminary Estimate: Prepared to decide financial policy matter. Prepared on the basis of Practical knowledge and cost of similar works.

2. Plinth Area Estimate: Plinth area of building*Plinth area rate. Fixed from the cost of similar buildings constructed in the locality having similar finishing and amenities.

3. Cubical Content Estimate: Cubical content of building*Rate per cubic meter. More accurate than Plinth area method.

Types of Estimates:

4. Detailed Estimate (Item Rate Estimate): Accurate Estimate. Based on plan and sanction of the building. Quantities of item under each sub head is calculated from dimensions taken from drawing and total cost is worked out in the form called abstract of cost. This estimate is prepared for getting administrative and technical sanction of the competent authority.
5. Revised Estimate: It is also detailed estimate and prepared afresh, when the original sanctioned detailed estimate exceeds by 10% or more, either due to the rates being found insufficient or due to some other reasons.

Types of Estimates:

6. Supplementary Estimate: This is fresh detailed estimate of additional work in addition of the original one and is prepared when additional work is required to supplement the original work.
7. Repair and Maintenance Estimate: To keep the structures in proper conditions, annually repairing work is carried out. The estimated amount should not be more than 1.5% of the Capital cost of the work.

- Contingency – 3% to 5%- For unforeseen items, change in design and for provision of petty establishment.
- Work charged establishment – 2% (1.5%-2%)

Q. Which of the following is most correct estimate?

a. Plinth area estimate b. Cube rate estimate

c. Detailed estimate d. Building cost index estimate

Q. A document containing detailed description of all items of work(but their quantities are not mentioned) together with their current rates is called:

a. Tender b. Schedule of rates

c. Rate analysis d. Abstract estimate

Methods of Estimating:

1. Long wall and short wall method (Out to out and in to in method):

   The length of long wall and short wall are calculated by out to out(External dimension) and in to in (internal dimension of room) respectively.

2. Center Line method: Quicker method but less accurate than long wall and short wall method. Length of centerline is determined for both long wall and short wall.

Q. In the center line method of working out volumes, for cross walls, what deductions must be made from the center line length at each junction?

a) 2b b) b c) 1.5b d) 0.5b

For L junction: No deduction

For T junction: Deduction = 0.5b

For cross(+) junction: Deduction = b

Q. When engineering departments undertake the works of other departments, the amount charged towards design, supervision and execution etc. is called:

a) Work charged Establishment b) Contingencies

c) Service Charge d) Centage charge

Q. The plan of the building is in the form of rectangle with center line dimensions of outer walls as 9.7m x 12.7m. The thickness of the wall in the superstructure is 0.30m. The plinth area is

a. 130 m^2 b. 127 m^2 c. 123.2 m^2 d. 116.5 m^2

Q. In above question find the perimeter of centerline:

a. 44.8m b. 46m c. 45.4m d. 45.7m

Q. The quantum of work of any item a skilled labour is supposed to turnout in a day is known as:

a. Unit work b. Task work c. Target work d. Basic work

Rate Analysis:

Obtaining the cost of unit amount of an item is called rate analysis.

To obtain the rate of an item, generally the following costs are considered:

a) Cost of material
b) Cost of labour (skilled and unskilled)
c) Cost of equipment, plants, tools etc.
d) Overhead cost and profit (5% and 10% respectively= Total 15%)

Overhead cost: The overhead cost include cost which are indirect expenses and not productive expenses in the job. Types:

a) General overhead: Salary of staff, office rent, telephone, electric bills etc.
b) Job overhead: Workman's compensation, insurance, small tools and plants etc.

Procedure for Rate Analysis:

Cost of material =X

Cost of labour charge = Y

Cost of equipment, plant and tools = Z

Sub total Cost = (X+Y+Z) = A(say)

Contractor's Profit and Overhead Charge = 15% of A =0.15A

Total Cost = 1.15A

Q. Which of the following is known as job overhead?

a) Stationery b) Postage c) Workman's compensation, insurance etc. d) None of the above

Calculations:

Calculate material required for pcc 1:2:4(M15) per m^3

Volume of mixed concrete = 1 m^3

Dry volume = 1.525*1 = 1.525 m^3 (Increase by 50%-55%)

Proportion of PCC = 1:2:4 Total parts of mixed proportion =7

Cement = 1/7*1.525 m^3 =1.525/7*1450kg/ m^3 = 315.9 Kg = 315.9/50 = 6.3 bags

Sand = 2/7*1.525 m^3 = 0.435 m^3

Aggregate = 4/7*1.525 m^3 = 0.872 m^3

- W/C ratio varies from 0.4 to 0.6. W/C ratio decreases with increase in grade of concrete.
- For M15 W/C is 0.6: Water required = 0.6*315.9 Kg = 189 Kg = 189 ltr.

Q. The volume of cement required to prepare 100 cum of 1:2:4 concrete is:

a) 16 m^3 b)32 m^3 c)25 m^3 d) 21 m^3

Specifications:

- Specification describes the nature and the class of work materials to be used.
- Specification should be clear and there should not be any scope for ambiguity.

a) General specifications: These gives the nature and class of work in general term.

b) Detailed/Specified specification: Specify quality and quantity of material, proportion of mortar, method of preparation and execution, workmanship etc.

Q. The information which cannot be included in drawings is conveyed to the estimator through:

a) Specifications b) Cover note c) Progress Chart d)None of the above

Bill of Quantities (BOQ):

- It is the estimate of various items of work providing description of work, quantities and unit rate. It is prepared in tabular form.

SN	Description of Work	Quantity	Unit	Rate	Amount	Remarks

Q. Bill of Quantity is prepared by:

a) Quantity Surveyors b) Vendors c) Geodetic surveyors d) Suppliers

Q. Column of rate in BoQ is filled by:

a) Client b) Consultant c)Contractor d) None of the above

Valuation:

- Valuation is the technique of estimating and determining the fair price of value of property, such as building, factory or other engineering structures.
- By valuation present value of property is determined.
- The value of property depends upon its structure, life, maintenance, location, bank interest, legal control etc.
- The value may be decided by its selling price, or income or rent.
- Valuation is done either for buying or selling property, taxation, rent fixation or acquisition or mortgaging.

Methods of Valuation:

A. Sinking method:

$$I = S * i/(1+i)^n-1$$

B. Depreciation method:

a. Straight line method, $D = (C-Sv)/N$

b. Declining Balance method, $D =1-(Sv/C)^{(1/n)}$

C. Year's Purchase:

Capitalized Value = Net income* YP

It is the capital required to be invested in rupees in order to receive an annuity of one rupees at a certain rate of interest.

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