ESTIMATION & COSTING

1. Units for Various items of work

1. Earth work
   All in (m^3), Except
   → Surface dressing, levelling, Cleaning.. etc (m^2)
   → Culting of trees (Girth Specified) (No's)
   → For earthwork Normal lead (30m) & Normal lift (1.5m)

2. Concrete
   All in (m^3), Except
   → Lime Concrete in Roof terracing & (Jaffries) (m^2)

3. D.P.C (m^2)

4. Brickwork (m^3)
   → Honey comb, half brick, Thin partition walls, (m^2)

5. Stone work (m^3)
   → Stone Slab in roof, Shelve
   → Stone work in wall facing or lining } (m^2)
   → Stone Chujjas, Sun Shade

6. Wood work
   → Main Components (m^3)
   → Ply wood, Shutters, leaves, panneld, glazed.. etc (m^2)

7. Roofing (m^2)
   → Except Joints, Ridges, Valleys, gutters... (m)

8. Plastering, painting, Pointing and finishing (m^2)
   → Except Skirting, ~~let~~ (m)
   Letters & figure (No's)

9. Miscellaneous
   → String Course, Drip Course, Beading, Throating (m)

2. Measured Correct to the Nearest

Length	nearest to	0.01 m (For important/accurate = 0.005 m like beam, Slab thick. etc)
Area		0.01 sq.m
Volume		0.01 cu.m (Wood work = 0.002 m)
weight		1.00 kg

UNITS

Bricks

	Actual Size	Nominal Size
Standard modular brick	19×9×9 cm	20×10×10 cm
Standard modular brick-tile	19×9×4 cm	20×10×5 cm
Traditional brick	9×4 3/8×2 3/4 in	9×4 1/2×3 in

*) Thickness of wall

1 brick = 20cm (Standard brick)

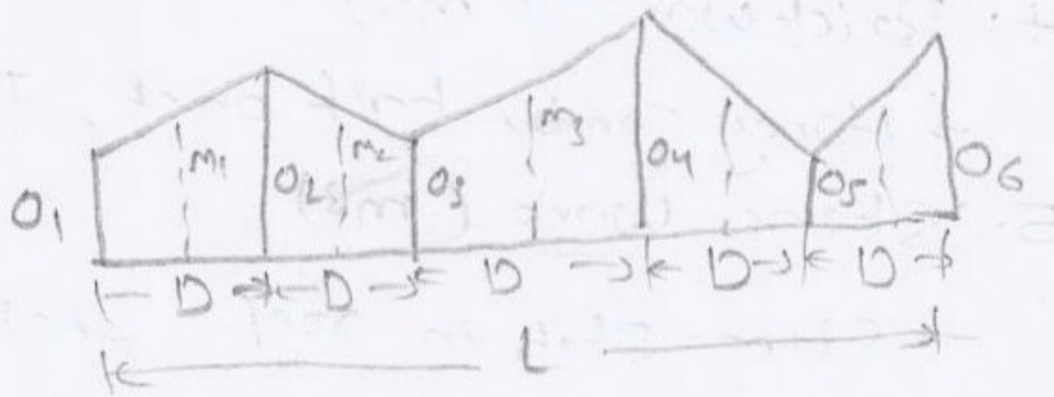
= 9 inch (Traditional brick)

*) Thickness of Lintel & Slab

1 flat brick = 10cm

1 brick tile = 15cm

Earthwork :



1. Mid-ordinate Rule:

$$A = D(M_1 + M_2 + M_3 + \cdots + M_n)$$

2. Average ordinate Rule

$$A = \frac{L}{n}(O_1 + O_2 + O_3 + \cdots + O_n)$$

3. Trapezoidal rule or) End Area method

$$A = D\left(\frac{O_1 + O_n}{2} + O_2 + O_3 + O_4 + \cdots + O_{n-1}\right)$$

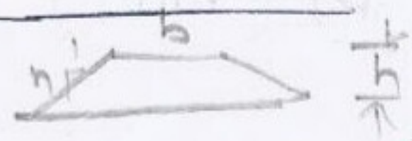
4. Prismoidal or) Simpson's rule

$$A = \frac{D}{3}\left[(O_1 + O_n) + 4(O_2 + O_4 + \cdots) + 2(O_3 + O_5 + \cdots)\right]$$

or

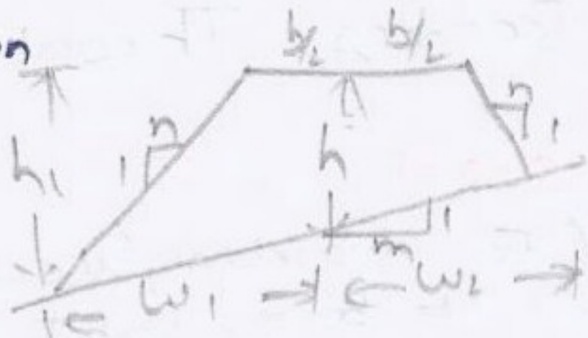
$$= \frac{D}{6}\left[\frac{O_1 + O_n}{2} + 2(O_2 + O_4 + \cdots) + (O_3 + O_5 + \cdots)\right]$$

1. Level Section



$$A = (b + nh)h$$

2) Two-level Section



$$\omega_1 = \frac{m}{m-n}\left(\frac{b}{2} + nh\right)$$

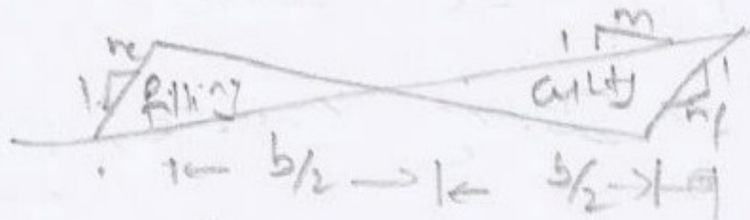
$$\omega_2 = \frac{m}{m+n}\left(\frac{b}{2} + nh\right)$$

$$A = \frac{1}{2}\left[h(\omega_1 + \omega_2) + \frac{b}{2}(h_1 + h_2)\right]$$

$$= \frac{1}{2n}\left[\left(\frac{b}{2} + nh\right)(\omega_1 + \omega_2) - \frac{b^2}{2}\right] = \frac{1}{2}\left[\left(h + \frac{b}{2n}\right)(\omega_1 + \omega_2) - \frac{b^2}{2n}\right]$$

$$= \frac{m^2 n}{n(m^2 - n^2)}\left[\left(\frac{b}{2} + nh\right)^2\right] - \left[\frac{b^2}{4}\right] = \frac{m^2 n}{m^2 - n^2}\left(h + \frac{b}{2n}\right)^2 - \frac{b^2}{4n}$$

3. Side hill - Two level section



$$A_c = \frac{1}{2}\left(\frac{b}{2} + mh\right)^2 / (m - n_f)$$

$$A_f = \frac{1}{2}\,\frac{\left(\frac{b}{2} - mh\right)^2}{m - n_c}$$

Estimate:

1. plinth Area Estimate (Approximate)
   → Is a priliminary estimate, to know the approximate cost before hand.
   → plinth area Estimate is prepared for each storey seperately.
2. Detailed Estimate (or) Item Rate Estimate (Accurate)
   prepared in Two stages
   a) Calculation of Quantity
   b) Abstract of Estimated Cost.
3. Revised Estimate (Sanction estimate exceed 5% (or) Expenditure exceed 10%).

Areas:

1. plinth Area
   Is the built up covered area of building measured at floor level of any storey.
   Includes:
   → Areas of floor and walls (excluding plinth offsets)
   → Internal shafts for Sanitary < 2 Sq.m
   → Supported porches (other than Cantilevered)
   Not included
   → Court-yard, open areas, balconies...
   → Sunshades, Cantilever projections
   → Internal shafts for Sanitary > 2 Sq.m.
2. Floor Area (or) ~~Carpet Area~~
   Is the total area of a floor in between walls.
   Floor area = plinth area − Area occupied by walls & Sills of doors
3. Carpet Area = Floor area − (Circulation, varandah, passage ... etc) (i.e non-liveable area)

Detailed Specifications

1. Earthwork:
   Excavated earth shall not be placed with in (1m) of the edge of the trench. (Rate of payment @ 100 cu.m)
2. Cement Concrete
   Propotion shall be 1:2:4 (25mm thick for floors)
   Min Compressive Strength 140 kg/m² on 7 days
3. Damp proof Course (D.P.C)
   25mm for 1:1½:3 (Concrete)
   20mm for 1:2 (mortar)
4. Form work:
   Forms Should not be removed before 14 days in general
   side forms may however be removed after 3 days
5. Brickwork (English bond)

Valuation.

* Net income (or) Net return = Gross income - outgoings
* Sinking fund:
  It is the outgoing of ~~zeem~~ rent.
  → Some amount of rent is set aside annually as sinking fund to accumulate the total cost of construction when the life of building is over.

Values:

1. Scrap value.
   The value of dismantled materials, for a building when the life is over
2. Salvage value
   The value at the end of utility period without being dismantled.
3. Market value
   The value at any particular time from open market
   → Market value may change from (Time - Time or place to place)
4. Book value:
   The value shown in account book after necessary depreciations.
   i.e Book value = original cost - Depreciation up to previous years.
   @ particular year
5. Rateable value
   The net annual letting value of the property.
   (Likely to be a selling/buying value)
6. obsolescence value
   The ~~boot vo~~ market value of becomes low due to out dated style of building (even in very good condition)

Annuity:

The annual payments (Paid by may be months/years) paid for Capital amount invested party.

a) Annuity Dues
   paid at begining of each period/year for definite No. of periods.
b) Deffered Annuity
   Payment of annuity begins after some years.
e) perpectual Annuity:
   payment of annuity continue for indefinite period (i.e No end)

Capital Cost:

Total amount required to possess a property

[= land cost + Construction cost (when buy a land)
= Market value (when buy a whole property)]

Capitalized Value:

Is the amount of money whose annual interest (@ high rate of interest) will be equal to Net annual income from the property.

i.e **Capitalized value = Net annual income × Year's purchage**

eg: if you Deposite 50,000 in bank @ high rate of interest is 5%, then you get $50,000 \times \frac{5}{100} = 2500$/year.

ie if you invest 50,000 on property, you should earn atleast 2500/year net income from that property

→ High rate of interest may increase time to time. Hence to safe may increase Rent (i.e Rent ∝ High rate of interest)

Year's purchase (Y.P)

The Capital sum required to be invested in order to recieve an annuity of ₹ 1.00 @ certain rate of interest.

i.e $$\text{Year's purchase} = \frac{100}{\text{Rate of interest}}$$

→ if a bank interests 4%. Then you need to deposite Rs. 25 to get Re 1.00 per year.

$$\therefore \quad YP = \frac{100}{4} = 25$$

eg: Capitalized value of a property fetching a net annual rent of Rs. 1000 and the highest rate of interest being 5%.

$$\therefore \text{Capitalized value} = 1000 \times \frac{100}{5} = \text{Rs. } 20,000/-$$

Sinking Fund (I)

The annual deposite/instalment to get the money of structure at the end of it's useful life.

Annual $$\text{Sinking Fund (I)} = \frac{Si}{(1+i)^n - 1}$$

S = Total amount of Sinking fund invested on that

i = Rate of interest

n = No. of years Req to get (S).

eg: A pumping set with a motor hay been installed in a bwilding @ a cost of Rs. 2500. Assuming the life of pump of 15 yrs, work out the amount of annual instalment of Sinking fund Req to be deposited to accumulate the whole amount of 4% compound interest.

Thus, Annual Sinking fund (I) $= \frac{2500 \times 0.04}{(1+0.04)^5 - 1} = 2500 \times 0.05 = \text{Rs. } 125.$

ie The owner is to deposite Rs. 125/- annually @ 4% compound interest for 15 years to accumulate Rs. 2500/-,

Depreciation

Decrease or loss in the value of a property due to deterioration, wear & tear & obsolescence.

Method of Calculating Depreciation

1. Straight line method

Depreciation is same in every year.

$$\text{Annual Depreciation (D)} = \frac{\text{original cost} - \text{Scrap value}}{\text{Life in year}} = \frac{C-S}{n}$$

Book value after ~~No of~~ m yeay $= C - mD$

2. Constant percentage method or) Declining balance method

loss it's value by every yeay by a constant percentage

$$\text{Annual Depression (D)} = 1-\left(\frac{S}{C}\right)^{1/n}$$

Book value after m yeay $= C\left(\frac{S}{C}\right)^{m/n}$ $(\because S \neq 0)$

3. Sinking fund method :

Depression (D) = Sinking fund + interest on that Sinking fund

4. Quantity Survey method

Experience person can work out and Calculate the Depression for each item in detail.

∴ Depreciated value of each part $(D) = P\left(\frac{100-\gamma d}{100}\right)^n$

where

P = Cost of item @ present

γd = Rate of Depreciation (Depending on life of item/structure)

= 1.0 (100 yeay life)

= 1.3 (75 yeay)

= 2.0 (50 yeay)

= 4.0 (25 yeay)

= 5.0 (20 yeay)

Mortgage:

An owner can barrow money (by loan) against the security of his property.

Mortgagor = person who takes the ~~loan~~ loan

Mortgagee = person who advancey/gives the loan

Mortgage deed = Document for the mortgage transaction.

Works:

Project > 1,00,000

Major work = 20,000 - 1,00,000

Minor work = 2500 - 20,000

Petty work < 2500

Powers (upto)

Chief Engineer - Full power
(Administrative head of department).

Superintendent Engg - 5 lac (Administrative & professional head of Circle) — also called Surveyor of works (SW)

(Executive Engineer - 1 lac (Responsible for execution & management of all works in the division
(Also known as Divisional Engineer)

Assistant Engineer - 25,000/- (Directly incharge of the works)

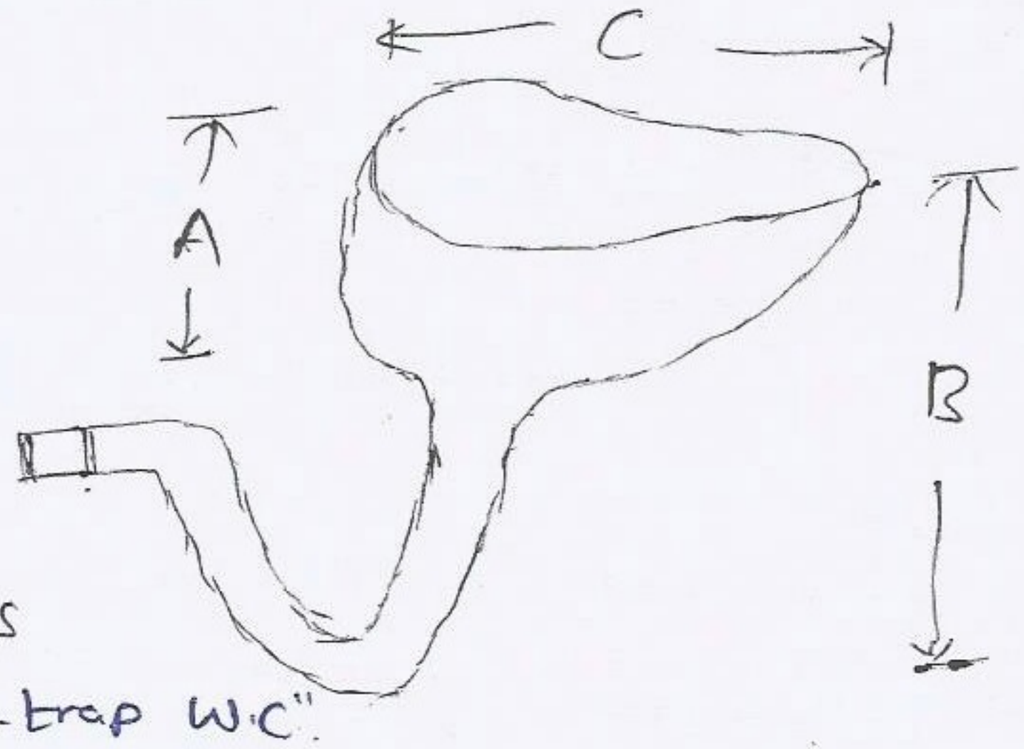
Sub-Divisional Engineer also known as District Engineer.

Water Closets:

A = 300mm

B = 450 mm

C = 500 mm



→ Anti-Siphonage pipe is Connected to "Top of P-trap W.C".

→ The Slope of the outlet of P-trap below the horizontal is kept 14°

→ The Height of Sink of wash basin above floor level is kept 75-80cm.