Basic Measurement

Estimate

It is the probable cost of any project/ work with specified time & conditions.

Following are the various types of estimate:

1). Approximate estimate/Rough/ abstract estimate

It is used for the basic information of any project & failure financial planning.

2). Plinth Area Estimate

- This method is based upon 2 dimensions (LxB) Mainly.
- It is the built up covered area.

3). Cube Rate estimate

- this estimate is based upon cubical dimension (LxBxH) of the work.
- This method is much better as compared to previous method.

4). Detailed estimate

- This is the most accurate method.
- It is generally occurred in 2 stages
    1. Measurement of work/dimension.
    2. Abstract of estimate with the help of prices.

Soling

It is the process of making the base for concrete work/other work. by using layers of dry brick (Stones)

Brick size

Normal → 20x10x10 cm

Modular → 19x9x9 cm

Standard

Traditional

Non-std.   } → 23 x 11.5 x 7.6 cm

Field

Conventional

No of bricks used in

Edge soling = $1m^2/0.23 \times 0.076$ (LxH)

Flat soling = $1m^2/0.23 \times 0.115$ (LxB)

DPC – Damp proof course

	Cement	sand	Aggregate
M10	1 :	3 :	6
M15	1 :	2 :	4
M20	1 :	1.5 :	3
M25	1 :	1 :	2

- DPC is measured in m^2/Area
- It is <u>used to prevent the moisture</u> & <u>provided at plinth level</u>. NIKHIL GOEL 9560969640
- The general thickness of DPC is about 2 to 2.5 cm. with suitable grade of concrete (M15 to m20) having Water repellent agent (bitumen etc)

Earth work

- Earth work is measured in m^3.
- If any valuable material found during excavation then it will be property of government of india.
- It the depth of excavation is less than 30 cm then excavation will be surface/shallow excavation & it is measured in m^2.
- The general lead & lift in excavation is about 30m & 1.5m respectively.
- in foundation, we use lean/weak concrete.

Stone & Brick Work

- It is generally measured in m^3.
- if the thickness of wall is 10cm, then brick work is measured in m^2.
- Dressing of stone is measured in m^2.

Steel and Iron work

- Density of steel is 7850kg/m^3
- generally amount of R/F (only in steel) is 0.6 to 1% of total RCC volume
- The weight of a steel bar per meter length is calculated be following formula

$$\left(\frac{d^2}{162}\right) \ Kg/m$$

Where d = dia of bar in mm.

Plastering and pointing

- It is Measured in m^2.
- The thickness of plaster is about 12mm
- Following are the deduction conditions for the area of opening in the plaster work.

  1). if the area of opening ➔ < 0.5 m^2 ➔ No deduction

  2). If the area of opening ➔ 0.5 - 3 m^2 ➔ One side deduction

  3. if the area of opening ➔ > 3m^2 ➔ Both side deduction for the payment

Note:- 1) In RCC work, PCC work, R/F brick work are measured in m^3.

2). Jaali work, rolling shutter, plywood, net wiring, laminated board are measured in m^2.

3). Generally woodwork is measured in m^3.

Degree of accuracy in estimation

- Wood work should be measured to nearest 2mm.
- Weight should be measured to nearest 1kg or 0.001 Tonn
- thickness of slab should be measured to nearest ½ cm.
- Generally dimension should be measured to nearest .01m, Area - 0.01m^2 & Volume - 0.01m^3

Unit -2

VALUATION

- Valuation is the art of determining the fair price of a property/building.
- Cost means original construction price of a building but value may increase of decrease w.r.t time

Purpose of valuation

Taxation

Direct Tax

We	**pro**	**com**	**in** (TRICK)
↓	↓	↓	↓
Wealth	Property	Commercial	income Tax

Ex Cu SE ME (TRICK)

Ex	➔	Excise
Cu	➔	Custom
S	➔	Service
E	➔	Entertainment

Rent Fixation

- Generally 6-10% of total value of a property is considered as Annual Rent of the building.
- Valuation is also req. for long, mortage, & for the many future planning like LIC Policy.
- Gross Income ➔ Net Income + Expenditure
  (Saving)

Types of Expenditure

1). Taxation

- Taxiation is about 14%

2). Repairness

- This expenditure is about 10-15% of the gross income.
- It is spent of the repairness of the bounding libs white whishing, crack filling etc.

3). Management & Collection charge

- It is about 5-10% of total gross income.
- It is used for the management of a society/home like as electricity bill, watchmen etc.

Scrap Value

- It is taken as about 10% of the total value of a property after its utility period (guarantee period)
- It is the value of dismantle material
- The cost of dismantling & removal of rubbish material is deducted from total receipt obtain from sale of usable material.

Salvage Value

- It is the value at the end of utility period without being dismantled.
- The cost of dismantling & removal of rubbish material is not deducted from the total receipt

Note :- 1). Salvage value & Scrap value may be positive, negative & zero.

2). For the RCC structure, scrap value & salvage value are always negligible.

Sinking Fund

$$I = \frac{SL}{(1+i)^n - 1}$$

Where,
- S = Total Sinking Fund
- L = Annual installment of sinking fund
- i = Rate of Compound interest
- n = no.of utility period

Market Value

It is the value of a property if it is put in open market for auction

Book Value

- Book value decreases year to year gradually.
- It depends upon life period of the building property & its depreciation amount.
- After the end of utility period, book value is equal to the scrap value.

Book value = value of the property upto that year Depreciation allowed for that year

Depreciation

It is the gradual reduction in the price of a property/building.

Due to obsolescence, design change etc.

Following are **the method for the calculation of depreciation**.

1). Straight line method

In this method we assume depreciation in the form of fix amount.

$$D = \frac{C-S}{n} \qquad \rightarrow \text{LEARN}$$

Where
D = Depreciation

S = Scrap value

C = Original cost of construction

n = no. fo utility period

Book value after N year = C-(NxD)

2). Constant Percentage Method

- This method is also called Balancing Decline method.
- In this method, we assume that the depreciation is taken as fix percentage

$$D = 1\left[\frac{C}{S}\right]^{1/n} \qquad \rightarrow \text{Learn}$$

Unit – 3

MＥTERIAL & EＳTIMATION

Overhead cost

- It is also called indirect cost.
- It is not the part of regular cost.

Following are the *types of overhead cost.*

1). General Overhead Cost

e.g. Posting, printing, travelling, telephone bill etc.

2). Job Overhead Cost

e.g. Labous compensation, establishment of new office.

Classification of Project

On the basis of cost, project work can be classified into following types:

1) Major
2) Minor
3) Petty

Major Work

It the cost of project is more than 2 lac.

Minor work

If the cost of project lie in the range 50k-2 lac.

Petty work

If the cost of project is less than 50,000.

Some Importance Points

1). No. of bricks use in $1m^3$ brick work is 500.

2). Contractor profit is about 10% of total project cost.

3). the no. Of bricks carried by a truck is 4000.

4). The Volume of sand carried by a truck is 3 to $5m^3$.

5). The total amount of labour is about 25% of the total project.

6). The earthwork pavement is done in per $100m^3$,

7) No of pricks per 100,

8) Cement bag (per bag)

Types of Estimate

1). Approximate estimate

2). Plinth area estimate

3). Cube rate estimate

4). Detailed estimate

5). Revise estimate

Following are the conditions for the **Revise estimate**

(a). If the variation is more than 5% of total sanction amount of the whole project.

(b). If variation is more than 10% of sanction amount of a particular work of a project.

(c). If there is material deviation (difference) is very large.

Supplementary estimate

➔ This estimate takes place due to development of new concept, design change etc

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NOTE :- In cube rate estimate if there is slopy surface/mumty then we take average height of that surface for measurement purpose.

Type of Area

1). Plinth Area

➔ It is the built up covered area of any building.

⇨ it is measured outer to outer diagonally.

⇨ The courtyard area/play ground is not included in the plinth area.

⇨ If the area of lift/sanitary work is upto $2m^2$ than it will be included in the plinth area & vice versa

⇨ Cantilever Porch is not included in the plinth area.

⇨ Simply supported porch is included in plinth area.

2). Floor Area

Floor Area = Plinth Area – Area occupied by walls/intermediate support

$$\text{Floor Area Ratio} = \frac{\text{Area of all floors}}{\text{Area Of Total Plot}} \times 100$$

Area of Balcony

⇨ It is included upto 50% in floor area.

⇨ The construction cost of first floor is decrease by 15% (approx) as compared to Ground floor construction work.

⇨ Floor area is measured inner to inner dimension excluding area of intermediate support

Circulation Area

⇨ This area is generally use by persons for the movement purpose.

⇨ It is generally of **Two types**

1). Vertical circulation Area

- This area is used by the persons of building for vertical movement like as stair case, lift etc

- It is about 3% of total plinth area

2). Horizontal Circulation Area

- This area is used for horizontal movement of the persons like as verandah.

- It is about 7% of total plinth area.

Carpet Area

- This area is also called living area/usable area etc.

Carpet Area = Floor Area - (circulation Area + Non usable area)

- The carpet area for commercial building is about 60 to 75% of total plinth area.
- The residential building carpet area is about 50 to 65% with a target of 65%

NOTE:- 1). Floor Area, carpet area, circulation area, plinth area etc. are measured at each floor/point.

2). Generally frame structcere are design on the basis of strong column & weak beam concept.

Technical Sanction

Following are the **power of accepting the tender**.

Designation	upto
Chief Engineer	Full power
Superintending Engineer	50 Lakh
Executive Engineer	10 lakh
Sub divisional Engineer	(20-40)k
Junior Engineer	X

➔ Chief engineer is the head of administrative department & he is directly responsible to the guest

➔ Superintending engineer is the head of circle & he is also called survey or engineer

NOTE:- Measurement book is considered as a Bible of JE

Account section

Work	%
1). Contractor	10%
2). Labour charge	25%
3). Contingences charge	3-5%
4). Electrification	8%
5). Electric fan	4%
6). Water supply & sanitary	8%
7). Water charge	1.5%

8). Departmental charge   10-15%

9). Work charge establishment   1.5-2%

10). Tools & plants   1-1.5%

Work charge establishment

Additional supervising staff engages at site.

Contingences charges

It is a type of a irregular charge/indirect charge

Unit-4

Contractor

Type of contract

1). Lump-sump contract

In such type of contract we fix a particular amount with specify quantity, quality & time etc. (in advance) Such type of contract are unbalance contract

2). Per unit item rate contract

⇨ Such type of contract are also called schedule rate contract.

⇨ In this contract, we fix the price of each item/unit cut not quantity.

⇨ It is a type of balance contract.

3). Lump-sump & sachedule rate contract

In such type of contract we give the contract at lump sump rate for the current define work. But in future, quantity may be increase as per item rate.

4). Fixed Percentage

⇨ Such type of contract is also called cost plus percentage contract.

⇨ When a contractor is paid certain percentage over the actual cost of construction as his profit.

Earnest money

- While submitting a tender the contractor is req. to deposit some amount with the department as the guarantee of the tender is known as earnest money.

- It is about 2 to 2.5% of the tender amount.

Security money
- After accepting the tender the contractor has to deposit some amount in the form of security.
- It is about 10%(including earnest money) of the tender value.

Note:- 1). Earnest money & security money are refunded after a certain period of time & without any interest.

2). Muster role is use for the attendance of the labour. (FORM NO-21)

Environment
Trap
⇨ Trap are used to prevent entry of foul fases into our house.
⇨ The efficiency of trap depend upon depth of water seal.
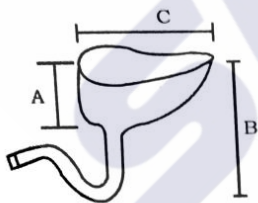⇨ The commonly water seal depth is about 50 to 75mm

Classification of Trap
1). On the basis of shape
i). P-Shape   ii). Q - Shape   iii). S - Spape

A = 300 mm
B = 450 mm
C = 500 mm

2). On the basis of purpose

i). Nhani trap/floor trap

Such type of trap are provided for carry out the wastage from a single room/floor.

ii). Gully trap

It is used to carry out the waste product from more than one floor.
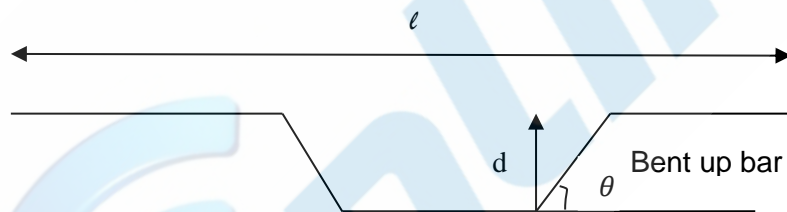
iii). Inter cepting Trap

It is provided at the junction of house sewer & municipal committee secure.

NOTE:- 1). Generally we use P-type trap.

2). The spacing b/w two manhole is dependent upon diameter of sewer line, alignment/gradient

3). The minimum size of sewer pipe line is 10cm in hilly area & 15cm in plain areas.

RCC WORK

a). $\theta = 30°$, Additional length per bent up = 0.3d

b). $\theta = 45°$, Additional length per bent up = 0.42d

For $45°$

L= l + (2x 0.42d)

L = Total

L = clear length

Schedule of Bar

It is the document which contain all the details of bending of bar, its length, weight etc. Find out the total length of a bar if it is crank/curtail at 45o. If 'l' is the total clear length of bar & 'd' depth of bar.

$$L = l + 2 \times 0.42d$$
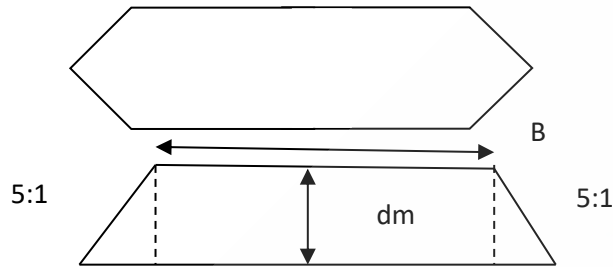
BFS → Brick flooring surface

BBS → Bar bending schedule

Earth Work

- Any valuable material found during excavation will be property of govt of india
- Following are the method for the calculation of earth work.

1). Mid – Sectional Area Method

In this type of method we take average depth of the given diff depth.

$= \frac{1}{2} \times Sd_m \times d_m + B.d_m + \frac{1}{2} Sd_m \times dm$

$= (Sd^2_m + b.d_m)$

Learn → $\boxed{dm = \dfrac{d_1 + d_2}{2}}$ dm = mean depth

Volume = area X Length

2) Mean sectional Area Method

In this method we take average of given diff area.

$\boxed{Am = \dfrac{A1 + A2}{2}}$ → Learn

3). Prismoidal formula method

$\boxed{Volume = \dfrac{L}{6} \times A1 + A2 + 4Am}$ ← LEARN

(REST FORMULA WILL BE DISCUSSED IN SURVEY)

NOTE :- The Above method having very little difference in the calculation of volume of earthwork (approx 0.55)

Method of Building estimate

Following are the method for the calculation of estimation in the buildings.

1). Long wall & short wall method

⇨ This method is also called individual wall method, separate wall method, general method.

⇨ In this method long wall (in longitudinal direction) is measured from outer to outer. But short wall (transverse direction) is measured from inner to inner.

⇨ This method is very simple & accurate as compared to centre line method.

⇨ This method is time consuming.

⇨ In this method, length of long wall decreases as we more from foundation to super structure. But short wall length increases as we move from sub-structure to super structure.

2). Centre line method

⇨ This method is rapid method but not accurate.

⇨ In this method there is no change in total length if we move from sub-structure to super structure.

⇨ This method is generally preferred for circular, square, octagonal (polygon) shape without any cross wall.

⇨ This method req. Special attention at the junction point meeting point.

<div align="center">Unit -3 (Left topics previously)</div>

Schedule of Rates

It is the document which contain all the information regarding the per unit price of all the items excluding their quantity detail.

Quantity survey

This document contain details of quantity of all the items.

Factors affecting the rate Analysis

1). Specification

➔ Quality

➔ Quantity

➔ Time

→ Types of work

→ Project cost etc.

2). If the distance b/w Construction site & source of material is more than 8 km (5mile → 1 mile = 1.6km), then transportation charge will be applicable

Turnout

It is the work done by a skilled person in 1 day.

Work	Quantity (per day per person)
1). Work in foundation with mud mortar	$1.5m^3$
2). Work in foundation with lime/cement concrete	$1.25m^3$
3). Work in superstructure with mud mortar	$1.25m^3$
4). Wok in superstructure with lime/cement concrete	$1m^3$
5). Distemper (one coat)	$35m^2$
6). White washing/colour washing (1 coat)	$200m^2$
7). White washing/colour washing (3 coat)	$70m^2$
8). RCC Work	$3m^3$
9). Lime concrete in Roof	$6m^3$
10).R/F Brick work	$1m^3$
11).12mm plastering with cement/lime morter	$8m^2$
12). lime concrete in foundation/flowing	$8.5m^3$
13). Half brick work/Partition wall	$5m^2$
14). Brick work in foundation & plinth	$1.25m^3$

Calculation of material

Cement – concrete work

For cement concrete work, we divide the 1.54 by the sum of ratio of the material & multiply it with the respective material ratio and total wok to get quantity of that material in concrete work.(DRY VOLUME)

$$\frac{1.54}{} \text{ X Raspective material ratio X Total work}$$

Sum of ratio

Eq 1:2:4 $9m^3$

Cement   = $(1.54/1+2+4)\times 1)^9 = 1.98m^3$

NOTE :- 1). In case of lime concrete work we use 1.52 in place of 1.54.

2). Volume of 1 bar of cement = 34.5 liter = $0.0345m^3$

3). No of bags in $1m^3$ of cement volume

= 1/0.0345 = 28.8 bags   (30 bags.)

Plastering work

- We increase the calculated volume by 30% (12mm thickness) & 20% (20mm thickness) due to uneven surface.
- For dry volume calculation, we increase the above obtained volume by 25%

Flooring Work

- For flooring work the calculated volume is increased by 10% due to uneven surface.
- We Increase the above calculated volume by 50% for dry volume calculation.

Brick work

Special Condition 1

= $\left(\dfrac{0.3}{\text{Sum of ratio}} \times \text{respective material ratio} \right)$ Total volume

Special condition 2

1). The calculated volume is increased by 15% due to frog filling & wastage of material.

2). For dry volume calculation we increase above obtained

Deduction at the L-junction of wall for total length of the central line is _____.

(A) half the thickness of wall

(B) no reduction

(C) thickness of wall

(D) twice the thickness of wall

In long wall and short wall method, the length of the short wall is the equal to the center to center length of wall minus _____.

(A) half of the width of wall

(B) one fourth of width of wall

(C) twice of the width of wall

(D) width of wall