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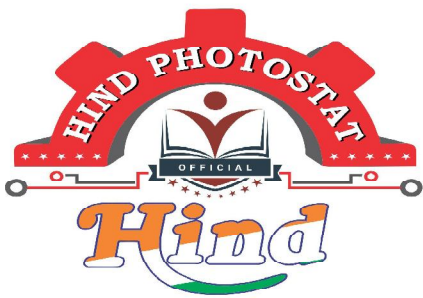
Estimation & Casting

Written By-Jaspal Sir

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

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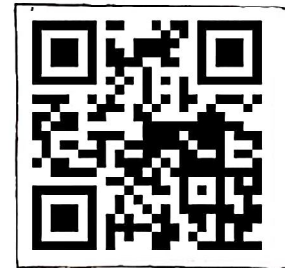
ESTIMATION & COSTING

— It is a technique of calculating/computing the various quantities and the expected expenditure to be incurred on a particular work/project.

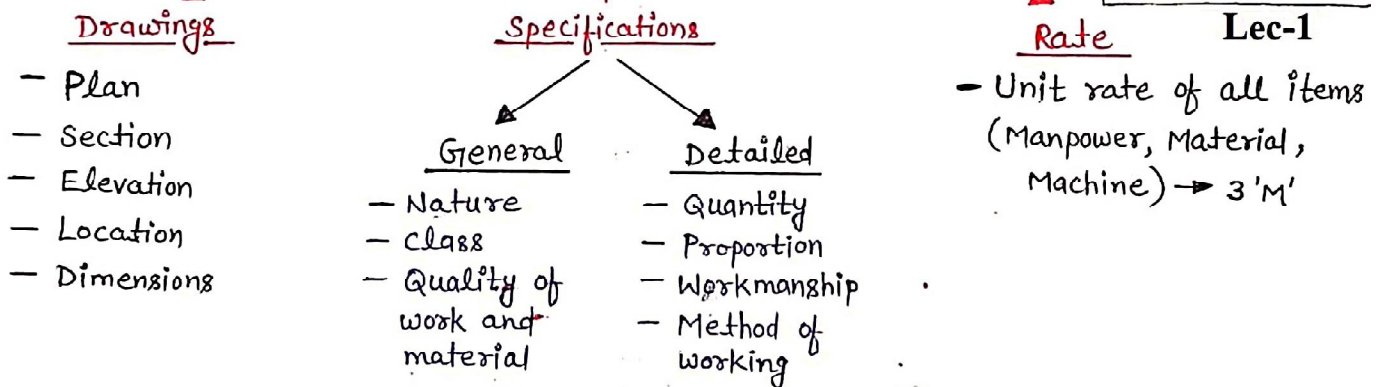
Need for Estimation :

- Estimation is carried out to fulfill the following needs :
- (i) It gives the idea of cost of the work hence helps in deciding the feasibility of project.
 - (ii) It gives the idea of time reqd. for completion of project.
 - (iii) It gives the idea of material quantity reqd for completion of work.
 - (iv) It helps in inviting the tenders for the project.
 - (v) It helps in controlling the expenditure on project.
 - (vi) It helps to evaluate where there is any benefit to execute the project.

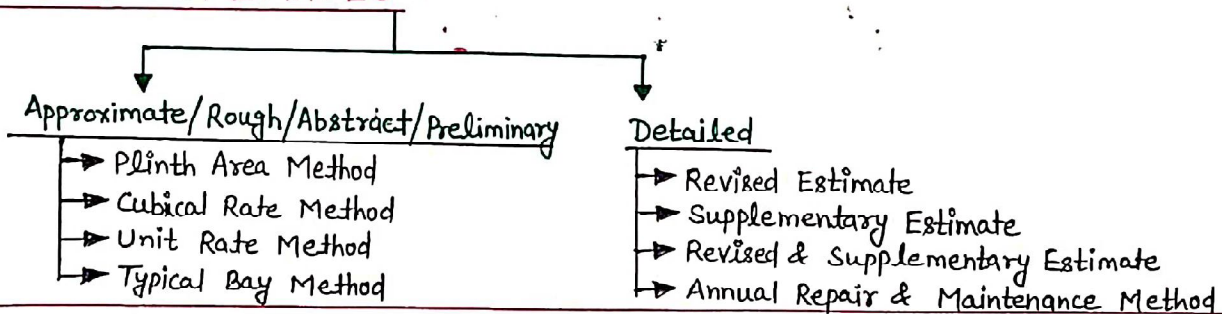
Data Required for Preparing the Estimates :



Lec-1



TYPES OF ESTIMATES :



(1) APPROXIMATE ESTIMATE :

- For calculating approximate estimate of a work, no detailed knowledge is required, and it can be done on the basis of practical knowledge.
- It is done to obtain administrative approval of the project.
- It helps in deciding the financial aspect of the project.

- eg: cost of construction is 1300 ₹/sq. ft

plot area = 3000 sq. ft

No. of stories = 3

Built-up area \Rightarrow 1st floor = 80%.

2nd floor = 85%.

3rd floor = 90%.

\rightarrow Total cost = $(0.8 + 0.85 + 0.9) \times 3000 \times 1300$
= 99.45 lakhs

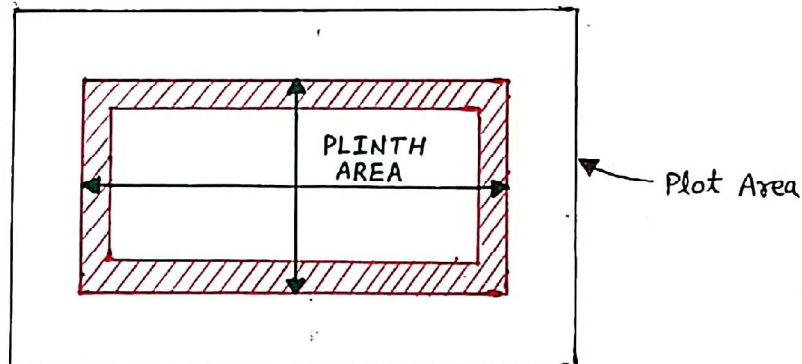
- Approximate estimate can be made by following methods :

(i) Plinth Area Method :

- $\text{Approximate cost} = \text{Plinth Area} \times \text{Rate of Plinth Area}$

Plinth Area :

- The built-up covered area of a building measured at floor level of any storey.



Lec-1 (35:00)

For the purpose of plinth area, following shall be 'INCLUDED':

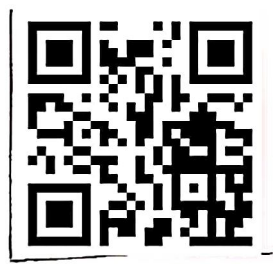
- (a) Area of wall at the floor level excluding plinth offsets, if any.
- (b) Shaft for sanitary, water supply installation, electrical installation, fire fighting, air conditioning & light.
- (c) Stair case
- (d) In case of open verandah with parapets:
 - (i) 100% area for the portion protected by projections above
 - (ii) 50% area for the portion unprotected by projections above
- (e) 100% of area of balcony protected by projection above,
50% of area of balcony unprotected by projection above
- (f) In case of 'ALCOVE' made by cantilevering slab:
 - (i) 25% of alcove of height 1m
 - (ii) 50% of alcove of height 1-2m
 - (iii) 100% of alcove of height >2m



Lec-1 (54:20)

Explanations:

- (a) Wall का area, floor level पर include करना है, offset means gap, अगर gap दिया हुआ है तो wall का area include नहीं करना है। मतलब, plinth के portion के बाहर अगर wall बनी है तो उसको include नहीं करना है।
- (b) Shaft मतलब opening given for pipes to be carried from one point to another.
- (c) घर के अन्दर बनी stair case included है पर घर के बाहर बनी stair case को include नहीं करना है।
- (d) अगर open verandah with parapets ऊपर से covered है तो इसको 100% include करना है, अगर ऊपर से cover नहीं है तो 50% include करना है।
- (e) अगर balcony ऊपर से covered है तो 100% include करना है, अगर ऊपर से covered नहीं है तो 50% include करना है।
- (f) Alcove, generally, India में नहीं मिलते। wall में कोई depression बना रखा है तो इसको alcove बोलते हैं। जैसे- Forts में बने रहते हैं। अगर ये alcove 1m height का है तो 25% include करेंगे, 1-2m height का है तो 50% include करेंगे और >2m height का है तो 100% include करेंगे।



'EXCLUDED' in Plinth Area :

- (a) Area of loft
- (b) Area of Architectural band, cornice etc.
- (c) Area of vertical sun breakers
- (d) Open platform
- (e) Terrace
- (f) Open spiral/service stair cases
- (g) Area of mummy, machine rooms, towers, domes above terrace level.

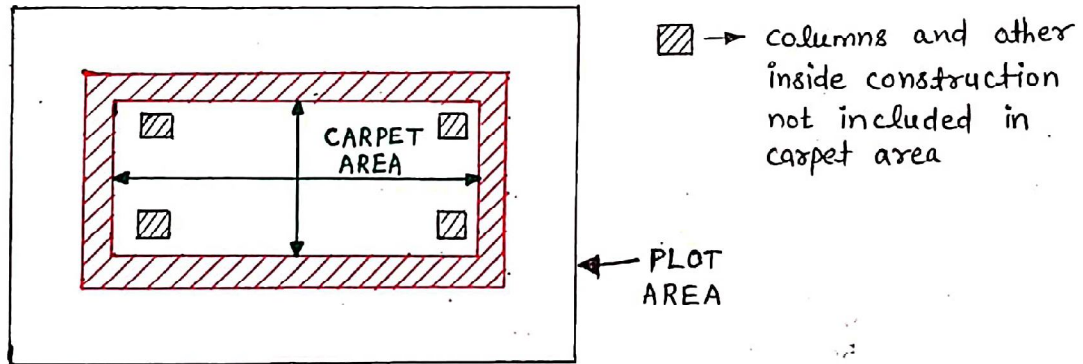
Explanations :

- (a) Open cantilever (टाँड) is not included in plinth.

NOTE :

Carpet Area :

- The covered area of the usable spaces of rooms at any floor is termed as carpet area.
- It is measured b/w the walls to walls within the building
- It is the sum of actual area which can be carpet



- Followings are 'NOT INCLUDED' in carpet area :

↳ Wall area, Veranda, corridors, passages, entrance hall, porch, staircase, stair cover, lift shaft, bathroom, machine room, kitchen & pantry, store room, canteen, AC duct, shaft for sanitary work.

NOTE :

(1) Plinth area is 10-20% more than carpet area.

(2) Carpet Area = Plinth Area - Area not included in carpet area

(3)

Type of Building	Carpet Area
Office	60-75% of Plot Area
Residential	50-65% of Plot Area



Lec-2 (35:15)

NOTE :

Floor Area :

- It is the plinth area excluding area of walls.

- $\text{Floor Area} = \text{Plinth Area} - \text{Wall Area}$

Set-Back Area :

- Setback is the minimum open space required around any building.

- The purpose of providing setback area is that the construction should be far away from the road, any water body, any nearby construction.

Circulation Area :

- Area that is helpful in movement of people through the building, around the building or between the building is termed as circulation area.

- eg: Lobbies, corridors, stairs, lift, landing etc.

- These are classified into two categories:

(a) Vertical circulation area: staircase, lift

(b) Horizontal circulation area: corridor, passage, balcony, verandah, lobby etc.

- Vertical circulation area \simeq 3% of Plinth Area

Horizontal circulation area \simeq 7% of Plinth Area

NOTE :

$$\text{Floor Area Ratio (FAR)} = \frac{\text{Total Floor Area}}{\text{Total Plot Area}}$$

Que : Floor Area (FA) = 1000 sq.m , Plot Area (PA) = 2000 sq.m

Sol :
$$FAR = \frac{FA}{PA} = \frac{1000}{2000} = 0.5$$

Que : If above construction is of four storey, what is FAR.

$$FAR = \frac{4 \times 1000}{2000} = 2$$



Lec-2 (56:15)

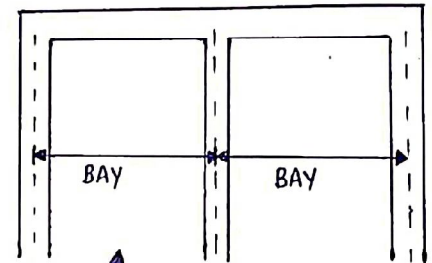
(ii) Cubical Content Method :

- It is more suitable to be applied for multi-storied buildings.
- $$\text{Approximate Cost} = \text{Volume} \times \text{cubical rate}$$
- This method is most accurate in approximate estimation methods.

(iii) Unit Rate Method :

- In this method, estimate is made by considering the unit rate of different items.
- $$\text{Approximate Cost} = \text{No. of units} \times \text{unit rate}$$

Type of Building	Unit
School Building	Classroom / Bench / student
Hospital	Bed
Theater / Stadium	Seat
Water Tank	Litre
Bridge	Span



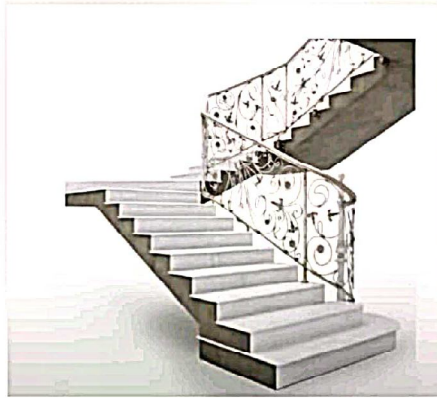
(iv) Typical Bay Method :

- In this method, estimate is made by considering the cost of bay (span)
- $$\text{Approximate Cost} = \text{No. of Bays} \times \text{Bay Rate (Span Rate)}$$
- This method is generally used for the construction of bridge.

Included in Plinth Area



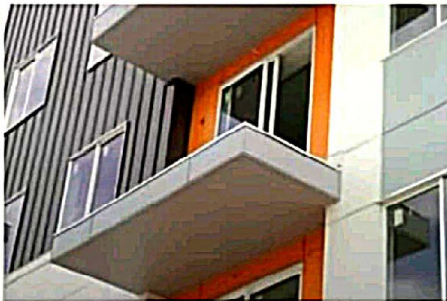
Shaft for Sanitary etc.



Stair Case



Open Verandah with Parapets



Balcony Protected by Projection Above



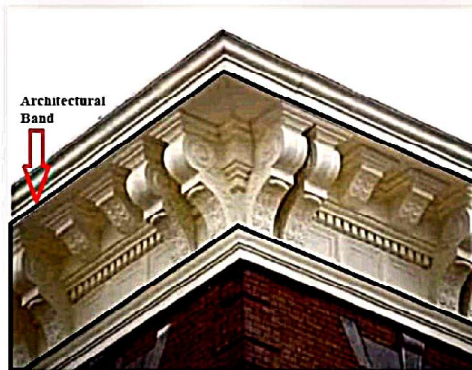
Alcove

Excluded in Plinth Area



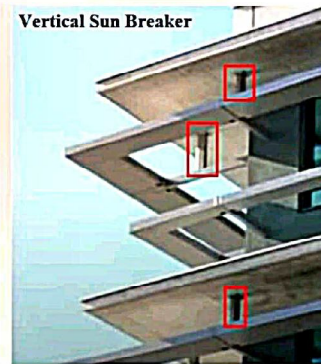
Area of Loft

Area of Loft



Architectural Band

Architectural Band



Vertical Sun Breaker

Area of Vertical Sun Breaker



Open Spiral Stair Case

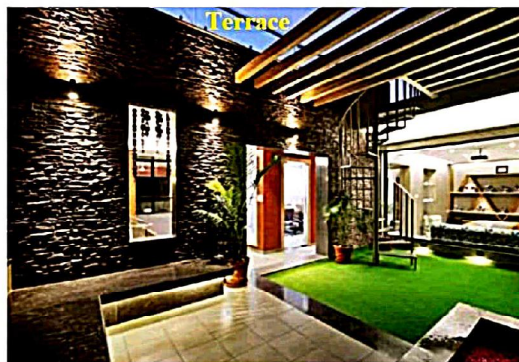
Open Spiral Stair Case



Open Platform

Open Platform

Jaspal Sir



Terrace



Area of Mumty

Ajay Prakash

NOTE :

Lumpsum :

- While preparing an estimate it is not possible to workout the details of 'PETTY ITEMS' (Insignificant wrt civil engg.), Hence, their lumpsum value is considered.



Lec-3

(i) Contingency : (3-5% of project cost)

- It is unforeseen/incidental expenses which can not be predicted prior to the execution of project.
- eg: severe accident, specialist visit on site

(ii) Work Charge Establishment : (1.5-2% of project cost)

- During the execution of the project, certain services are required, expense of which is paid from work charge establishment.
- eg: watchman, security camera, supervisor

(iii) Tools and Plants : (1-1.5% of project cost)

- It is the cost of tools and machines purchased/hired for the execution of project.

(iv) Departmental Cost (Engineering Cost) : (10-15% of project cost)

- It is the cost of engineer for certain work like designing, planning, supervision etc.

(v) Sanitary & Water Supply : (8% of project cost)

- Laying of pipes, disposing water out of the plant

(vi) Electrification : (8% of project cost)

- Cost for lighting etc.

These lumpsum values can also be applied in our day-to-day life.