# G.P. Dhangar

# Quantity Surveying and Valuation

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### CONTENTS

- INTRODUCTION
- METHODS OF BUILDING ESTIMATE
- ESTIMATING OF BUILDING
- DIFFERENT TYPES OF ROOFS AND THEIR ESTIMATES
- EARTH WORK
- SLAB AND ARCH CULVERTS
- ANALYSIS OF RATES
- SPECIFICATIONS
- VALUATION

#### INTRODUTION

- QUANTITY SURVEYING:-Is computation or calculation of the quantities required and expenses likely to be incurred in the construction of work.
- ► ESTIMATING:-The procedure of working out of approx. cost of a work by working out the quantities and then calculating the cost at suitable rates.
- COSTING:-The determination of actual cost of the work before the execution of it.
- VALUATION: The procedure of finding out the value of fair price of the properties.

### TYPES OF ESTIMATES

Rough cost estimate.

Plinth area estimate.

Cubical content estimate.

Detailed estimate.

Revised estimate.

Supplementary estimate.

Annual repair.

Extension estimate.

### METHOD OF ESTIMATING

Complete and fully dimensioned plans and section.

Detailed specification.

Rate of various items.

### MAIN ITEMS OF WORK

Earth work.

Concrete in foundation.

D.P.C

Masonry.

Flooring.

Roofing.

Pillars.

Drip course, Cornice and parapet.

Plastering and Pointing.

Wood work and Iron work.

#### DETAILED MEASUREMENT FORM

#### Detail of Measurement Form:

Item No.	Description or Particulars		M			
P II		No.	Length m	Breadth m	Height or Depth, m	Content or Quantity
						-
						3

Abstract of cost. The cost of each item of work is calculated from the quantities multiply by rate (current or schedule of rates) in a prescribed form abstract of cost and then total cost is worked out. A percentage of 5% is added for contingencies. Then the grand total will give the estimated cost of the project.

#### Abstract of Cost Form:

Item No.	Description or Particulars	Quantity	Unit of payment	Rate	Amount
	•				1 1 1 1 1 1
					12 Charles
	(4)			8	

#### UNIT MEASUREMENT

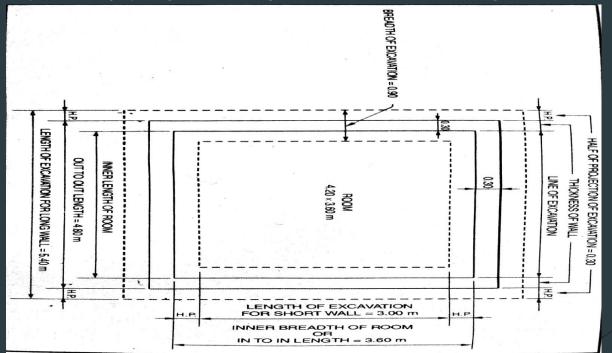
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Sand filling.    LCONCRETE:   Cement concrete 1: 4: 8 in foundation   cu m   per cu m   % cft	6.	Surface dressing and levelling, etc.	sq. m	per sq. m	0.500.500
IL CONCRETE:   Cement concrete 1: 4: 8 in foundation   cu m   per cu m   % cft   cu m   per cu m	7	Cutting of trees (Girth-specified)	no	per no	
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7. R.C.C. chajja and sun-shade  8. Precast cement concrete  9. Cement concrete bed plates  10. Cement concrete bed plates  11. Damp proof course (D.P.C.) of cement concrete 1:2:4  with one or two coats of bitumen laid hot and sprinkled  with sand (thickness specified generally 2.5 cm to 4 cm)  12. Lime concrete in foundation.  13. First class burnt bricks (B.B.) in mud mortar in  foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in  superstructure  3. First class B.B. in cement mortar 1:5 in foundation  and plinth  Cu m  per cu m	-6.	R.C.C. shelves 1:2:4 (thickness spacified, generally			
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9. Cement concrete jali work (thickness specified) 10. Cement concrete bed plates 11. Damp proof course (D.P.C.) of cement concrete 1:2:4 with one or two coats of bitumen laid hot and sprinkled with sand (thickness specified generally 2.5 cm to 4 cm) 12. Lime concrete in foundation.  13. First class burnt bricks (B.B.) in mud mortar in foundation and plinth 2. First class burnt bricks (B.B.) in mud mortar in superstructure 3. First class B.B. in cement mortar 1:5 in foundation and plinth  2. Cement concrete jali work (thickness specified)  sq. m per sq m per sq m per sq. m cu m per cu m %cft  cu m per cu m %cft	7.	R.C.C. chajja and sun-shade	cu m	per cu m	per cft
10. Cement concrete bed plates  11. Damp proof course (D.P.C.) of cement concrete 1:2:4 with one or two coats of bitumen laid hot and sprinkled with sand (thickness specified generally 2.5 cm to 4 cm)  12. Lime concrete in foundation.  13. First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth  2. Cum  2. per cum  3. per cum  4. per cum  5. per cum  6. per cum  7. per cum  8. per cum  9. pum  9. per cum	8.	Precast cement concrete	· cu m	per cu m	per cft
10. Cement concrete bed plates  11. Damp proof course (D.P.C.) of cement concrete 1:2:4 with one or two coats of bitumen laid hot and sprinkled with sand (thickness specified generally 2.5 cm to 4 cm)  12. Lime concrete in foundation.  13. First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth  2. Cum  2. per cum  3. per cum  4. per cum  5. per cum  6. per cum  7. per cum  8. per cum  9. pum  9. per cum	9.	Cement concrete jali work (thickness specified)	sq. m	per sq m	per sft
with one or two coats of bitumen laid hot and sprinkled with sand (thickness specified generally 2.5 cm to 4 cm)  12. Lime concrete in foundation.  III. BRICK WORK:  First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth	10.	Name of the Control o	cu m	per cu m	per cft
with one or two coats of bitumen laid hot and sprinkled with sand (thickness specified generally 2.5 cm to 4 cm)  12. Lime concrete in foundation.  III. BRICK WORK:  First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth	11.	Damp proof course (D.P.C.) of cement concrete 1:2:4	24	the says	
12. Lime concrete in foundation.  III. BRICK WORK:  1. First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth		with one or two coats of bitumen laid hot and sprinkled		a term of	a di
III. BRICK WORK:  1. First class burnt bricks (B.B.) in mud mortar in foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth		with sand (thickness specified generally 2.5 cm to 4 cm)	sq. m	per sq. m	7.5
1. First class burnt bricks (B.B.) in mud mortar in foundation and plinth cu m per cu m %cft  2. First class burnt bricks (B.B.) in mud mortar in superstructure cu m per cu m %cft  3. First class B.B. in cement mortar 1:5 in foundation and plinth	12.	Lime concrete in foundation.	cu m	per cu m	1 7
1. First class burnt bricks (B.B.) in mud mortar in foundation and plinth cu m per cu m %cft  2. First class burnt bricks (B.B.) in mud mortar in superstructure cu m per cu m %cft  3. First class B.B. in cement mortar 1:5 in foundation and plinth		III BDICK WORK			
foundation and plinth  2. First class burnt bricks (B.B.) in mud mortar in superstructure  3. First class B.B. in cement mortar 1:5 in foundation and plinth	-1.				A - 10
2. First class burnt bricks (B.B.) in mud mortar in superstructure cu m per cu m %cft  3. First class B.B. in cement mortar 1:5 in foundation and plinth	-		cu m	per cu m	%cft
superstructure cu m per cu m %cft  3. First class B.B. in cement mortar 1:5 in foundation	2.	First class burnt bricks (B.B.) in mud mortar in			1
3. First class B.B. in cement mortar 1:5 in foundation			cu m	per cu m	%cft
and plinth cum per cum % cft	3.	First class B.B. in cement mortar 1:5 in foundation		-18 - 17 - 17 - 17 - 17 - 17 - 17 - 17 -	50
		and plinth	cu m	per cu m	% cft

### METHOD OF BUILDING ESTIMATE

LONG WALL & SHORT WALL METHOD OR OUT TO OUT & IN TO IN METHOD

The length of long wall add 2times half projection and then calculate the quantity.

The length of short wall subtract 2 times half projection and then calculate the quantity by multiplying the length breadth and height.

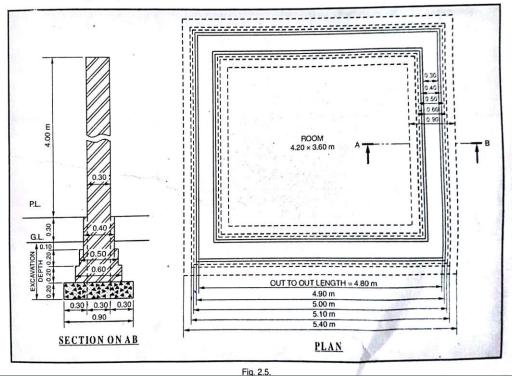


### WORK OUT THE QUANTITIES OF THE FOLLOWING

- 1. Excavation for foundation
- 2. Lime concrete in foundation
- 3. Mud masonry in foundation
- 4. Mud masonry in superstructure.

Example 2.4. Work out the quantities of the following items of work from the given drawing of a room 4.20 m  $\times$  3.60 m;

- 1. Excavation for foundation
- 2. Lime concrete in foundation
- 3. Mud masonry in foundation and plinth
- 4. Mud masonry in superstructure.



	_				\		
		1	T	Measur	ements		Experimental notes
Iter		No.	L	В	H	Quantity	Experimental nova
No	λ.		m	m	m		(0.00, 0.30)
1.	Excavation of foundation:  Long walls of room Short walls of room	2 2	5,40 3,00	0.90	0.70 0.70	6.80 3.78 <b>10.58</b>	H.P. = $\frac{(0.90 - 0.30)}{2}$ = 0.30 m L = 4.80 + 0.30 + 0.30 = 5.40 m L = 3.60 - 0.30 - 0.30 = 3.00 m <b>cu m</b>
	Total				CONTRACT.	10.50	
2	Lime concrete in foundation: Long walls of room Short walls of room	2 2	5.40 3.00	0.90 0.90	0.20 0.20	1.94 1.08	L = Same as excavation L = Same as excavation
and the same of th	Total	N. H	00 THE		NA IN	3.02	cum
	1004		A HILLS IN CO.	\$40.40\pi = 1524			
3	Mud masonry in foundation & plinth:  I Footing:  Long walls of room  Short walls of room	2 2	5.10 3.30	0.60	0.20 0.20	1.22 0.79	H. P. = $(0.60 - 0.30)/2 = 0.15 \text{ m}$ L = 4.80 + 0.15 + 0.15 = 5.10  m L = 3.60 - 0.15 - 0.15 = 3.30  m
	Il Footing:	•	500	0.50	0.20	1.00	H.P = $(0.50 - 0.30)/2 = 0.10 \text{ m}$ L = 4.80 + 0.10 + 0.10 = 5.00  m
	Long walls of room Short walls of room	2 2	5.00 3.40	0.50 0.50	0.20	0.68	$L = 3.60 - 0.10 - 0.10 = 3.40 \mathrm{m}$
	III Footing including plinth:						H.P. = $\frac{(0.40 - 0.30)}{2}$ = 0.5 m
	Long walls of room	2	4.90	0.40	0.40	1.57	$L = 4.80 + 0.05 + 0.05 = 4.90 \mathrm{m}$
	Short walls of room	2	3.50	0.40	0.40	1.12	$L = 3.60 - 0.05 - 0.05 = 3.50 \mathrm{m}$
	Total	4				6.38	cum
4.	Mud masonry in super-structure:						
	Long walls of room	2	4.80	0.30	4.00	11.52	L = out-to-out
	Short walls of room	2	3.60	0.30	4.00	8.64	L = in-to-in
	Total					20.16	cum

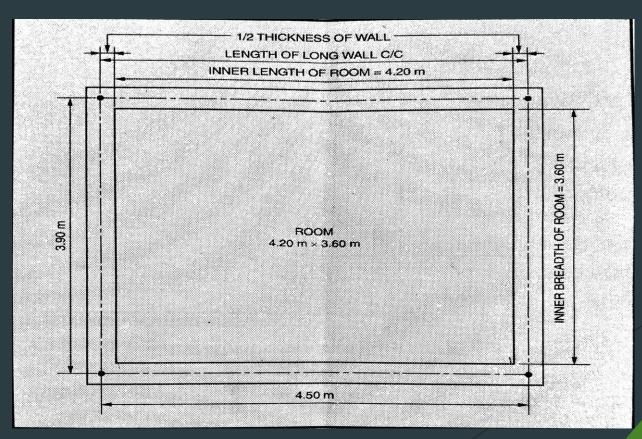
#### CENTRE LINE METHOD

CENTRE LINE METHOD:-

LENGTH OF LONG WALL CENTRE TO CENTRE=INNER BREADTH OF ROOM+HALF THICKNESS OF WALL ON ONE SIDE +HALF THICKNESS OF WALL ON ONTHER SIDE

LENGTH OF SHORT WALL CENTRE TO CENTRE=INNERR BREADTH OF ROOM+ONE

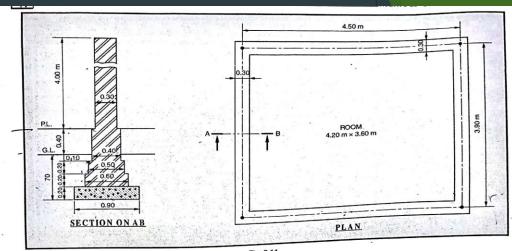
THICKESS OF WALL.



# ESTIMATE THE QUANTITIES OF THE FOLLOWING BY CENTRE

LINE METHOD

- . Excavation for foundation.
- 2. Lime concrete in foundation.
- 3. Mud masonry in foundation.
- 4. Mud masonry is superstructure.

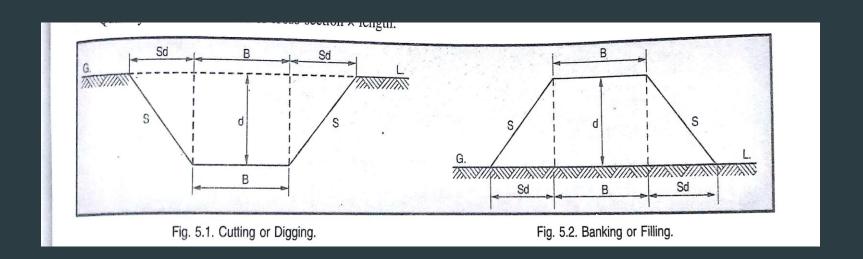


Details of measurements and calculation of quantities (Example 2.9).

	Solution. Details of measurements and		T	Measur	ements		
	Particulars	No.	L	B	H	Quantity	Experimental notes
Item No.	Particulars		m	m	m		
1.	Excavation for foundation:		18				The state of the s
1.	la companie de la com	2	4.50	0.90	0.70	5.67	L = Centre to centre
- 1	Room's long walls Room's short wall	2	3.90	0.90	0.70	4.91	L = Centre to centre
	Room's short wan		UANEU	028	2000	10.58	cum
	Carlo Ca	i extist	105 XXXXX	1000 TO 40340		Salada Companya ana an	
2	Lime concrete in foundation:	2	4.50	0.90	0.20	1.62	
	Room's long wall	2	3.90	0.90	0.20	1.40	
200.000	Room's short wall	2. resumences:2	S.50	DO DO DE LOS DE	0.20	3.02	cum
	Total	0.7462	ownige	N. Paris		3.02	
3.	Mud masonry in foundation and plinth:						
	Room's long wall		4.50	0.00	0.20	1.08	
- 1	I Footing	2	4.50	0.60	0.20	_ 0.90	
	II Footing	.2	4.50	0.50		. 0	
	III Footing (including plinth)	2	4.50	0.40	0000	1.44	
	Room's short wall						
	I Footing	2	3.90	0.60	0.20	0.94	
	II Footing	2	3.90	0.50	0.20	0.78	
	III Footing (including plinth)	2	3.90	0.40	0.50	1.25	
	Total					6.39	cum
	Mud masonry in superstructure:					8	
	Room's long wall	2	4.50	0.30	4.00	10.80	
	Room's short wall	2	3.90	0.30	4.00	9.36	
(A) 2	Total	N AND	NACOUS I	MILLER	glatiketo.	20.16	cum

### EARTH WORK

► EARTH WORK:-cutting and filling of the earth



### Work out the cost of earth work for a portion of a road from Rd to Rd 90 m.

Rd	N.S. level	Formation level
(o),	205.00	210.00
(30)	205.60	
60 -	206.00	
90	206.80	

The formation is in a downward gradient of 1 in 30. Formation width is 10 metres and side slope 2:1 (Horizontal: Vertical) rate of earth work is Rs. 375.00% cu m.

#### Solution, Method I:

Rd	N.S. level	Formation level	Filling or Banking
0 ·	205.00	210.00	5.00\
60)	205.60	209.00	3,40
- 60	206.00	208.00	2.00
<u>-</u>	206.80	207.00	0.20

Formation level at Rd 0 is given a 210.00 metres. It has downward gradient 1 in 30 so the formation levels at other Rds can be calculated by reducing 1 metre.

Now N.S. levels are already known and formation levels are worked out. So the height of the bank can be calculated as

#### Cross-section at RdO.

Applying Trapezoidal formula:

Area of filling 
$$=$$
  $\left(\frac{a+b}{2}\right)h = \left(\frac{10+30}{2}\right)5 = 100 \text{ sq m}$ 

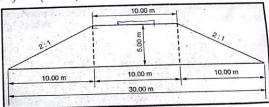


Fig. 5.8.

#### Cross-section at Rd. 30:

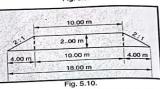
Area of filling = 
$$\left(\frac{10 + 23.60}{2}\right) 3.40$$
  
= 57.12 sq m

#### Cross-section at Rd 60:

Area of filling = 
$$\left(\frac{10+18}{2}\right)$$
2  
= 28 sq m

#### Cross section at Rd 90:

Area of filling = 
$$\left(\frac{10 + 10.80}{2}\right) 0.2$$
  
= 2.08 sq m





Rd	Area of cross section sq m	Mean area sq m	Length m	Quantity cu m	Remarks
0	100.00	_	— .	-~	
30	57.12	78.56	30	2356.80	
60	28.00	42.56	30	1276.80	
90	2.08	15.04	. 30	451.20	
			Total	4084.80	cum

Earth work in filling = 4084.80 cu m.

#### Abstract of Cost

Item No.	Particulars	Quantity	Unit of payment	Rate Rs. P.	Amount Rs. P.
1.	Earth work in banking from Rd. 0 to Rd. 90 Add 5% contingencies	4084.80 % cu m		375.00	15318.00 765.90
				Grand Total	Rs. 16083.90 Ar

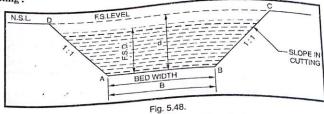
#### Method II Tabular Form

Rd. in metre	Banking or Filling (d) <sup>2</sup>	B×d	$S \times d^2$	Total area $Bd + Sd^2$ sq m	Mean area sq m	Length or Distance m	Quantity $(Bd + Sd^2) \times L$ cum	Remarks
0	5.00	50.00	50.00	100.00	100 + 17.13		_	
30	3.40	34.00	23.12	57.12	78.56	30	2356.80	
60	2.80	20.00	8.00	28.00	42.56	30	1276.80	
90	0.20	2.00	0.08	2.08	15.04	30	451.20	
n yikisid	Marie Marie Co.				1000000	Total	4084.30	cum

### **CANALS**

- There are three kinds of section of a canal in shape of trapezoid:-
- 1. Full In cutting.
- 2. Fully in embankment.
- 3. Partly in cutting and filling.

Section fully in cutting:



Note. If the full supply depth (F.S.D.) is within the bed the channel is called fully in cutting:

Area

$$=Bd+Sd^2$$
 or  $\frac{(AB+CD)}{2}$  d.

Section partly in cutting and partly in embankment:

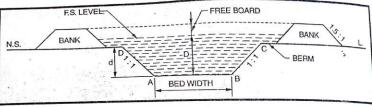


Fig. 5.49.

AB = Bed width of channel;

d =depth of cutting or digging

D = depth or water (F.S.D.);

Free board = Height of bank above F.S.L. and Height of bank = D + Free board – d.

Note. If F.S.L. is above N.S.L. the channel is called Partly in cutting and Partly in embankment.

Section fully in embankment:

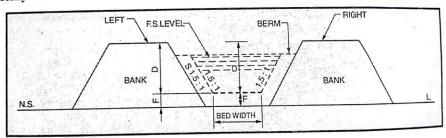


Fig. 5.50.

F = Height of filling and D = Depth of water (F.S.D.)

### ANALYSIS OF RATES

- ▶ **DEFINITION:**-To determine the rate of a particular item of work from a quantities of materials and labours required and their cost.
- 1. Cost of material.
- 2. Cost of labour.
- 3. T and P and Sundries.
- 4. Contractor's profit.

## RATES OF MATERIALS AND LABOURS

		Materials	
S. No.	Particulars	Rate at site Rs. P.	Units of payment
1.	1st class brick	2,000,00	%00 no.
2.	IInd class brick	1,900.00	% no.
3.	Brick ballast	400.00	per cu m
4.	Surkhi	250.00	per cu m
5.	White lime (unslacked)	200.00	per quintal
	or white lime	400.00	per cu m
6.	Shingle (Bajri)	600.00	per cu m
7.	Sand (Pit)	200.00	per cu m

S. No.	Particulars	Rate at site Rs. P.	Units of payment
8.	Sand (coarse)	400.00.	per cu m
9.	Cement 50 kg	190.00	per bag
10.	M.S. bar	2,500.00	per quintal
11.	Stone ballast	500.00	per cu m
12.	Local stone	300.00	per cu m
13.	Tile 30 cm × 15 cm × 3 cm	3,000.00	% nos.
14.	Clay or mud	20.00	per cu m
15.	Dressed stone	400.00	per cu m
16.	Bitumen	5.00	per kg
17.	Distemper	30.00	per kg
18.	Primer	40.00	per litre

T		L.		
	a	n	m	ш

	Labout			
S. No.	Particulars	Rate		Per day
1.	Brick layer	250.00		Per day
2	Mason	200.00	120	Per day
3.	Plasterer	200.00		Per day
4.	Black smith	200.00		Per day
5.	Carpenter	200.00	a in the file	Per day
r#6.	Bhishti (waterman)	120.00	£ .	Per day
A.	Mazdoor	100.00		Per day
8.	Skilled Mazdoor	120.00		Per day
9.	Painter	150.00		Per day
10.	White washer	130.00	-	Per day

Note. The rate of materials and labour given above are fluctuating in every city. The approximate rates are given only to guide the students.