A Study on Detail Quantity & Cost Estimation of a Room in C.I.E.T, Raipur

Umesh Kumar Yadav[1], Anurag Wahane[2]
B.E. Student, Civil Engineering, CIET, Raipur, C.G, India
Assistant Professor, Civil Engineering Dept., CIET, Raipur C.G, India

Abstract - Many different items of work in a project depend on the quantities of the items, rate of items & cost of labour. In preparing an estimate the quantities of different items of wok are calculated by simple mensuration method and from these quantities abstracted cost is calculated which is actual cost at the present time. Accurate quantities of concrete and brick work can be calculated from layout drawings (given by competent authority).There are different methods for estimating of the residential, educational or other important buildings. It can be worked out using method- Long wall-short wall Method. In this paper, the quantity are worked out by manually and cost estimation of the building are carried out on the basis of latest PWD SOR (Schedule of Rates) 2015 and other market local traders quotations. The main objective of this paper is to carried out the actual cost of a single class room at present time.

Keywords -Auto cad, LW-SW method, Quantity Estimation, SOR, PWD etc.

---

1. INTRODUCTION

An estimate is the anticipated or probable cost of a work and is usually prepared before the construction is taken up. Before undertaking any work or project it is necessary to know its probable cost which is obtained or derived by estimating. The estimating is prepared by computing or calculating the quantities required and then calculating the cost at suitable rates, to go get the expenditure likely to be incurred in the construction of the work or structure. The actual cost is known only after the completion of work from the account of the completed work.
Accurate estimate is prepared in detail item-wise by ***Detailed Estimate.*** For 'Detailed estimate' the work is divide into different item of work, and the quantities under each are taken out and then an 'Abstract of estimate cost' is prepared at suitable rates. Provision for contingencies, 3% to 5% of the estimated cost, is made in estimate to cover the miscellaneous petty expenditures which do not come under any item of work. Provision is also made in the estimate for work charged establishment at 1.5% to 2% of the estimated cost.

1.1 TYPES OF ESTIMATE –

The following sections given below are the different types of estimate: -
Preliminary estimate or approximate or stage-1 estimate or rough cost estimate, Plinth area estimate, Cube rate estimate or cubical content estimate, Approximate quantity method estimates, Detailed estimate or item rate estimate or stage-2 estimate, Revised estimate, Supplementary estimate, Supplementary and Revised estimate.

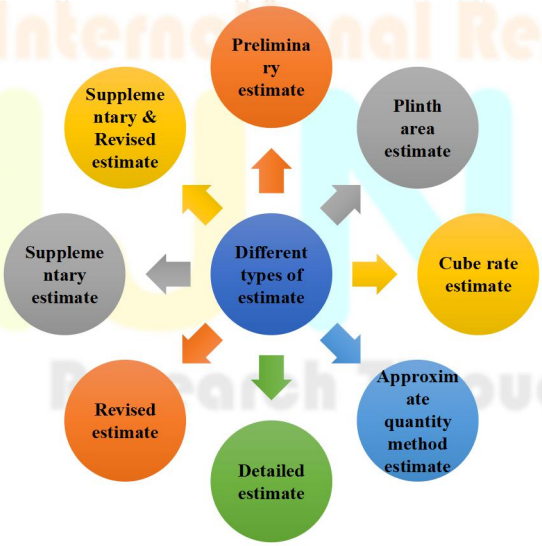

Figure: 1.1 Flow Chart of Different Types of Estimate

- **Detailed Estimate or Item Rate Estimate or Stage-2 Estimate–**

Detailed estimate is an accurate estimate and consist of working out the quantities of each item of works, and working the cost. The dimensions, length, breadth and height of each item are taken out correctly from drawing and quantities of each item are calculated, and abstracting and billing are done. The detailed estimate is prepared in two stages: -

I. Details of Measurement and Calculation of Quantities–

The details of measurement of each item of work are taken out correctly from plan and drawings and quantities under each item are computed or calculated in a tabular form named as *Details of Measurement Form-*

S. No.	Particular of items	No.	Length (m)	Breadth (m)	Height (m)	Quantity	Explanatory notes

II. Abstract of estimated cost –

The cost of each item of work is calculated in a tabular form from the quantities already computed and total cost is worked out in *Abstract of Estimate Form*.

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks

2. LITERATURE REVIEW

Appu John [1], Aswathy Warrier (2018) [2] in their paper has studied that in preparing an estimate the quantities of different items of wok are calculated by simple mensuration method and from these quantities cost is calculated. There are different methods for estimating the reinforcement quantities. It can be worked out using two methods: Long wall-Short wall method and line method.

B.N. Dutta [2] In Estimating and Costing in Civil Engineering (Theory and practice including specification and valuation), It has focused on various methods of estimating and costing of quantities. It emphasizes on the calculations of quantities of materials, tools, equipment, labours etc. and cost associated with them. It consists of numerous examples of estimation of buildings, RCC works, culverts, bridges, etc. In Design and Estimation of a reinforced building: A Case Study (IOSR Journal of Mechanical and Civil Engineering), the cost of various structures of the administrative block of the building are worked out and the design part ids done with the help of IS Code 456:2000.

B. Lavanya (2016) [3] Estimating is the technique of calculating/computing the various quantities and the expected expenditure to be incurred on a particular work/ project. For all engineering works it is required to know beforehand the probable cost of construction known as the estimated cost. Necessary for preparing an estimate are drawings like plan, elevation and sections of important point's, detailed specifications about workmanship& properties of materials, Standard schedule of rates of the current year.

Alfredo Serpell et.al (2013) [4] studied about the cost estimation of new construction projects using an integrated, computerbased approach. The paper studies the limitations of computer programs based on parametric estimating methodologies and CBR. Historical data was effectively reused in the modeling which is used by the CBR method. 17 historical datas of construction were selected for the validation purpose. The system produced a suitably detailed and accurate cost estimate for each of the tested projects. This method generates estimates of construction projects with more accuracy and in an efficient way.

3. METHODOLOGY

The quantities like earth work, foundation concrete, brickwork in plinth and super structure etc., can be workout by any of following three methods - Long wall – short wall method, Centre line method & Crossing method.

Long wall and Short wall Method - In this method the walls along the length of room is considered to be the long wall and the wall perpendicular to long wall is said to be short wall. The External lengths of the walls running in the direction out to outs and the internal lengths of wall running in the transverse direction in to inand calculate the quantities by multiplying length, breadth, and height. Length of long wall = center-center length + half width on one side + (½)breadth of another Length of short wall= center to center length-half breadth of one side – (½)breadth of another

3.1 STRUCTURAL SPECIFICATIONS

Table 3.1 Structural Properties Used in the Room

Particular of item	Properties
Built -up area	**20.50 m^2**
Dimension of the room (inside)	**8.350 m x 9.940 m**

Column sizes	**340 mm x 260 mm**
Beam sizes	**530 mm x 340 mm**
No. Of door	**1**
No. Of windows	**5**
Size of window	**2.44 m x 2.43 m**
Sizes of door	**1.52m x 2.85m**
Thickness of wall	**260 mm**
Height of the room	**3.81 m**

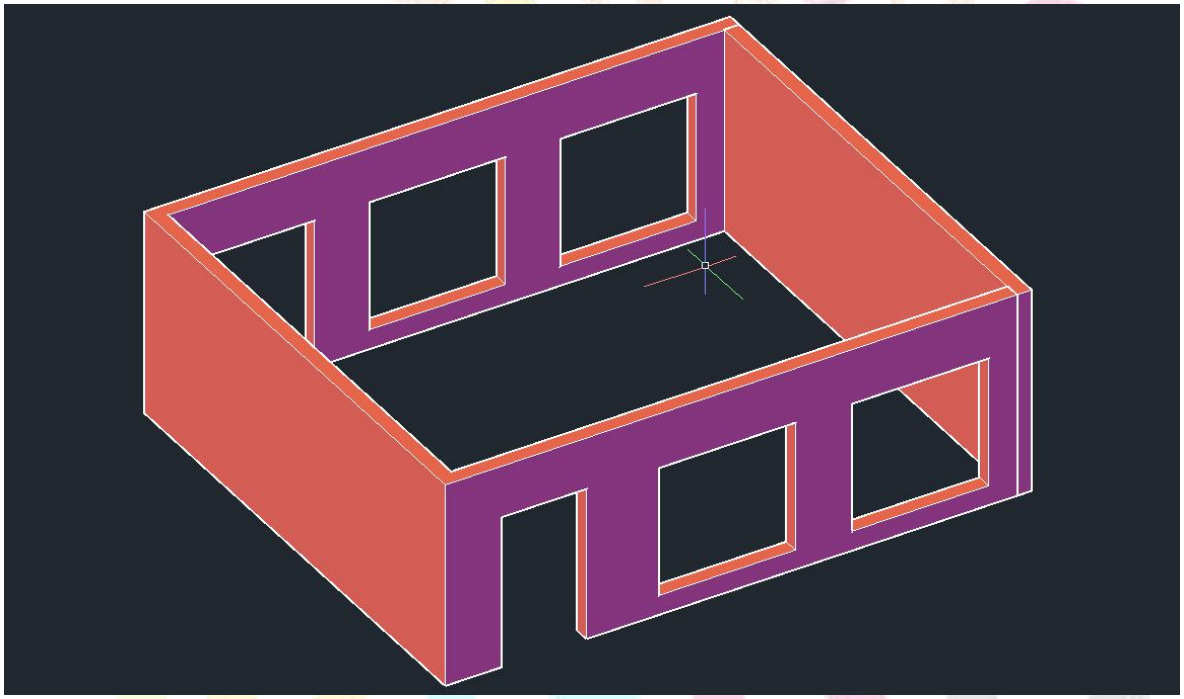

Fig. 3.1 Three-Dimensional Rendering View of EB-008 Room

The total built-up area for the EB-008 room is 20.50 m^2 is shown in figure 3.2. The length of the room along X-Direction is 9.44 m. The width of the room along Z-Direction is 8.35m. In this room, there are total number of 10 (ten) columns & the size of each columns is of 260 mm X 340 mm. The thickness of external wall is 260 mm. The total no. of beam used in this room is 6 (Six). There are 4 beams along the length 8.35m and there are 2 beams along the length 9.44m as shown in Fig. 3.2 The total no. of windows are 5 and each windows having a size of 2.44m X 2.30m (refer figure 3.1).

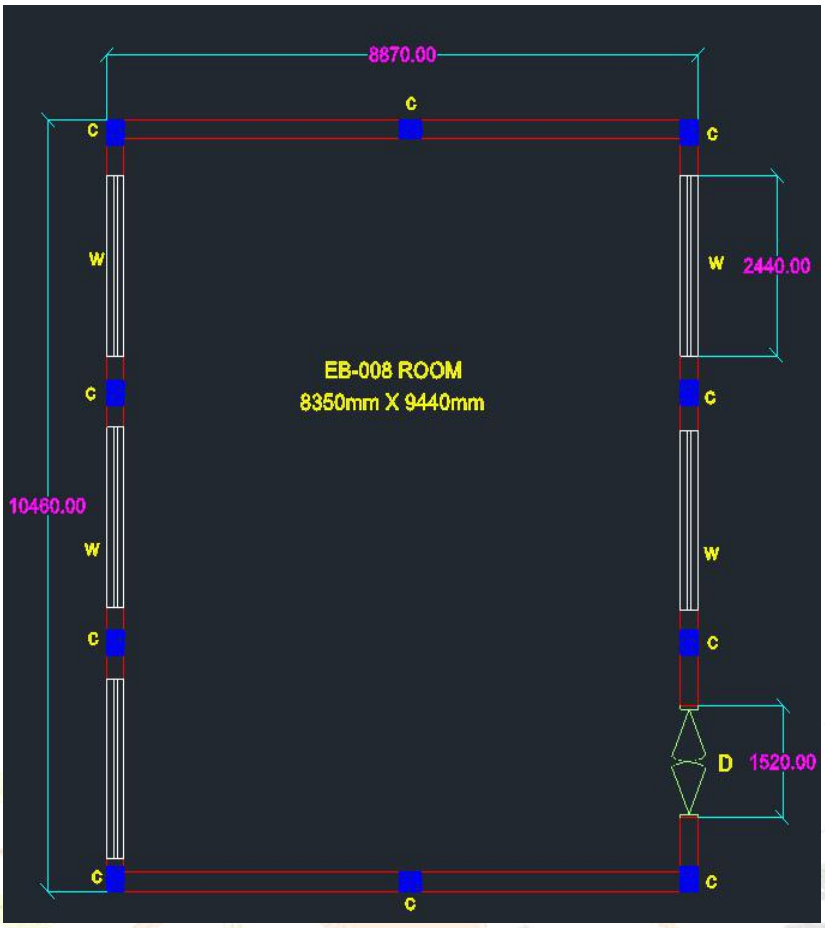

Fig. 3.2 Two-Dimensional Plan of EB-008 Room (All dimensions are in mm)

In this parameter 'W' denotes windows 'C' denotes column and 'D' denotes doors of EB- 008.The half fixed and half Sliding fully glazed windows are used in this room. Double leaf double swing fully glazed doors are used in this room. There is total no. of 6 beams in which each beam is of 0.26m X 0.34m. The Rectangular column and beam are used in the structure. The clear span of beam along (8.35m) is 8.65m including bearing walls and along (9.44m) is 9.74 m including bearing walls.

3.2 SPECIFICATION OF MATERIALS

The material properties used in the room EB-008 have been described below in Table 4.2 and the specification utilized for the calculation of quantities is also here by included in table for the estimation purpose.

Table 3.2Material Properties Used in the Room

Particulars	Details
Grade of concrete	M-25
Grade of steel	Fe-500
Yield strength of steel	250 N/mm^2
Modulus of elasticity	$2X10^5$
Unit Density of RCC	25 N/mm^2
Density of concrete	2400 kg/m^3
Density of cement	1440m^3/kg
Main steel	12 mm, 10 mm
Distribution steel	6 mm
Spacing of Stirrups in beams	35 cm c/c
Spacing of tie in columns	15 cm c/c

3.3 Overall Quantities of EB-008 Room

Table 3.3 Quantities of Brick work in Super Structure

S. N	Particular of Items	No	L (m)	B (m)	H (m)	Q (cu.m)	Explanatory Notes
1	**1st Class Brickwork in Super Structure**						
	Long Walls	2	10.46	0.26	3.81	20.72	L=10.2+0.26 = 10.46 m
	Short Walls	2	8.35	0.26	3.81	16.54	L=8.61-0.26 = 8.35m
					Total	**37.26**	
	Deduct -						
	Door Opening	1	1.52	0.26	2.85	1.13	
	Window Opening	5	2.44	0.26	2.43	7.70	
				Total Deductions		**8.83**	
				Net Total		**28.43**	

3.4 Quantities Report of RCC Work in Beams (Along 8.350 m)

Table 3.4 Quantities Report of RCC Work in Beams (Along 8.350 m)

S. No.	Particular of Items	No.	L (m)	Width (m)	H (m)	Quantity	Explanatory Notes
2.1	**RCC work (1:1.5:3) Excluding Steel and Its Bending**	1	8.65	0.34	0.53	1.56 cu.m	**L = 8.35+0.3 = 8.65 m**
		For total no. of 4 beams = 1.56 X 4				***6.24 cu.m***	
2.2	**Steel Work and Its Bending**						
2.2.1	***Main Steel***						**15 cm Bearing Wall**
2.2.1.2	10 mm Ø Straight Bars @ 0.61 kg/m	2	8.75 =	17.5 m	X0.61 kg/m =	10 .70 kg	**L=8.35+0.15+0.15 – 2 cover +2 hooks = 8.35 + 0.3 – (2*0.04) + 2* 9* 0.010 = 8.75m**
2.2.1.3	12 mm Ø Straight Bars @ 0.61 kg/m	4	8.79 =	35.16 m	X0.89 kg/m =	31.30 kg	**L=8.35+0.15+0.15 – 2 cover +2 hooks =8.35 + 0.3 – (2*0.04) + 2 * 9* 0.012 =8.79m**
2.2.1.4	10 mm Ø Bent-Up Bars @ 0.61 kg/m	4	9.13 =	36.52 m	X0.61 kg/m =	22.28 kg	**L=8.35+0.15+0.15 – 2 cover +2 hooks +1 depth=8.35 + 0.3 – (2*0.04) + 2 * 9* 0.010 + 0.38 =9.13m**
2.2.2	***Distribution Steel***						
2.2.2.1	Stirrups, 6 mm Ø Bars @ 0.22 kg/m	26	1.48 =	38.48 m	X0.22 kg/m =	8.46 kg	**Nos = (8.35+0.30 - 0.08/ 0.35) +1 =26 no. L = (0.43*2) + (0.26*2) +18*0.006 =1.48m**
		Total =				72.74 Kg	
		For total no. of 4 beams = 72.74 X 4 =				***290.96Kg or 2.90 Quintals***	

3.5 Quantities Report of RCC Work in Beams (Along 9.940 m)

Table 3.5 Quantities Report of RCC Work in Beams (Along 9.940 m)

S. No	Particular of items	No.	L (m)	B (m)	H (m)	Quantity	Explanatory notes
3.1	**RCC Work (1:1.5:3) Excluding Steel and its Bending**	1	10.24	0.34	0.53	1.84 cu.m	**L= 9.94 +0.3 = 10.24 m**
		For total no. of 2 beams = 1.84 X 2 =				***3.68 cu.m***	
3.2	**Steel Work and Its Bending**						
3.2.1	***Main Steel***						**15 cm Bearing Used**
3.2.1.1	10 mm Ø Straight Bars @ 0.61 kg/m	2	10.3 =	20.68 m	X0.61 kg/m =	12.61 kg	**L=9.94+0.15+0.15 – 2 cover +2 hooks =9.44 + 0.3 – (2*0.04) + 2* 9* 0.010 = 10.34m**
3.2.1.2	12 mm Ø Straight Bars @ 0.89 kg/m	4	10.3 =	41.52 m	X0.89 kg/m =	36.95 kg	**L=9.94+0.15+0.15 – 2 cover +2 hooks =9.94 + 0.3 – (2*0.04) + 2 * 9* 0.012 =10.38m**
3.2.1.3	10 mm Ø Bent-Up Bars @ 0.61 kg/m	4	10.7 =	42.88 m		26.15 kg	**L=9.94+0.15+0.15 – 2 cover +2 hooks +1 depth. =9.94 + 0.3 – (2*0.04) + 2 * 9* 0.010 + 0.38 =10.72m**
3.2.2	***Distribution Steel***						
3.2.2.1	Stirrups, 6 mm Ø Bars @ 0.22 kg/m	30	1.48 =	44.4 m	X0.22 kg/m =	9.77 kg	**Nos = (9.94+0.30 - 0.08/ 0.35) +1 =30 no. L = (0.43*2) + (0.26*2) +18*0.006 = 1.48m**
		TOTAL =				***85.48 Kg***	
		For total no. of 2 beams = 85.48 X 2 =				***170.9 Kg or 1.709 Quintals***	

3.6 Quantities Report of RCC Work in Columns

Table 3.6 Quantities Report of RCC Work in Columns

S. No.	Particular of items	No.	L (m)	B (m)	H (m)	Quantity	Explanatory notes
	RCC Work (1:1.5:3) Excluding Steel and its Bending	1	0.34	0.26	3.81	0.34 cu.m	
		For total no. of 10 columns = 0.34 X 10 =				***3.4 cu.m***	
	Steel Work and its Bending						
	Main Steel						
	12 mm Ø Vertical Bars @ 0.89 kg/m	6	3.91 =	23.46 m	X0.89 kg/m =	20.87 kg/m	**L = 3.81+bend = 3.81+0.1 = 3.91m**
	Distribution Steel						
	Ties 6 mm Ø Bars @	27	1.15=	31.05 m	X0.22 kg/m =	6.83 kg/m	**Nos = (3.81 / 0.15) +1 =27 no.**

	0.61 kg/m						**L = (0.22*2) + (0.3*2) +18*0.006 = 1.15m**
		TOTAL =				***27.70 Kg***	
		For total no. of 10 columns = 27.70 X 10 =				***277 Kg or 2.77 Quintals***	

3.7 Quantities Report of RCC Work in Slab

Table 3.7 Quantities Report of RCC Work in Slab

S. No.	Particular of items	No.	L (m)	B (m)	H (m)	Quantity	Explanatory notes
	RCC Work (1:1.5:3) Excluding Steel and its Bending	1	10.24	8.65	0.12	10.63 cu.m	**L = 9.94+0.15+0.15 = 10.24 m B = 8.35+0.15+0.15 = 8.65 m**
	Shuttering & Centring						
	Bottom	1	9.94	8.35	-	83 sq.m	
	Side-1	2	10.24	-	0.12	2.45 sq.m	
	Side-2	2	8.65	-	0.12	2.1 sq.m	
		Total =				***87.55 sq.m***	
	Steel Work and its Bending						
	Main Steel						
	12 mm Ø Straight Bars @ 0.89 kg/m	35	8.78 =	307.3 m	X0.89 kg/m =	273.5 kg/m	**L =8.35 + 0.30 – (2*0.04) + 2 * 9* 0.012 = 8.78m Nos. = (10.24-0.08 / 0.30) +1 = 35 no.**
	12 mm Ø Bent-Up Bars @ 0.61 kg/m	35	9.58 =	335.3 m	X0.89 kg/m =	298.41 kg/m	**L==8.35 + 0.30 – (2*0.04) + 2 * 9* 0.012 + 0.8 =9.8m Nos. = (10.24-0.08 / 0.30) +1 = 35 no.**
	Distribution Steel						
	Bottom Bars central Portion, 6 mm Ø Bars @ 0.22 kg/m	49	10.26 =	502.7 m	X0.22 kg/m =	110.59 kg/m	**L = 10.24-0.08+(18*0.006) = 10.26m Nos. = (8.65-0.04 / 0.18) +1 =49 no.**
		Total =				***682.5 kg/m***	

3.8 Quantities of Cement Plastering (1:3)

 # Material for 12 mm Thick Plastering for Inside Walls of 105.4 m²

Volume of wet mortar = area × thickness= 105.4× 0.012 = 1.26 cu.m
Adding 30% to fillup the joint, uneven surface = 1.26+ (1.26 × 0.3) = 1.64 cu.m
Increasing by 25% for total dry volume = 1.64+ (1.64 ×0.25) =2.05 cu.m

- **Cement** = (1/1+3) ×2.05 = 0.51 m^3
- **Quantity of cementin terms of kg** = 0.51 x 1440 = 734.4 kg (15 Bags)
- **Sand** = (3/1+3) ×2.05 = 1.54 m^3

#Material for 12 mm Thick Plastering in Ceilling for 83 m²

Volume of wet mortar = area × thickness= 83× 0.012 = 1 cu.m

Adding 30% to fillup the joint, uneven surface = 1+ (1 × 0.3) = 1.3 cu.m
Increasing by 25% for total dry volume = 1.3+ (1.3 ×0.25) =1.62 cu.m

- **Cement** = (1/1+3) ×1.62 = 0.41 m^3
- **Quantity of cement in terms of kg** = 0.40 x 1440 = 576 kg (12 Bags)
- **Sand** = (3/1+3) ×1.62 = 1.21 m^3

#Material for 12 mm Thick Plastering for Outside Walls of 116.35 m2

Volume of wet mortar = area × thickness= 116.35× 0.012 = 1.40 cu.m
Adding 30% to fillup the joint, uneven surface = 1.40+ (1.40 × 0.3) = 1.82 cu.m
Increasing by 25% for total dry volume = 1.82+ (1.82 ×0.25) =2.28 cu.m

- **Cement** = (1/1+3) ×2.28 = 0.57 m^3
- **Quantity of cementin terms of kg** = 0.57 x 1440 = 821 kg (17 Bags)
- **Sand** = (3/1+3) ×2.28 = 1.71 m^3

The total quantities of cement Plastering is found to be addition of quantities of cement Plaster for Inside walls plus Outside walls plus Ceiling. Therefore,

- **Total Cement required in plastering** = 0.51 +0.41 + 0.57 = 1.49 m^3
- **Total Sand required in plastering** = 1.54+ 1.21+ 1.71= 4.46 m^3

4. RESULTS & DISCUSSIONS

4.1 Rate analysis of 1st class brickwork in super structure

Table 4.1Estimated Cost of 1st class brickwork in super **structure**

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
1	**1ST Class brickwork in super structure in cement mortar (1:6)**	**For 28.43 cu.m**			
1.1	Bricks	14215 nos.	Rs.4.5/no.	Rs.63968	
1.2	Cement (39 bags)	1.34 cu.m	Rs.280/bag	Rs. 10920	
1.3	Sand	8.04 cu.m	Rs.800/cu.m	Rs. 6432	
		Total =		***Rs.81320***	

4.2 Rate analysis of RCC beam (along 8350 mm)

Table 4.2 Estimated Cost of RCC beam (along 8350 mm)

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
2	**RCC beam (Along length 8350 mm)**				
2.1	**RCC work in beam excluding steel & its bending (1:1.5:3)**	**For 6.24 cu.m**			
2.1.1	Cement (50 bags)	1.72 cu.m	Rs.280/bag	Rs.1400	
2.1.2	Sand	2.58 cu.m	Rs.800/m^3	Rs.2064	
2.1.3	Coarse aggregate (8996 Kg)	5.17 cu.m	Rs. 0.55/kg	Rs.4948	
	Total =			***Rs. 21012***	
2.2	**Steel & its bending of RCC beam**				
2.2.1	***Main steel***				
2.2.1.1	10 mm Ø Straight bars @ 0.61 kg/m	10.07 kg	54.5/kg	Rs. 549	As per PWD
2.2.1.2	11 mm Ø Straight bars @ 0.61 kg/m	31.10 kg	54.5/kg	Rs. 1695	As per PWD

2.2.1.3	12 mm Ø Straight bars @ 0.61 kg/m	22.28 kg	54.5/kg	Rs. 1214	As per PWD
2.2.2	***Distribution steel***				
2.2.2.1	Stirrups, 6 mm Ø Bars @ 0.22 kg/m	8.46 kg	54.5/kg	Rs. 461	As per PWD
		Total =		***Rs. 3919***	

4.3 Rate Analysis of RCC Beam Along 9940 mm

Table 4.3 Estimated Cost of RCC beam (along 9940 mm)

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
3	**RCC beam (Along length 9940 mm)**				
3.1	**RCC work (1:1.5:3) excluding steel & its bending**	**For 3.68 cu.m**			
3.1.1	Cement (29 bags)	1..01 cu.m	Rs.280/bag	Rs. 8120	As per local traders
3.1.2	Sand	1.52 cu.m	Rs.800/cu.m	Rs. 1216	As per local traders
3.1.3	Coarse aggregate (5307 kg)	3.05 cu.m	Rs. 0.55/kg	Rs. 2918	As per local traders
		Total =		***Rs.12254***	
3.2	**Steel work & its bending**				
3.2.1	***Main Steel***				
3.2.1.1	10 mm Ø Straight bars @ 0.61 kg/m	12.61 kg	54.5/kg	Rs. 687	As per PWD
3.2.1.2	12 mm Ø Straight bars @ 0.89 kg/m	36.95 kg	54.5/kg	Rs. 2014	As per PWD
3.2.1.3	10 mm Ø Bent-Up bars @ 0.61 kg/m	26.15 kg	54.5/kg	Rs. 1425	As per PWD
3.2.2	***Distribution Steel***				
3.2.2.1	Stirrups, 6 mm Ø bars @ 0.22 kg/m	9.77 kg	54.5/kg	Rs. 533	As per PWD
		Total =		***Rs. 4659***	

4.4 Rate Analysis of RCC Columns

Table 4.4 Rate Analysis of RCC Columns

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
4.1	**RCC work (1:1.5:3) excluding steel & its bending**	**For 3.4 cu.m**			
4.1.1	Cement (27 bags)	0.94 cu.m	Rs.280/bag	Rs. 7560	
4.1.2	Sand	1.41 cu.m	Rs.800/cu.m	Rs. 1128	
4.1.3	Coarse aggregate (4889 kg)	2.81 cu.m	Rs. 0.55/kg	Rs. 2689	
		Total =		***Rs. 11377***	

4.2	**Steel Work and its Bending**				
4.2	***Main Steel***				
4.2.1	12 mm Ø Vertical Bars @ 0.89 kg/m	20.87 kg/m	54.5/kg	Rs. 1137	
4.3	***Distribution Steel***				
4.3.1	Ties 6 mm Ø bars @ 0.61 kg/m	6.83 kg/m	54.5/kg	Rs. 373	
		Total =		***Rs. 1510***	
		For total no. of 10 columns = 27.70 X 10 =		***Rs.15100***	

4.5 Rate Analysis of RCC Slab

Table 4.5 Rate Analysis of RCC Slab

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
5.1	**RCC Work (1:1.5:3) Excluding Steel and its Bending**	**For 11.14 cu.m**			
5.1.1	Cement (84 bags)	2.94 cu.m	Rs.280/bag	Rs. 23520	
5.1.2	Sand	4..40 cu.m	Rs.800/cu.m	Rs. 3520	
5.1.3	Coarse aggregate (15329 kg)	8.81 cu.m	Rs. 0.55/kg	Rs. 8431	
		Total =		***Rs. 35471***	
5.2	**Shuttering & Centring**	86.61 sq.m	235/sq.m	Rs.20353	
		Total =		***Rs. 20353***	
5.3	**Steel Work and its Bending**				
5.3.1	***Main Steel***				
5.3.2	12 mm Ø Straight Bars @ 0.89 kg/m	273.5 kg/m	54.5/kg	Rs.14906	
5.3.3	12 mm Ø Bent-Up Bars @ 0.61 kg/m	298.41 kg/m	54.5/kg	Rs.16263	
5.4	***Distribution Steel***				
5.4.1	Bottom Bars central Portion, 6 mm Ø Bars @ 0.22 kg/m	110.59 kg/m	54.5/kg	Rs. 6027	
		Total =		***Rs. 37196***	

4.6 Total Rate Analysis of Cement Plastering

Table 4.6 Total Rate Analysis of Cement Plastering

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
4.4.1	**Cement plaster of walls including inside walls, outside walls and ceiling**	**For 6.62 cu.m**			
4.4.2	Cement (48 bags)	1.65 cu.m	Rs.280/bag	Rs.12040	As per local traders
4.4.3	Sand	4.96 cu.m	Rs.800/cu.m	Rs.3568	As per local traders
		Total =		***Rs. 15608***	

4.7 Rate Analysis of Tile Flooring & Paint work

Table 4.7 Rate Analysis of Tile Flooring & Paint Work

Item no.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
4.5.1	**Tile flooring**	83 sq. m.	Rs.858/ sq. m	Rs. 71214	As per PWD
4.5.2	**Paint work (plastic paint) 2 coats**	305 sq. m	44.5/sq. m	Rs.13572	As per PWD
		Total =		***Rs.71214***	

4.8 Abstract of Estimated Total Cost

Table 4.8 Total Estimated Cost

Item No.	Particular of items	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
9	**1ST Class brick work in super structure in cement mortar (1:6)**	28.43 cu.m	-	Rs. 74040	
10	**Cement Concrete (1:1.5:3) Including cantering shuttering**	23.95 cu.m	-	Rs. 100467	
11	**Steel work (Fe-500)**		-	Rs. 60874	
12	**Cement Plaster Work (1:3)**	5.95 cu.m		Rs.15608	
13	**Tile flooring**	78.82 sq.m	858/sq.m	Rs. 71214	
14	**Paint work (plastic paint) 2 coats**	305 sq.m		Rs. 13572	
		Total		***Rs. 335775***	
	Add 3% Contingencies			Rs. 10073	
	Add 2% Work charged Establishment			Rs. 6715	
		Grand Total		***Rs. 3,52,563***	

5. CONCLUSION

- The total cost of 1ST Class brickwork in super structure having cement mortar (1:6) for quantity of 28.43 cu.m is Rs. 81320.
- The total cost of cement concrete having (1:1.5:3) for quantity of 23.95 cu.m is Rs. 100467.
- The total cost of Steel having grade of steel Fe-500 for quantity of 1117 kg is Rs. 60874.
- The total cost of cement plaster having cement mortar (1:3) for quantity of 5.95 cu.m is Rs. 15608.
- The total cost of tile flooring for quantity of 78.82 sq.m is Rs. 71214.
- The total cost of paint work of plastic paint (2 coating) for quantity 305 sq.m is Rs. 13572.

6. REFERENCES

[1] Mr. APPU JOHN, Assistant Professor, Department of Civil Engineering, VJCET, Kerala, for his dedication and valuable guidance.
[2] B.N. Dutta Estimating and Costing in Civil Engineering (Theory and practice including specification and valuations)
[3] B. Lavanya (2016) B. Tech Civil Engineering from CMR Institute of Technology, M. Tech in Structural Engineering from DRK College of Engineering &Technology. She is presently working as an Assistant Professor of Civil Department in Vignan Institute of Technology & Science.
[4] Alfredo Serpell (2013) "estimating the cost of new construction projects using an integrated, computer-based approach", Creative Construction Conference 2013
[5] Akshay Chaudhary, Payal Sachdeva, Maninderpal Singh; Design and Estimation of a reinforced building: A Case study ISR journal of Mechanical and Civil Engineering (ISOR-JMCE)
[6] IS: 456-2000, "Code of Practice for Plain and Reinforced Concrete", Bureau of Indian Standards, New Delhi, India.

Author Biographies

Mr. Umesh Kumar Yadav,
Pursuing BE in Civil Engineering, CSVTU, Bhilai.
Specialization in Civil Engineering.

Mr. Anurag Wahane, M. Tech in Structural Engineering, Working as Assistant Professor, Department of Civil Engineering, C.I.E.T, Raipur. I've published 3 indexed papers in various reputed journals such as Seismic Analysis on RCC Frames of Different Shapes by Using STAAD.Pro Software & Manufacturing process of AAC Blocks.