DESIGNING AND ESTIMATION OF RESIDENTIAL BUILDING

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Abstract - In this paper, to organizing and evaluating a house, it is imperative to do contemplating to find the locale for development which is trailed by arranging, organizing to get stronghold nuances, including deciding the cost of development by estimation for amounts of the materials those to be known. This paper incorporates the convincing arranging particularly in land use by making a game plan for twin house by keeping up a vital separation from over maltreatment of room. The plan of house is addressed in this paper by using Auto CAD. In this paper, structure part is passed on as per codal game plan given in IS Code 456:2000, SP-16. All of the nuances which we got from the structure is given in the report and besides figures which appearing changed determining concerning the piece, column, balance setup are shown in the report. The Accurate amounts for the strong and brickwork can be resolved from the structure outlines (plan).For assessing, the central line method is used here for getting modestly exact cost of development. The fundamental system cost is found and whole delayed consequence of the errand is shown in this paper would be useful for structure specialists and amount surveyors.

I. INTRODUCTION

The standard purpose of this endeavor is to achieve a commendable probability that structures being orchestrated and arranged will perform alluringly in the midst of their proposed life. With an adequate dimension of prosperity, the twin house organized should withstand and bolster all of the stores and mutilations of standard development and have acceptable solidness and attractive security from the shrewd effects of maltreatment and fire.The record should be taken of recognized hypotheses, attempt and the need to get ready for strength and to achieve quality. Not simply estimations alone produce secured, functional and durable structures, also suitable materials, quality control, adequate indicating and incredible supervision are correspondingly fundamental.

As per the requirements of the Standard method of estimation of structure works the amounts are commonly depicted in this paper. There are two methods for evaluating as seeks after:

a)   Long wall short wall method

b)   Central line method

From this, central line method is used here.The development organize relies upon term Quantity take off [QTO] which is work for securing and envisioning the development costs [2].All theaccurate amounts of the strong and brickwork will in all likelihood find out from the structure delineations (plan).It is moreover gigantic to know the amounts of materialsincluding bolster nuances for evaluating the cost of the structure. The assistant system cost which isgoing to find and its whole delayed consequence of the endeavor is shown in this paper would be profitable for structure specialists and amount surveyors.

II. METHODOLGY

2.1 DATA COLLECTION

The detail about the site or area at which twin house is going to construct is needed to collect completely such as orientation of buildings near by the site, also about the surrounding things.

2.2 ANALYSIS

After all the data collected, it is necessary to analysis all data which we collected to proceed the step by planning, drawing the plan using AutoCAD, designing and estimation. Also any other research thesis or base papers which are related to our have to analyze to get an idea for preceding the further process and completing this project.

2.2 DRAWING (2D PLAN)

Planning ought to include choosing the extent of rooms, floor area of rooms and statures, thickness of wall, private settlement for different classes of workers, use of room. Prior to planning, we need to do review for finding the all out area of the site and to make limit line for lessening or confining the future issues due to over misuse of some other additional area or plots or space of construction.In our plan, there are 32 rooms, floors (G+1)and plinth area 3100 sq. feet. The plan drawn by utilizing AutoCAD is appeared as follows.

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2.4 DESIGNING

Reinforced cement concrete members can be designed by one of the following methods.

A) LIMIT STATE METHOD

This method of configuration depends on the plastic hypothesis. Halfway factor of wellbeing are utilized in this method to decide the structure loads and to plan quality. The structure helps to IS 456:2000 distributed by Bureau of Indian Standards made by the plan by utmost state method straightforward thus this method is as a rule broadly utilized by and by and it was embraced here for planning.
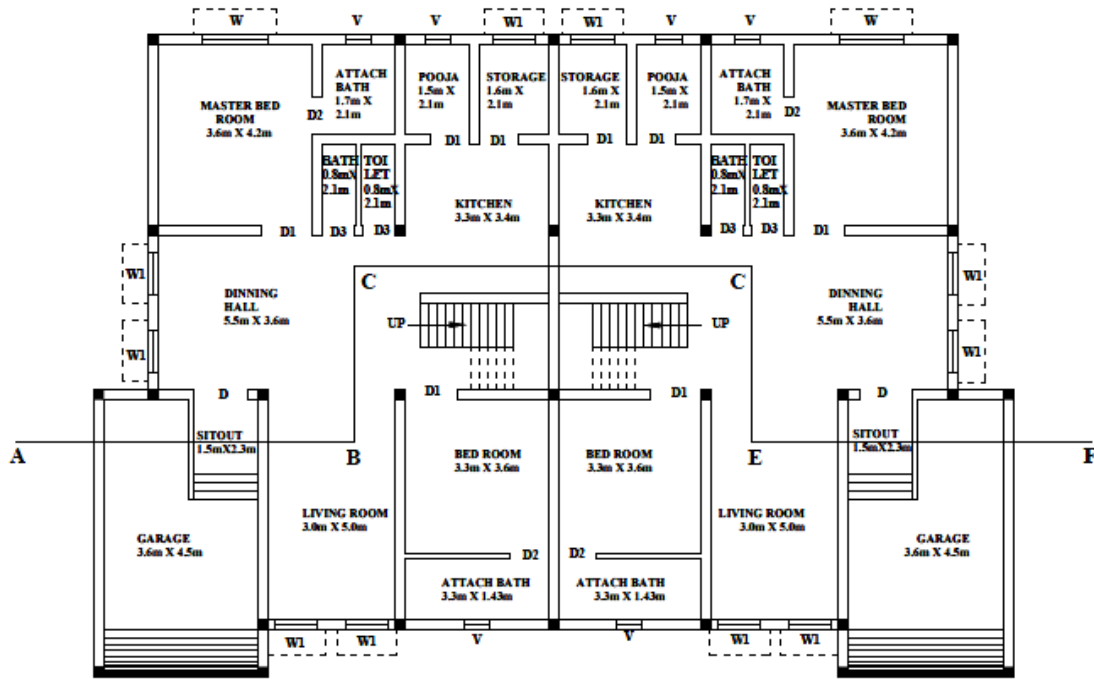
GROUND FLOOR

Fig. 1 Ground floor plan
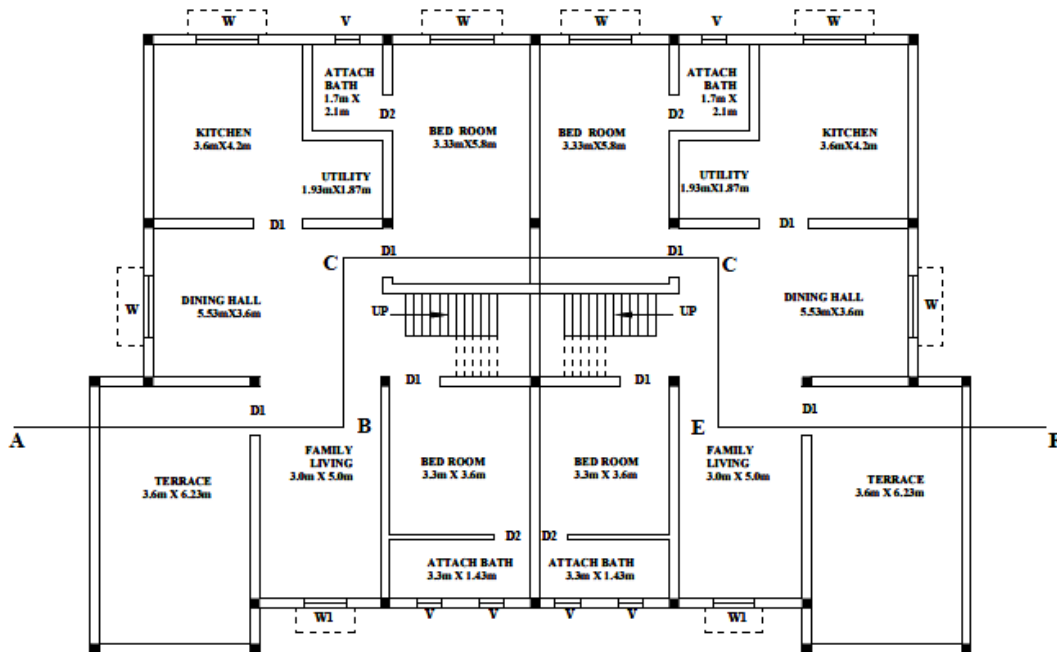
FIRST FLOOR

Fig 2 First Floor Plan

2.4.1. SLAB

A concrete slab is a common structural element of modern buildings. Two types of slabs are:

One way slab: When the ratio of long direction to short direction of slab is greater than 2, it can be called as a one way slab.

TABLE 1.DESIGN OF SLAB

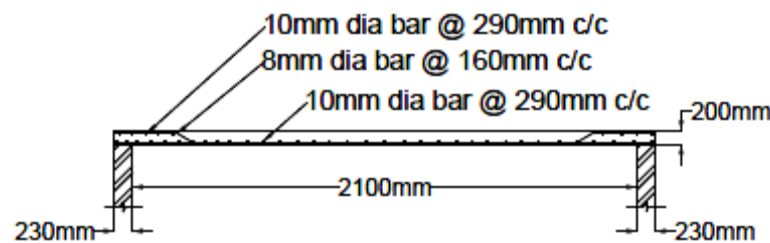| S.NO	TYPE OF SLAB	SIZE OF SLAB (mm)	MAIN REINFORCEMENT		DISTRIBUTION REINFORCEMENT		DEPTH (mm)
			DIAMETER (mm)	SPACING (mm)	DIAMETER (mm)	SPACING (mm)	
1	Two way slab	3600x4200	10	300	8	180	130
2	Two way slab	5260x2100	10	290	8	160	200
3	Two way slab	6530x5130	10	200	8	180	230

Fig 3 One way slab detailing

Two way slab: In two way slab, slab span in both the directions so needs moment resisting reinforcement in both directions. If the ratio of long and short side is less than 2, then it is two way slabs.
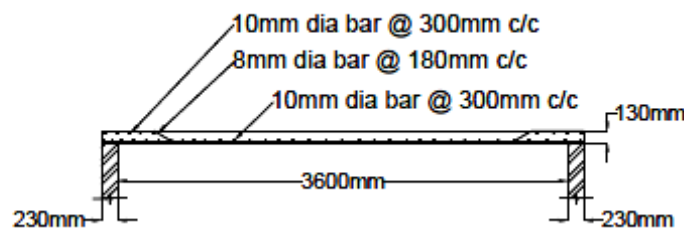

Fig 4 Two way slab

2.4.2. BEAM
A beam has to be generally designed for the actions such as bending moment, shear force and twisting moments developed by the lateral loads. The size of a beam is designed considering the maximum B.M in it and generally kept uniform throughout its length.

TABLE 2. DESIGN OF BEAM

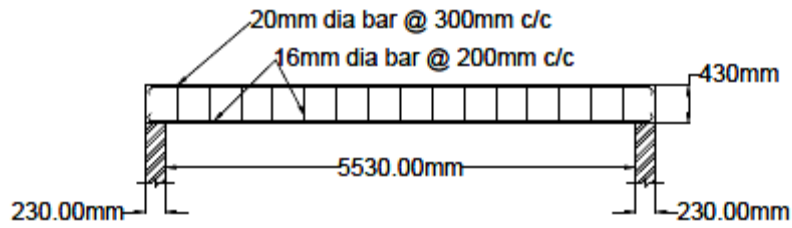| S.NO	TYPE OF BEAM	SIZE OF BEAM (mm)	SPAN (mm)	COVER (mm)	MAIN REINFORCEMENT		DISTRIBUTION REINFORCEMENT		DEPTH (mm)
					DIAMETER (mm)	SPACING (mm)	DIAMETER (mm)	SPACING (mm)	
1	Doubly reinforced beam	300x485	5530	30	20	300	16	200	430
2	Doubly reinforced beam	155x335	5000	25	20	300	16	200	365

Fig 5 Detailing of beam

2.4.3 FOOTING

A foundation was the lowest and supporting layer of a structure. Foundations are generally divided into two categories.

Types of footing

- Isolated Column Footings
- Combined Footings
- Continuous Footings
- Mat Footing/Raft Footing

TABLE3. DESIGN OF FOOTING

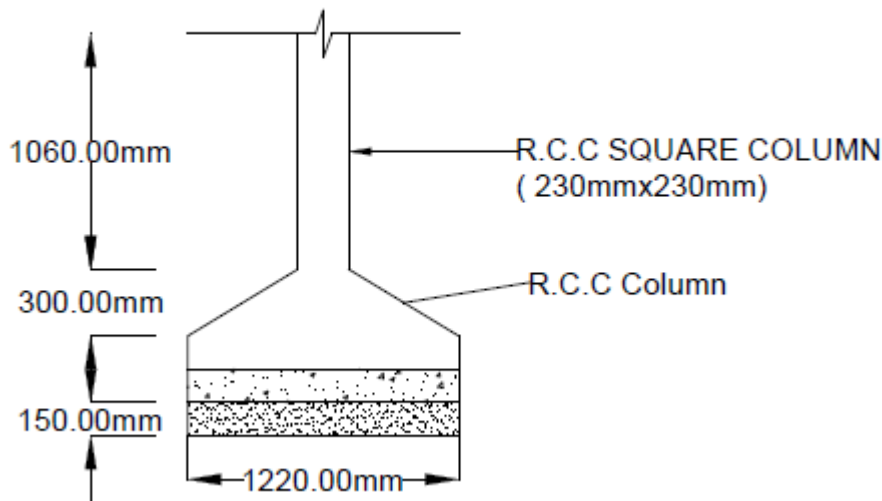| S.NO	TYPE OF FOOTING	SIZE OF FOOTING (mm)	SIZE OF COLUMN (mm)	AXIAL LOAD (KN)	MAIN REINFORCEMENT		DISTRIBUTION REINFORCEMENT	
					DIAMETER (mm)	SPACING (mm)	DIAMETER (mm)	SPACING (mm)
1	Trapezoidal footing	1220x1220	230x230	162	10	300	8	240

Fig 6 Detailing of footing

2.5 ESTIMATION

For all building works, it is required to know already the expense of development known as evaluated cost. On the off chance that the assessed expense is more noteworthy than cash accessible, at that point endeavors are made to decrease the expense by diminishing the work or by changing the determinations. From these methods given underneath, central line method is utilized here for assessing to get moderately exact and ideal expense of development. The theoretical estimation is displayed beneath for both the floors

Methods of Estimates:

1) Individual wall method
2) Central line method

Methods of Estimates

1) Individual wall method:

In this method, measure or find out external length of running in longitudinal direction in-to-in (of cross or short walls in-to-in) and calculate the same rule applies to excavation in foundation, to concrete in foundation and to masonry.

a)Long Wall=out to out= c/c of length + b/2+b/2

a)Short wall= in to in = c/c of length − b/2 − b/2

2) Central line method:

In this method, sum-total length of central lines of walls, long and short, has to found out. Find total length of central lines of wall of same type long and short having same type of foundation and footings and then find quantities by the total center length by respective breadth and height. From this two types, we are using central line method for estimation.

AMOUNT CALCULATION FOR GROUND FLOOR

TOTAL = Rs. 1147954.7

Add 8% for water supply and sanitary works = Rs.91836.38

Add 8% for Electrification works = Rs. 91836.38

TOTAL= Rs.1331627.53

Add 2% for Contingencies = Rs.26632.55

Add 3% for Work charge Establishment= Rs.39948.82

GRAND TOTAL FOR GROUNG FLOOR= Rs.1398208.9

AMOUNT CALCULATION FOR FIRST FLOOR

TOTAL = Rs.997470.43

Add 8% for water supply and sanitary works = Rs.79797.63

Add 8% for Electrification works = Rs.79797.63

TOTAL= Rs.1157065.69

Add 2% for Contingencies = Rs.23141.31

Add 3% for Work charged Establishment= Rs.34711.97

GRAND TOTAL FOR FIRST FLOOR = Rs.1214918.97

TOTAL AMOUNT

CALCULATION

TOTAL (GF + FF)   = Rs.2613127.87

Rs.180000.0

Cement (450 Bags)   = 0

Fine aggregate (242.735   Rs.776755.0

cu.m)   = 0

Course aggregate(125.56 cu.m) = Rs. 401792.00

Rs.651462.0

Bricks (108577 NOS)   =   0

Rs.886464.0

Steels (11664 kg)   =   0

TOTALLY ESTIMATED COST =Rs.55,09,600.87

III.CONCLUSION

It is inferred that the plan by manual method fulfills the whole necessity and it would be adequate for development of structure with .In this work a twin house has been legitimately planned according to IS456-2000, IS 875-Part 1 and Part 2, SP 16:1980.The proposed twin house is a surrounded structure. The basic structures are finished by utilizing LSM (Limit State Method).The configuration utilizing LSM(Limit State Method) creates a structure that fit for the expected reason amid a planned life. In the wake of planning is done, estimation for the twin house by central line method and the expense is evaluated according to PWD current rate plan. The significant parameters that impact the cost acceleration in development industry are steel, concrete, total, blocks, composite materials, types of gear and work costs are found. Subsequently the goal of this undertaking has been accomplished and effectively assessed.

IV.REFERENCE

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