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DESIGNING, 3D MODELING & ESTIMATION COSTING OF G+3 RESIDENTIAL BUILDING USING REVIT ARCHITECTURE & MS EXCEL"

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*Abstract:*In general, for building design and model can be employed by the architecture of Autodesk Revit. In addition, it can give you an exact vision via design, construction and documentation. BIM is concept which can be carried throughout the lifetime of the building (from planning till demolition) By the use of BIM in a construction project has the potential benefit of both improving product quality and enabling more sustainable designs of buildings. Even though the economic and environmental benefits of BIM is widely acknowledged, the adoption of this new technology has been slow. During the last three decades the construction industry has seen drastic improvement of the use of IT. The latest and most promising in these developments is the use of Autodesk Rivet Architecture and Building Information Modeling (BIM). Revit Architecture will show the clear picture of building excellent visualization and BIM can be described as a tool that enables storage and reuse of information and domain knowledge throughout the lifecycle of the project.For beginning to intermediate courses in construction estimating in two- and four-year construction management programs. A step-by-step, hands-on introduction to commercial and residential estimating.Construction Estimating with Excel, 3/e, introduces readers to the fundamental principles of estimating using drawing sets, real-world exercises, and examples. The book moves step-by-step through the estimating process, discussing the art of estimating, the quantity takeoff, how to put costs to the estimate, and how to finalize the bid. As students progress through the text they are shown how Microsoft Excel can be used to improve the estimating process. Because it introduces spreadsheets as a way of increasing estimating productivity and accuracy, the book can help both beginning and experienced estimators improve their skills.To bring the book up to date, the material and equipment costs and labor rates have been updated to reflect current costs, and the discussion of Excel (including the figures) is based on Excel 2016. Additionally, content throughout the book has been updated to align to ACCE and ABET student learning outcomes.

Index Terms **–** ACCE,ABET,BIM

I. INTRODUCTION

The Revit Architecture software will give the plan view, 3d model with excellent elevation, detailing diagrams, schedules for each structural elements, and with rendering we can have realistic view with high efficiency, building information modeling (BIM) gives the information about project design, its different views, scope, quantities, and phases when you need it. In the Revit model, every project we did will give the 2d, 3d, section views, elevations with detailing and schedules, quantities also it will provide us. Revit Architecture collects information about each structural element's material its visualization realistic in nature and its design such as thickness height and in schedule it will give no of data such as cost type of family, no. of brick, no of doors, no. of windows etc. across0all other representations of the project. In Revit we can have these all 2D, 3D, and sectional views, elevations and detailing drawing etc. in one complete sheet. From the outset, Revit was intended to allow architects and other building professionals to design and document a building by creating a parametric three-dimensional model that included both the geometry and non-geometric design and construction information, which is also known as Building Information Modelling or BIM (1975 Eastman C.). At the time, several other software packages—such asArchiCADand Reflex—provided a three-dimensional virtual building model, and let the user control individual components via parameters (parametric components). Two key differences in Revit were that users created parametric components in a graphical "family editor" rather than a programming language, and the model captured all relationships between components, views, and annotations so that a change to any element automatically propagated to keep the model consistent.

1.1 TYPES OF ESTIMATES

- Preliminary or Approximate or Rough Types of Estimates
- Plinth Area Estimates
- Service Unit Method
- Floor Area Method
- Carpet Area Method
- Typical Bay Method
- Cost Comparison Method
- Cubic Content Method
- Annual Repair Estimate or Special Repair Estimate
- Revised Estimates
- Supplementary Estimate
- Detailed Estimate

II. OBJECTIVES OF THE PAPER

- To draw the G+3 Residential building details using Revit Architecture software from Autodesk.
- To view G+3 Residential building in Rendering Mode by using Auto desk Revit Architecture software.
- To Estimate the G+3 Residential building property using M.S. Excel.
- To determine the complete Estimation Quantity & Quality with specifications of G+3 Residential building.

2.0 LITERATURE REVIEW:

E. RakeshReddy, S. KailashKumar.

- In this project we are detailed explanation how do we design and modelling of G+5 commercial building by Autodesk revit architecture, which renders complete vision of construction. In general, for building design and model can be employed by the architecture of Autodesk Revit. In addition, it can give you an exact vision via design, construction and documentation.
- With the BIM new technology it is easy to model the building and we can connect to revit architecture, Revit MEP, Revit structure, Built for Building Information Modelling (BIM).

Dr. V. RameshBabu, VishnuVardhan, K. Peeraiah.

- In this the building can be designed by using Autodesk Revit Software. The software allows users to design a building and its components in 3D annotate the model with 2D drafting elements and access building information from the building model's database.

ShivadattaYadav1, Prof. Gajanan Kanade2.

- In this we study application of Revit as BIM for Integrated Project Delivery (IPD) for Building Construction Project. Also focus on current BIM trends, applications, benefits, possible risks and future challenges of BIM for the Construction industry.

Afizah Ayob et al.,

- Identified the contractors' perspectives regarding the key factors, their associated causes, current risk management implementation and mitigative measures in large construction companies in the northern states of Malaysia. The study can provide a thorough understanding of risk management and may lead to the development of a reasonable measure for risk factors, as well as can support the goal of achieving an acceptable level of competitiveness and cost-effective operation. The findings of the study are discussed in this paper.

Nurul Afida Isnaini Janipha and Faridah Ismail

- Recognized client's contribution in material purchasing activities to determine its impact towards construction quality and how they are related to one another. A preliminary survey was conducted with construction organisations to gain information on the clients' contribution and their significant involvement towards construction quality. A literature review was also done to analyse general issues related to construction environment and purchasing process. The findings of the study are explained in this paper.

Dwifitra Y Jumas et al.,

- Presented the latest research development in conceptual cost estimation (CCE) from year 1995 to year 2014, with objectives to map the CCE studies and to identify their active contributors as well as the common research methods adopted in the CCE studies. Fifty-six relevant articles obtained from 18 major journals associated with construction management studies are successfully accessed.Previous research shows that the implementation of lean construction differs according to companies' own understanding of the principles. M.S. Bajjou and Anas Chafi aimed to fill this gap by proposing a generic framework leading to a better understanding of the basics of lean construction.
- The largest part of current capital and production costs is contributed by purchasing of materials (Qiwen Jiang et al., 2010). Purchasing can be categorised into two roles; sourcing direct materials that relate to the main activity of the firm, and obtain indirect supplies, used in running the firm's support activities which can be divided into three levels: materials value, suppliers' value, and social value (Huanhuan Gou et al., 2011). However, Giannakis (2004) divided purchasing into six areas; research and development, financial planning and control, human relations, supply, conversion and distribution.

2-D PLAN DRAWING IN AUTOCAD

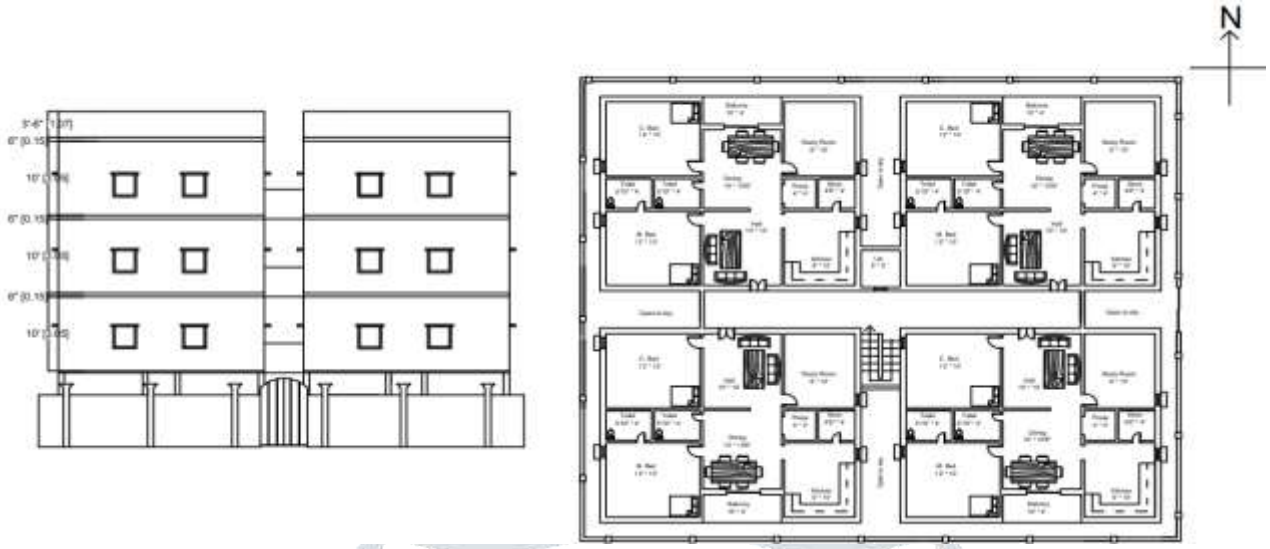

Fig-1: 2D Plan In Autocad

Table-1: Detailed Estimation of building

Center to Center distance		
Outer Wall Thickness = 0.15m		
Inner Wall Thickness = 0.12m		
1) Master Bed Room = 3.66x3.04		
Long wall	0.15/2+3.66+0.12/2	3.795
Short wall	0.15/2+3.04+0.12/2	3.175
2) Toilet 1 = 1.77x1.22		
Short wall	0.12/2+1.22+0.12/2	1.34
3) Toilet 2 = 1.22x1.22		
Short wall	0.15/2+1.77+0.12/2	1.905
4) C. Bed Room = 3.66x3.04		
Long wall	0.15/2+3.66+0.12/2	3.795
Short wall	0.15/2+3.04+0.12/2	3.175
5) Kitchen = 2.75x3.04		
Long wall	0.15/2+2.75+0.12/2	2.885
Short wall	0.15/2+3.04+0.12/2	3.175
6) Pooja Room = 1.22x1.22		
Short wall	0.12/2+1.22+0.12/2	1.34
7) Store Room = 1.42x1.22		
Short wall	0.15/2+1.42+0.12/2	1.555

8) Study Room = 2.75x3.04		
Long wall	0.15/2+2.75+0.12/2	2.885
Short wall	0.15/2+3.04+0.12/2	3.175

9) Hall = 3.04x3.04		
Long wall 1	0.15/2+3.04+0.15/2	3.19
Long wall 2	0.12/2+3.04+0.12/2	3.16

10) Balcony = 3.04x1.22		
Long wall	0.15/2+3.04+0.15/2	3.19

S.No	Description of Item	No. of Units	Length(m)	Breadth(m)	Height (m)	Quantity	Explanation
	A) Sub Structure						
1)	**Earth work excavation**						
	1) Master Bed Room = 3.66x3.04						
	Long wall	2	4.695	0.9	0.9	7.61	0.9/2+3.795+0.9/2	4.69
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.20
	2) Toilet 1 = 1.77x1.22						
	Short wall	2	0.44	0.9	0.9	0.72	(-0.9/2+1.34-0.9/2)	0.44
	3) Toilet 2 = 1.22x1.22						
	Short wall	1	1.005	0.9	0.9	0.82	(-0.9/2+1.905-0.9/2)	1.00
	4) C. Bed Room = 3.66x3.04						
	Long wall	2	4.695	0.9	0.9	7.61	0.9/2+3.795+0.9/2	4.69
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	5) Kitchen = 2.75x3.04						
	Long wall	2	3.785	0.9	0.9	6.14	0.9/2+2.885+0.9/2	3.78
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	6) Pooja Room = 1.22x1.22						
	Short wall	2	0.44	0.9	0.9	0.72	(-0.9/2+1.34-0.9/2)	0.44
	7) Store Room = 1.42x1.22						
	Short wall	1	0.655	0.9	0.9	0.54	(-0.9/2+1.555-0.9/2)	0.65
	8) Study Room = 2.75x3.04						
	Long wall	2	3.785	0.9	0.9	6.14	0.9/2+2.885+0.9/2	3.78
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	9) Hall = 3.04x3.04						
	Long wall 1	1	4.09	0.9	0.9	3.32	0.9/2+3.19+0.9/2	4.09
	Long wall 2	1	4.06	0.9	0.9	3.29	0.9/2+3.16+0.9/2	4.06
	10) Balcony = 3.04x1.22						
	Long wall	1	4.09	0.9	0.9	3.32	0.9/2+3.19+0.9/2	4.09
	Total Earth work excavation				**x4(for 4 flats)**	**219.61**	**Cu. m.**

2)								
	RMC in Foundation							
	1) Master Bed Room = 3.66x3.04							
	Long wall	2	4.695	0.9	0.9	7.61	0.9/2+3.795+0.9/2	4.69
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	2) Toilet 1 = 1.77x1.22							
	Short wall	2	0.44	0.9	0.9	0.72	(-0.9/2+1.34-0.9/2)	0.44
	3) Toilet 2 = 1.22x1.22							
	Short wall	1	1.005	0.9	0.9	0.82	(-0.9/2+1.905-0.9/2)	1.00
	4) C. Bed Room = 3.66x3.04							
	Long wall	2	4.695	0.9	0.9	7.61	0.9/2+3.795+0.9/2	4.69
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	5) Kitchen = 2.75x3.04							
	Long wall	2	3.785	0.9	0.9	6.14	0.9/2+2.885+0.9/2	3.78
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	6) Pooja Room = 1.22x1.22							
	Short wall	2	0.44	0.9	0.9	0.72	(-0.9/2+1.34-0.9/2)	0.44
	7) Store Room = 1.42x1.22							
	Short wall	1	0.655	0.9	0.9	0.54	(-0.9/2+1.555-0.9/2)	0.65
	8) Study Room = 2.75x3.04							
	Long wall	2	3.785	0.9	0.9	6.14	0.9/2+2.885+0.9/2	3.78
	Short wall	2	2.275	0.9	0.9	3.69	(-0.9/2+3.175-0.9/2)	2.27
	9) Hall = 3.04x3.04							
	Long wall 1	1	4.09	0.9	0.9	3.32	0.9/2+3.19+0.9/2	4.09
	Long wall 2	1	4.06	0.9	0.9	3.29	0.9/2+3.16+0.9/2	4.06
	10) Balcony = 3.04x1.22							
	Long wall	1	4.09	0.9	0.9	3.32	0.9/2+3.19+0.9/2	4.09
	Total RMC in Foundation				**x4 (for 4 flats)**		**219.61**	**Cu. m.**

3)								
	Plinth Level							
	1) Master Bed Room = 3.66x3.04							
	Long wall	2	3.945	0.15	0.3	0.36	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15	0.3	0.28	(-0.15/2+3.175-0.15/2)	3.02
	2) Toilet 1 = 1.77x1.22							
	Short wall	2	1.19	0.15	0.3	0.11	(-0.15/2+1.34-0.15/2)	1.19
	3) Toilet 2 = 1.22x1.22							
	Short wall 1	1	1.755	0.15	0.3	0.08	(-0.15/2+1.905-0.15/2)	1.75
	4) C. Bed Room = 3.66x3.04							
	Long wall	2	3.945	0.15	0.3	0.36	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15	0.3	0.28	(-0.15/2+3.175-0.15/2)	3.02
	5) Kitchen = 2.75x3.04							
	Long wall	2	3.035	0.15	0.3	0.28	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15	0.3	0.28	(-0.15/2+3.175-0.15/2)	3.02
	6) Pooja Room = 1.22x1.22							
	Short wall	2	1.19	0.15	0.3	0.11	(-0.15/2+1.34-0.15/2)	1.19
	7) Store Room = 1.42x1.22							
	Short wall	1	1.405	0.15	0.3	0.07	(-0.15/2+1.555-0.15/2)	1.40

	8) Study Room = 2.75x3.04							
	Long wall	2	3.035	0.15	0.3	0.28	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15	0.3	0.28	(-0.15/2+3.175-0.15/2)	3.02
	9) Hall = 3.04x3.04							
	Long wall 1	1	3.34	0.15	0.3	0.16	0.15/2+3.19+0.15/2	3.34
	Long wall 2	1	3.31	0.15	0.3	0.15	0.15/2+3.16+0.15/2	3.31
	10) Balcony = 3.04x1.22							
	Long wall	1	3.34	0.15	0.3	0.16	0.15/2+3.19+0.15/2	3.34
	Total Plinth Level		**x (for 4 flats)**				**12.605**	**Cu. m.**

4)	**Dam Proof Course**							
	1) Master Bed Room = 3.66x3.04							
	Long wall	2	3.945	0.15		1.19	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15		0.91	(-0.15/2+3.175-0.15/2)	3.02
	2) Toilet 1 = 1.77x1.22							
	Short wall	2	1.19	0.15		0.36	(-0.15/2+1.34-0.15/2)	1.19
	3) Toilet 2 = 1.22x1.22							
	Short wall 1	1	1.755	0.15		0.27	(-0.15/2+1.905-0.15/2)	1.75
	4) C. Bed Room = 3.66x3.04							
	Long wall	2	3.945	0.15		1.19	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15		0.91	(-0.15/2+3.175-0.15/2)	3.02
	5) Kitchen = 2.75x3.04							
	Long wall	2	3.035	0.15		0.92	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15		0.91	(-0.15/2+3.175-0.15/2)	3.02
	6) Pooja Room = 1.22x1.22							
	Short wall	2	1.19	0.15		0.36	(-0.15/2+1.34-0.15/2)	1.19
	7) Store Room = 1.42x1.22							
	Short wall	1	1.405	0.15		0.22	(-0.15/2+1.555-0.15/2)	1.40
	8) Study Room = 2.75x3.04							
	Long wall	2	3.035	0.15		0.92	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15		0.91	(-0.15/2+3.175-0.15/2)	3.02
	9) Hall = 3.04x3.04							
	Long wall 1	1	3.34	0.15		0.51	0.15/2+3.19+0.15/2	3.34
	Long wall 2	1	3.31	0.15		0.50	0.15/2+3.16+0.15/2	3.31
	10) Balcony = 3.04x1.22							
	Long wall	1	3.34	0.15		0.51	0.15/2+3.19+0.15/2	3.34
	Deduction							
	Main Door	2	1.4	0.15		0.42		
	Door 1	3	1.2	0.15		0.54		
	Door 2	3	0.9	0.15		0.405		
	Opening	2	1	0.15		0.3		
	Total Dam Proof Course	**x4 (for 4 flats)**				**35.358**	**Sq. m.**	

5)	Soil Filing Upto Plinth						
	1) Master Bed Room = 3.66x3.04	1	3.66	3.04	0.3	3.34	
	2) Toilet 1 = 1.77x1.22	1	1.77	1.22	0.3	0.65	
	3) Toilet 2 = 1.22x1.22	1	1.22	1.22	0.3	0.45	
	4) C. Bed Room = 3.66x3.04	1	3.66	3.04	0.3	3.33	
	5) Kitchen = 2.75x3.04	1	2.75	3.04	0.3	2.56	
	6) Pooja Room = 1.22x1.22	1	1.22	1.22	0.3	0.45	
	7) Store Room = 1.42x1.22	1	1.42	1.22	0.3	0.52	
	8) Study Room = 2.75x3.04	1	2.75	3.04	0.3	2.51	
	9) Hall = 3.04x3.04	1	3.04	3.04	0.3	2.78	
	10) Balcony = 3.04x1.22	1	3.04	1.22	0.3	1.12	
	11)Dinning = 3.04x3.08	1	3.04	3.08	0.3	2.81	
	Total Soil Filing Upto Plinth	x4 (for 4 flats)			81.786	Cu.m.	

B) Super Structure							
6)	Brick work in Super Structure						
	1) Master Bed Room = 3.66x3.04						
	Long wall	2	3.945	0.15	3	3.56	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15	3	2.73	(-0.15/2+3.175-0.15/2)	3.02
	2) Toilet 1 = 1.77x1.22						
	Short wall	2	1.19	0.15	3	1.08	(-0.15/2+1.34-0.15/2)	1.19
	3) Toilet 2 = 1.22x1.22						
	Short wall 1	1	1.755	0.15	3	0.79	(-0.15/2+1.905-0.15/2)	1.75
	4) C. Bed Room = 3.66x3.04						
	Long wall	2	3.945	0.15	3	3.56	0.15/2+3.795+0.15/2	3.94
	Short wall	2	3.025	0.15	3	2.73	(-0.15/2+3.175-0.15/2)	3.02
	5) Kitchen = 2.75x3.04						
	Long wall	2	3.035	0.15	3	2.74	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15	3	2.73	(-0.15/2+3.175-0.15/2)	3.02
	6) Pooja Room = 1.22x1.22						
	Short wall	2	1.19	0.15	3	1.08	(-0.15/2+1.34-0.15/2)	1.19
	7) Store Room = 1.42x1.22						
	Short wall	1	1.405	0.15	3	0.64	(-0.15/2+1.555-0.15/2)	1.40
	8) Study Room = 2.75x3.04						
	Long wall	2	3.035	0.15	3	2.74	0.15/2+2.885+0.15/2	3.03
	Short wall	2	3.025	0.15	3	2.73	(-0.15/2+3.175-0.15/2)	3.02
	9) Hall = 3.04x3.04						
	Long wall 1	1	3.34	0.15	3	1.56	0.15/2+3.19+0.15/2	3.34
	Long wall 2	1	3.31	0.15	3	1.49	0.15/2+3.16+0.15/2	3.31
	10) Balcony = 3.04x1.22						
	Long wall	1	3.34	0.15	3	1.51	0.15/2+3.19+0.15/2	3.34
	Deducaution						
	Main Door	2	1.4	0.15	2.1	0.882	
	Door 1	3	1.2	0.15	2.1	1.134	
	Door 2	3	0.9	0.15	1.9	0.7695	

Opening	2	1	0.15	2.1	0.63	
Window	4	1.4	0.15	1.4	1.176	
Ventilator	4	1.2	0.15	0.8	0.576	
Lintel over Main Door	2	1.55	0.15	0.15	0.06975	
Lintel over Door 1	3	1.35	0.15	0.15	0.091125	
Lintel over Door 2	3	1.05	0.15	0.15	0.070875	
Lintel over Opening	2	1.15	0.15	0.15	0.05175	
Lintel over Window	4	1.55	0.15	0.15	0.1395	
Lintel over Ventilator	4	1.35	0.15	0.15	0.1215	
Total Brick work in Super Structure	**x12 (for 4 flats in 3 floors)**				**309.62**	**Cu. m.**

7)

Plastering in Super Structure (Inside & Outside)							
1) Master Bed Room = 3.66x3.04							
Long wall	4	3.945	0.15		2.37	0.15/2+3.795+0.15/2	3.94
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
2) Toilet 1 = 1.77x1.22							
Short wall	4	1.19	0.15		0.72	(-0.15/2+1.34-0.15/2)	1.19
3) Toilet 2 = 1.22x1.22							
Short wall 1	2	1.755	0.15		0.53	(-0.15/2+1.905-0.15/2)	1.75
4) C. Bed Room = 3.66x3.04							
Long wall	4	3.945	0.15		2.37	0.15/2+3.795+0.15/2	3.94
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
5) Kitchen = 2.75x3.04							
Long wall	4	3.035	0.15		1.83	0.15/2+2.885+0.15/2	3.03
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
6) Pooja Room = 1.22x1.22							
Short wall	4	1.19	0.15		0.72	(-0.15/2+1.34-0.15/2)	1.19
7) Store Room = 1.42x1.22							
Short wall	2	1.405	0.15		0.43	(-0.15/2+1.555-0.15/2)	1.40
8) Study Room = 2.75x3.04							
Long wall	4	3.035	0.15		1.83	0.15/2+2.885+0.15/2	3.03
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
9) Hall = 3.04x3.04							
Long wall 1	2	3.34	0.15		1.01	0.15/2+3.19+0.15/2	3.34
Long wall 2	2	3.31	0.15		0.10	0.15/2+3.16+0.15/2	3.31
10) Balcony = 3.04x1.22							
Long wall	2	3.34	0.15		1.01	0.15/2+3.19+0.15/2	3.34
Deduction							
Main Door	4	1.4	0.15		0.84		
Door 1	6	1.2	0.15		1.08		
Door 2	6	0.9	0.15		0.81		
Opening	4	1	0.15		0.6		
Window	8	1.4	0.15		1.68		
Ventilator	8	1.2	0.15		1.44		

Lintel over Main Door	4	1.55	0.15		0.93	
Lintel over Door 1	6	1.35	0.15		1.215	
Lintel over Door 2	6	1.05	0.15		0.945	
Lintel over Opening	4	1.15	0.15		0.69	
Lintel over Window	8	1.55	0.15		1.86	
Lintel over Ventilator	8	1.35	0.15		1.62	
Total Plastering of Super Structure (Inside & Outside) x12 (for 4 flats in 3 floors)					**87.588**	**Sq. m.**

8)

Painting in Super Structure (Inside & Outside)							
1) Master Bed Room = 3.66x3.04							
Long wall	4	3.945	0.15		2.37	0.15/2+3.795+0.15/2	3.94
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
2) Toilet 1 = 1.77x1.22							
Short wall	4	1.19	0.15		0.72	(-0.15/2+1.34-0.15/2)	1.19
3) Toilet 2 = 1.22x1.22							
Short wall 1	2	1.755	0.15		0.53	(-0.15/2+1.905-0.15/2)	1.75
4) C. Bed Room = 3.66x3.04							
Long wall	4	3.945	0.15		2.37	0.15/2+3.795+0.15/2	3.94
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
5) Kitchen = 2.75x3.04							
Long wall	4	3.035	0.15		1.83	0.15/2+2.885+0.15/2	3.03
Short wall	4	3.025	0.15		1.81	(-0.15/2+3.175-0.15/2)	3.02
6) Pooja Room = 1.22x1.22							
Short wall	4	1.19	0.15		0.72	(-0.15/2+1.34-0.15/2)	1.19
7) Store Room = 1.42x1.22							
Short wall	2	1.405	0.15		0.43	(-0.15/2+1.555-0.15/2)	1.40
8) Study Room = 2.75x3.04							
Long wall	4	3.035	0.15		1.83	0.15/2+2.885+0.15/2	3.03
Short wall	4	3.025	0.15		1.82	(-0.15/2+3.175-0.15/2)	3.02
9) Hall = 3.04x3.04							
Long wall 1	2	3.34	0.15		1.01	0.15/2+3.19+0.15/2	3.34
Long wall 2	2	3.31	0.15		0.10	0.15/2+3.16+0.15/2	3.31
10) Balcony = 3.04x1.22							
Long wall	2	3.34	0.15		1.01	0.15/2+3.19+0.15/2	3.34

Deduction					
Main Door	4	1.4	0.15		0.84
Door 1	6	1.2	0.15		1.08
Door 2	6	0.9	0.15		0.81
Opening	4	1	0.15		0.6
Window	8	1.4	0.15		1.68
Ventilator	8	1.2	0.15		1.44
Lintel over Main Door	4	1.55	0.15		0.93
Lintel over Door 1	6	1.35	0.15		1.215
Lintel over Door 2	6	1.05	0.15		0.945
Lintel over Opening	4	1.15	0.15		0.69
Lintel over Window	8	1.55	0.15		1.86

	Lintel over Ventilator	8	1.35	0.15		1.62	
	Total Painting in Super Structure (Inside & Outside) x12 (for 4 flats in 3 floors)					**87.588**	**Sq.m.**
9)	**Slab for each Room**						
	1) Master Bed Room = 3.66x3.04	1	3.66	3.04	0.15	1.66896	
	2) Toilet 1 = 1.77x1.22	1	1.77	1.22	0.15	0.32391	
	3) Toilet 2 = 1.22x1.22	1	1.22	1.22	0.15	0.22326	
	4) C. Bed Room = 3.66x3.04	1	3.66	3.04	0.15	1.66896	
	5) Kitchen = 2.75x3.04	1	2.75	3.04	0.15	1.254	
	6) Pooja Room = 1.22x1.22	1	1.22	1.22	0.15	0.22326	
	7) Store Room = 1.42x1.22	1	1.42	1.22	0.15	0.25986	
	8) Study Room = 2.75x3.04	1	2.75	3.04	0.15	1.254	
	9) Hall = 3.04x3.04	1	3.04	3.04	0.15	1.38624	
	10) Balcony = 3.04x1.22	1	3.04	1.22	0.15	0.55632	
	11)Dinning = 3.04x3.08	1	3.04	3.08	0.15	1.40448	
	Total Slab work	**x12 (for 4 flats in 3 floors)**				**122.68**	**Cu. m.**
10)	**Plaster of Paris for Slab**						
	1) Master Bed Room = 3.66x3.04	1	3.66	3.04	0.15	1.66896	
	4) C. Bed Room = 3.66x3.04	1	3.66	3.04	0.15	1.66896	
	8) Study Room = 2.75x3.04	1	2.75	3.04	0.15	1.254	
	9) Hall = 3.04x3.04	1	3.04	3.04	0.15	1.38624	
	11)Dinning = 3.04x3.08	1	3.04	3.08	0.15	1.40448	
	Total Plaster of Paris For Slab	**x12 (for 4 flats in 3 floors)**				**88.592**	**Cu. m.**
11)	**Size of columns**						
	Column 1	48	0.38	0.23	3	12.5856	
	Total Size of columns	**x4 (for G+3 floors)**				**50.342**	**Cu.m.**
12)	**Size of Beams**						
	Beam 1	12	0.3	0.23	3.77	3.12156	
	Beam 2	28	0.3	0.23	3.28	6.33696	
	Beam 3	12	0.3	0.23	2.86	2.36808	
	Beam 4	16	0.3	0.23	4.49	4.95696	
	Beam 5	16	0.3	0.23	1.75	1.932	
	Total Size of Beams	**x4 (for G+3 floors)**				**74.862**	**Cu.m.**
13)	**Size of Stair Case**						
	Size of Single Step	9	0.8	0.4	0.3	0.864	
	Size of Landing	1	1.75	0.3	0.3	0.1575	

	Total Size of Stair Case	x4 (for G+3 floors)	4.086	Cu.m.

Table-2.0: Labors& Material charges

1) Excavation in foundation						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	20	40	700/day	20x40x700	560000
2	Mazdoors	16	40	600/day	416x40x600	384000
3	Auger boring	12	40	1000/day	12x40x1000	480000
					TOTAL COST RS =	**1424000**

2) RMC in Foundation						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Black Smit	12	10	750/day	12x10x750	90000
2	Beldars	12	10	700/day	12x10x700	84000
					TOTAL COST RS =	**174000**

3) Plinth level						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	12	20	700/day	12x20x700	168000
2	Mazdoors	12	20	600/day	12x20x600	144000
3	Bhisti	6	20	650/day	6x20x650	78000
4	Mason	4	20	650/day	4x20x650	52000
5	Bar Bender	4	10	500/day	4x10x500	20000
6	Mix Motors	4	20	1000/day	4x20x1000	80000
					TOTAL COST RS =	**542000**

4) Soil Filing Up to Plinth						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	8	10	700/day	8x10x700	56000
2	Mazdoors	12	10	600/day	12x10x600	72000
3	Bhisti	2	10	650/day	2x10x650	13000
4	Mix Motors	2	10	1000/day	2x10x1000	20000
					TOTAL COST RS =	**161000**

5) Brick work in Super Structure						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Mason	36	20	650/day	36x20x650	468000
2	Beldars	24	20	700/day	24x20x700	336000
3	Mazdoors	24	20	600/day	24x20x600	288000
4	Bhisti	6	20	650/day	6x20x650	78000
5	Mix Motors	6	20	1000/day	6x20x1000	120000
					TOTAL COST RS =	**1290000**
6) Plastering in Super Structure						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	24	30	700/day	24x30x700	504000
2	Mazdoors	36	30	600/day	36x30x600	648000
3	Mason	6	30	650/day	6x30x650	117000
4	Mix Motors	6	30	1000/day	6x30x1000	180000
					TOTAL COST RS =	**1449000**

7) Painting in Super Structure						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Painters	36	40	800/day	36x40x800	1152000
2	Mazdoors	24	40	600/day	24x40x600	576000
					TOTAL COST RS =	**1728000**

8) Flooring						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Mason	60	20	650/day	60x20x650	780000
2	Beldars	48	20	700/day	48x20x700	672000
3	Mazdoors	36	20	600/day	36x20x600	432000
4	Bhisti	72	20	650/day	72x20x650	936000
					TOTAL COST RS =	**2820000**

9) Slab Work						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	72	20	700/day	72x20x700	1008000
2	Mazdoors	48	20	600/day	48x20x600	576000
3	Mason	32	20	650/day	32x20x650	416000
4	Carpentor	12	20	750/day	12x20x750	180000
5	Bar Bender	12	10	500/day	12x10x500	60000
					TOTAL COST RS =	**2240000**

10) Beams Columns						
S.NO	**LABOUR**	**NUMBERS**	**DAYS**	**RATE**	**COST**	
1	Beldars	48	30	700/day	48x30x700	1008000
2	Mazdoors	32	30	600/day	32x30x600	576000
3	Bhisti	60	30	650/day	60x30x650	1170000
4	Mason	48	30	650/day	48x30x650	936000
5	Carpentor	12	30	750/day	12x30x750	270000
6	Black smit	24	30	750/day	14x30x750	315000
7	Bar Bender	6	10	500/day	6x10x500	30000
					TOTAL COST RS =	**4305000**

Miscellaneous work is the 10% of the whole cost	16133000x10/100	**1613300**
Project Manager 10% of the whole cost	17746300x10/100	**1774630**
TOTAL LABOUR & MATERIAL CHARGES Labor = Rs		**1,95,21,000**

RESULTS &DISCUSSIONS:

Table-3: Total cost of construction

1)	Earth work excavation	658.82	Cu.m
2)	RMC in Foundation	658.82	Cu.m
3)	Plinth Level	12.605	Cu.m
4)	Dam Proof Course	35.358	Sq.m
5)	Soil Filing Upto Plinth	81.786	Cu.m
6)	Brick work in Super Structure	309.62	Cu.m
7)	Plastering of Super Structure	87.588	Sq.m
8)	Painting in Super Structure	87.588	Sq.m

9)	Slab work	122.68	Cu.m
10)	Plaster of Paris For Slab	88.592	Sq.m
11)	columns	50.342	Cu.m
12)	Beams	74.862	Cu.m
13)	Stair Case	44.086	Cu.m

TOTAL COST OF THE G+3 RESIDENTIAL BUILDING

Rs = 2,48,62,000/-

CONCLUSIONS:

- Designing, Drawing & Estimation of G+3 multi-storey residential building was done.
- It's a G+3 storied building with parking in the basement and the rest of thefloors are occupied with apartments. All the structural components were designedmanuallyanddetailedusingAUTO REVIT ARCHITECTURE.
- TheEstimation of the G+3 Residential Buildingisdoneaccording to standard 8 specifications using M. S. EXCEL for each every property. The Calculations proved to be correct. And the oretical work has been done.
- Hence, I conclude that we can gain more knowledge in practical work when compared to the oretical work.

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