



# Design and Modelling of G+5 Commercial Building by Autodesk Revit Architecture

E. Rakesh Reddy, S. Kailashkumar

**ABSTRACT**---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. With 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 Modeling (BIM). 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. Use the information-rich models that Autodesk Revit Architecture is useful for make more informed Building designs decisions to support sustainable design, clash detection, construction planning, and fabrication Installation. Revit Architecture will clear picture of building excellent visualization by using V-ray software, that is made for Rendering purpose. For commercial buildings it will very helpful for visualize building before construction is made in the field.

When the Revit Architecture window is displayed, there we can see the different types of templates such as construction template, structure template, Architecture template. To accomplish this project i.e for design and modeling we use to select Architecture template.

**Keywords :** Families, components, mass IN-site, Levels, Grid lines.

## 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 V-ray rendering software 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 elements 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 across all 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.

Revised Manuscript Received on December 30, 2019.

\* Correspondence Author

E. Rakesh Reddy, Civil Engineering, Malla Reddy Engineering College, Hyderabad, Telangana, India.

S.Kailashkumar, Civil Engineering, Malla Reddy Institute of Technology, Hyderabad, Telangana, India

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

### A. Building Information Modeling(Bim):

•Now a days it is need of deliver of projects rapidly, more economically, and with enhanced potential for reduced environmental impact.

•The purpose of Autodesk Revit Architecture is made for BIM. BIM is an integrated process built on coordinated, reliable information about a project from design through construction and into operations.

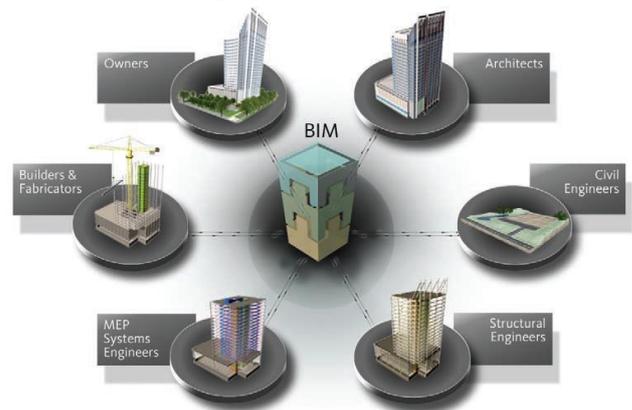


Fig. 1. BIM Process

### B. Starting a Project:

1. Double Click and open Revit software
2. Initially 1st we need to select Revit architecture template from template panel
3. Then we will entering into the Revit GUI
4. We can see left side properties box and right side project browser.
5. In view menu manage units and set the units as per need
6. Now set the grids.
7. Go to application menu bar save the file with require name in specified folder.

## II .PROJECT IN REVIT

### A. Creating a Project:

1. Before going to design the model in revit get the plan from architect.
2. As per need set the units.
3. Using grid line draw the plan view.
4. Using draw panel draw the grid lines.
5. In draw panel we have line, circle, rectangle, arc etc options.
6. Using these draw panel select the tools and complete the grid line diagram.

7. In properties box some modifying tools will be there to modify the grid lines.

8. Using copy, move, rotate, array options we can complete the grid diagram in less time.

### B. Name and Save The Project File:

1. After deciding project name save the file as soon as possible
2. If we save the file means we can avoid the file distraction at any moment due to power loss problem etc.
3. Click Application menu bar
4. Click on save
5. Select the required path folder, then give the name, to easy identify

### B. Zoom To a View:

1. In Revit we have various zoom options to see the model very clearly.
2. Zoom in Region.
3. Zoom out (2X).
4. Zoom to fit.
5. Zoom all to fit.
6. Window zoom.
7. Zoom Sheet size.
8. We have full navigation wheel also to have clear visualization of the model.

### C. Rename Levels:

1. As per the requirement we need to create the levels also for the multystoreyed building
2. For levels in go to architecture panel
3. Select level option in datum panel
4. Now draw the levels by giving floor height
5. Name the each level such ground floor, 1sr floor etc
6. Using offset option we can give the floor height
7. In level at the two ends of the level line we have grids for adjusting level line and it will show temporary dimensions also for changing.

### D. Components:

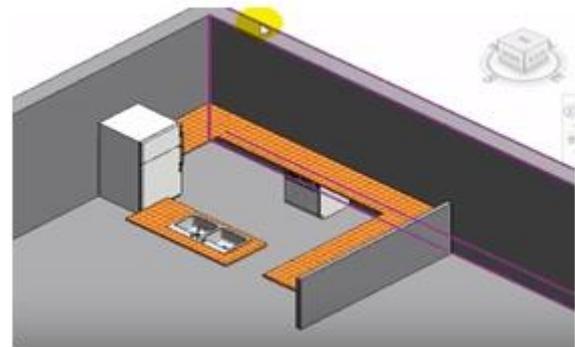
1. In component panel we have some categories in that we have doors, windows, Gates, Railings, Beds, all furnitures etc. objects, which have already created and it will available by installing Revit Architecture software itself.
2. We can import those components by selecting component option, go to browse, select the components as per need then place it in our model as per our requirement.
3. Wherever we want we can place it, and double click on that component it turns to new window in that we can modify the component modify it also, as per our need. This is best option in Revit, very userfriendly to modify the components as per our need.



**Fig. 2. Component Panel**



**Fig. 3. Available Components**



**Fig. 4. Components Placed In our Model**

### 6. Family Creation:

1. Families are nothing but components like door windows, furniture, railings, post balusters, columns, gates etc, but we need to create these as per need and we can place it in our model.
2. Creating families is very important in Revit Architecture
3. Using reference lines and reference planes, we need to draw Profile of the object as per our need
4. To make these components we have number of advanced tools.
5. Go to create panel in design panel we have tools like Extrusion, sweep, Blend revolve, Swept Blend etc
6. Using these above tools we can draw the components, and we have to save it in specifies path as family
7. To save go to application menu
8. Select save as
9. Then select family, save with required name example 'Table' could be considered one of the families within the category of Furniture.



Fig. 5. Family Creation Model

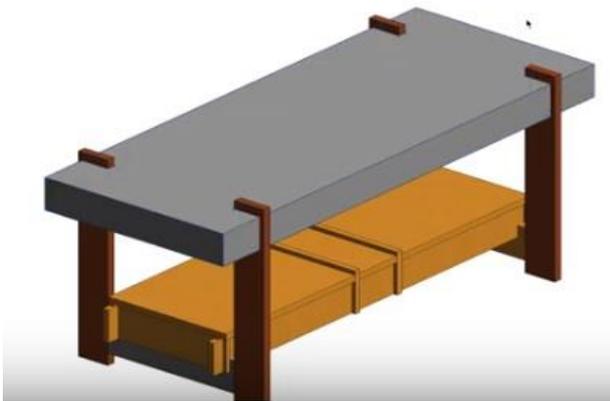


Fig. 6. Family in Realistic View Model

**III. ADDING EXTERIOR WALLS**

In this exercise, we will know how to create the wall and creating different types wall such as

1. Generic walls
2. Curtain wall
3. Stacked wall
4. Go to architecture panel
5. Select the wall panel
6. Then select wall Architectural
7. Then go to properties browser
8. Select the type of wall which you want
9. Then go to edit type, duplicate it and name it
10. Again go to edit option to change thickness material also
11. After that give the height for the wall
12. Then using draw panel draw the wall as per Architect plan by taking reference as the grid line diagram
13. But for the stacked wall, and curtain wall it will be different:
14. For the stacked wall firstly we need to create normal walls of different thickness, height, as per need
15. Then we will combine those walls from properties browser.
16. For curtain walls there are 3 types:
  1. Curtain wall: it will give directly plain type wall, there will be no curtain grids, mullions, we need add these after drawing the wall.
  2. Exterior Glazing: it will be available with Curtain grids only.

3. Store front: It will be available with Curtain grids and Mullions.

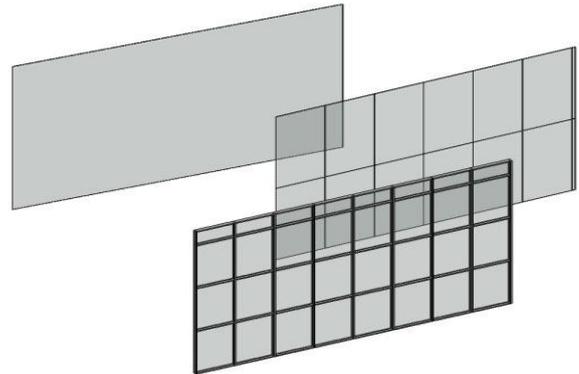


Fig. 7. Types of Curtain Wall

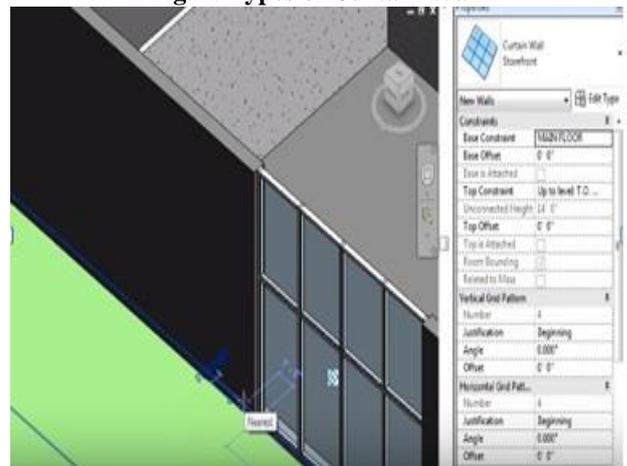


Fig. 8. Combination of Curtain Wall and Generic Wall

**IV. ADDING A ROOF**

In this exercise, we can know the how to create the roofs with diffent shapes and different types

1. Go to architecture tab
2. Select the roof
3. Then using draw panel draw the roof shape as per need
4. from properties we can give slope value as per need
5. By removing define slope we can have the flat slab.
6. We have roof by extrusion option to have the roof by drawing a plan like arc, line or combination of line and arc from elevation view

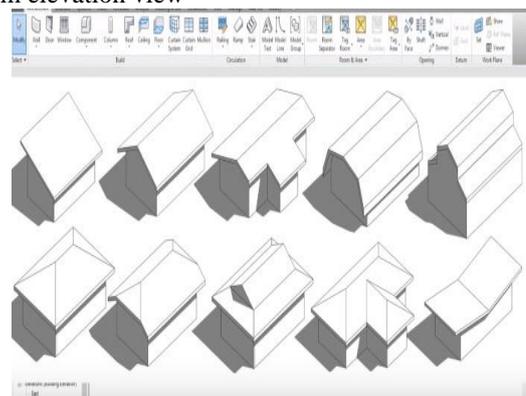
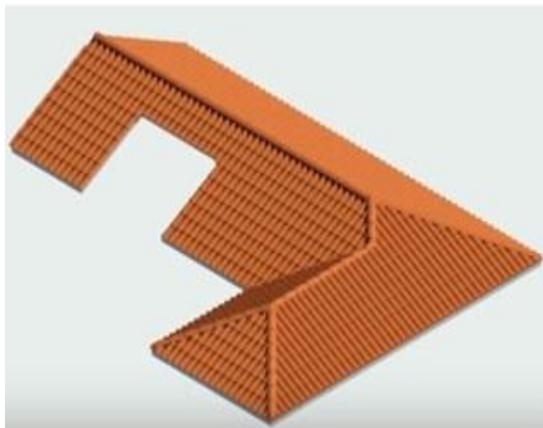


Fig. 9. Types of Roofs

1. Using offset option we can give the setbacks also
2. Using modify tools such as trim/extend, split tool we can modify the roof.
3. After creation of roof then from properties browser edit type we can change thickness and we can give the materials also.



**Fig. 10. Roof after Assigning Material**

## V. ADDING FLOORS

In this exercise, we can create floors in different shape

1. Select floor plan from project browser
2. Then architecture panel
3. Select architecture floor
4. Using draw panel draw the floor plan shape
5. Go to properties edit type, duplicate it, and name it with required name
6. We can change thickness and material also
7. We can the floors using the Pick line method, pick wall edge method
8. Drawing a closed figure in already drawn closed boundary will create hole in that particular area
9. Like that select each floor plan and draw the floors as per need
10. If the floors for all floors is same then we can copy also by using copy to clip board and paste option.



**Fig. 11. Floor in Model**

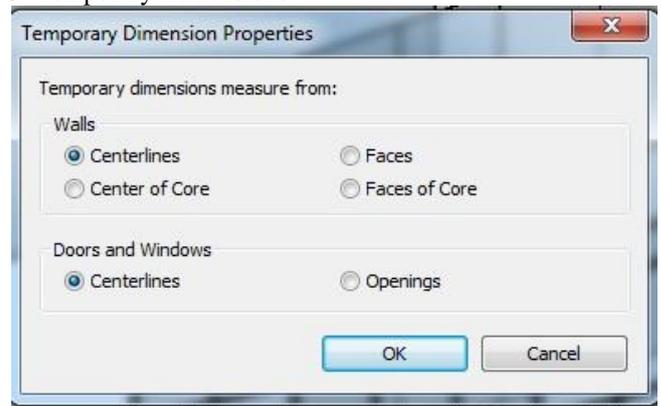
### A. Temporary Dimensions Settings:

1. we can change the dimension by double click on dimension line
2. we can lock the dimension to avoid changing the dimension.

### B. To Specify Temporary Dimension Settings:

1. Click Manage tab

2. Additional Settings button
3. Temporary Dimensions.



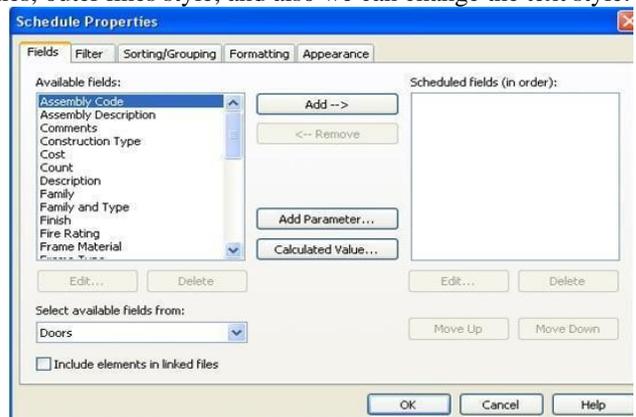
**Fig. 12. Temporary Dimension Property**

## VI. RESULTS

### Schedules & Quantities:

#### Procedure:

1. Click View tab
2. Create panel
3. Schedules drop-down
4. Schedule/Quantities.
5. In the New Schedule dialog, select a category from the category list as doors.
6. Select field from available fields such as family, width, height etc.
7. Click OK.
8. Select the scheduled Fields tab to add/remove field names in the schedule.
9. Using filter option we can filter the Doors by selecting the fields which we have selected previously.
10. On the Sorting/Grouping tab of the Schedule We can sort by using different fields as we initially selected like height, thick, and family type etc.
11. Using formatting option we can set orientation and alignment for door specifications which we have selected initially.
12. Using Appearance tab we can change the grid lines, outer lines style, and also we can change the text style.



**Fig. 13. Door Schedule Property Box**

<Door Schedule>		
A	B	C
Cost	Type	Count
2000.00	16" x 54" 2	15
2000.00: 15		
2200.00	36" x 80"	1
2200.00: 1		
2500.00		97
2500.00: 97		
3000.00		27
3000.00: 27		

Fig. 14. Door Schedule Fields Details

VII. CONCLUSION

This project gives the realistic modeling of building and accurate families ranging from furniture to lighting fixtures, as well as import existing models from other softwares like Auto CAD etc. We can get the approximate estimations of building also using Revit Architecture. In this Project we have done planning, modeling, scheduling of Doors and we have created families also for this commercial building.

A clear design and modeling of a commercial building with the efficient structural and architectural plans. It provides the overall knowledge of material take off and schedule/quantities in the model of the building defined in the project. 3 D realistic view give the clear picture about the family and the components placed with in the building model.

REFERENCES

1. Chopra, Anil k. (1995), "Dynamics of structures", Prentice Hall.
2. Daryl L. Logan (2007), "A First Course in the Finite Element Method", Thomson, USA
3. Fall H.G (2006), "Direct Stiffness Method For 2D Frames-Theory of structure".
4. Garcia Reyes, Hajirasouliha Iman, Pilakoutas Kypros, (2010), "Seismic behaviour of deficient RC frames strengthened with CFRP composites". Engineering Structures 32 (2010)
5. Yusuf Arayici, Charles Egbu, Paul Coates, Building Information Modelling (Bim) Implementation And Remote Construction Projects: Issues, Challenges, And Critiques (Published: May 2012 Itcon/2012/5).
6. N.S Chougale and Prof. B. A. Konnur, "A Review of Building Information Modelling (BIM) for construction industry", International journal of Innovative research in advance engineering, Vol. 2, Issue 4, pp. 98-102, 2015.
7. Z. Pucko, N suman, and U. Klansek, (2014), "Building information modeling based time and cost planning in construction projects", technology and management in construction an international journal.
8. J. V. Kumar and Muhua Mukherjee, "Scope of building information modeling (BIM) in India", Journal of engineering science and technology, pp. 165-169, 2009.
9. Wong, K.A., Nadim, A and Wong, F.K (2011) "Building Information Modeling for tertiary construction education in Hong Kong", Journal of Information Technology in Construction (ITcon), 16:467-476, [Online] Available from <http://www.itcon.org/2011/27> [Accessed: 25th Jan, 2013].
10. Kumar, J.V. and Mukherjee, M. (2009) "Scope of Building Information Modeling (BIM) in India", Journal of Engineering Science and Technology Review, 2 (1) 165- 169

AUTHORS PROFILE



Mr. E. Rakesh Reddy holds M.Tech (Structural Engineering) from Malla Reddy Engineering College (Autonomous), Hyderabad. He is currently working as Assistant Professor in Malla Reddy Engineering College (Autonomous). He has published a paper on "Application of Green material for the preparation of Eco friendly Bricks and Pavers" in IJET Scopus Journal in September 2018. He has Participated the International Conference on " Transformations in Engineering Education- Imparting Futuristic Skills" in SRM University-Amaravathi.



Mr. S. Kailash Kumar holds M.Tech (Structural Engineering) from Malla Reddy Engineering College (Autonomous), Hyderabad. He is currently working as Assistant Professor in Malla Reddy Institute of Technology. He has published an International Journal in IJRSAE and also Scopus Indexed Journal in IJITEE. Organized a Two day FDP -ITCE 2K17 in MRIT College. Participated in National conference in MREC college