CHAPTER 2

2.1 Drawing Aids

Revit provides dimensions and other indicators that help in building the design model accurately. These aids include listening dimensions, alignment lines, and snaps.

Drawing aids appear as objects are created or placed while sketching a design. For example, when a wall is placed in a building, listening dimensions and alignment lines appear to show its position with reference to nearby walls. A snap appears when a new wall is joined to an existing wall.

2.1.1 Alignment Lines

Alignment lines appear when the cursor is moved horizontally or vertically, or when the extension of a line or wall is crossed while placing an element.

2.1.2 Snaps

Snaps appear when the cursor is moved over geometric points in a sketch, such as endpoints and midpoints. Snaps display individual icons for recognition. You can enable or disable object snaps, and specify dimension snap increments. You can also override snap settings using keyboard shortcuts (Figure 1).

Setting Snap Increment

When you are placing an element or component in a view, the listening dimensions are showing according to the defined length dimension snap increment. Likewise when you are placing the element in an angle the angle snap dimension increases according to the defined angle dimension snap increment.

1. Click Manage tab » Settings panel » Snaps.
2. Select Length dimension snap increments and Angular dimension snap increments to turn on the snaps.
3. Enter the snapping increment values, separating increments with semicolons. There is no limit to the number of increments you can specify.
4. Click OK. Figure 1

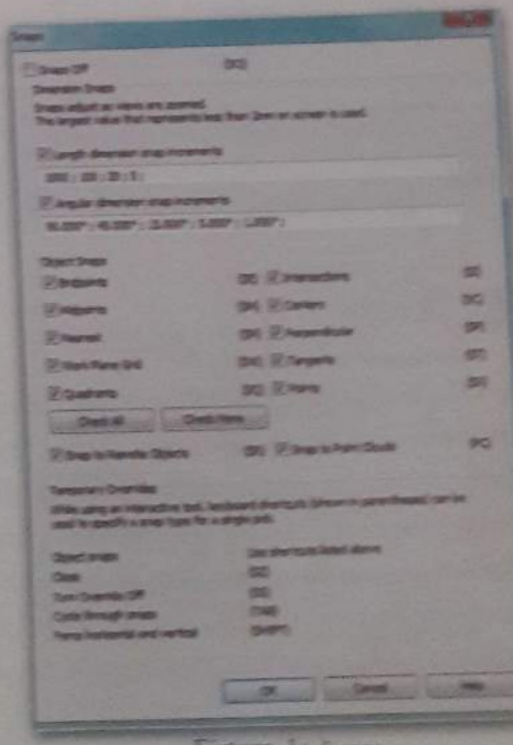


Figure 1: Snaps

Enabling and Disabling Snap

For enabling and disabling do the following

- Select Snaps Off to disable all snapping in the project.
- Select or clear the appropriate object snaps.

Temporarily Overriding Snap Settings

When you are working in a project, you can use shortcut key combinations or the right-click shortcut menu to temporarily override snap settings. Temporary overrides affect a single pick only. (Figure 2)

2.1.3 Project Units

The display format of the various quantities in a project can be specified. The display format specified affects the appearance of quantities on the screen and in a printout. The format of various data for informational or presentation purposes can also be specified.

Project units are grouped by discipline, such as common, structural, or electrical. When the discipline is changed, different unit types become available. In the Project Units dialog, the display format of each unit type can be previewed. For example, length may have a display format of 1' 5½". (Figure 3).

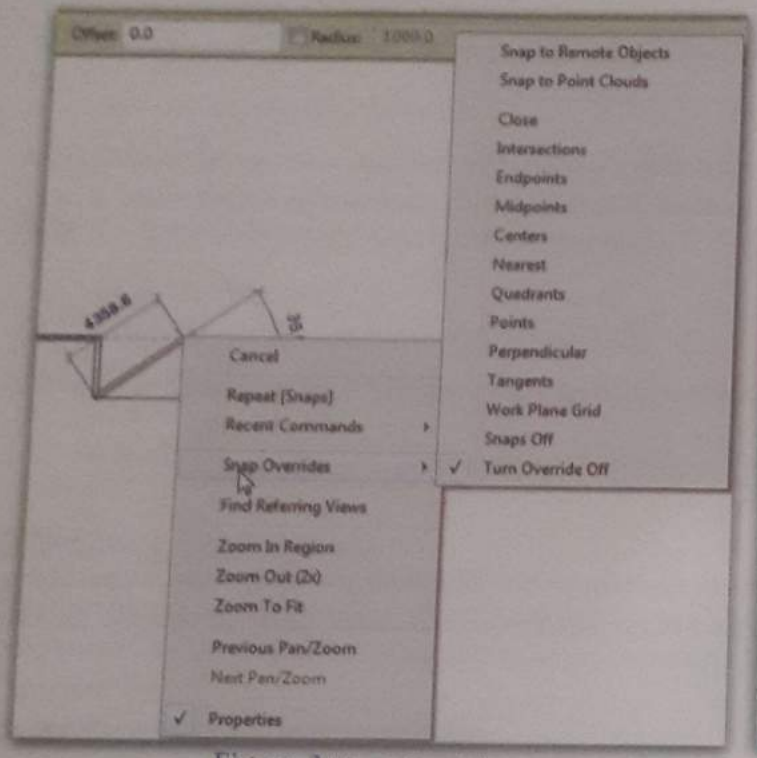


Figure 2: Snap Overrides

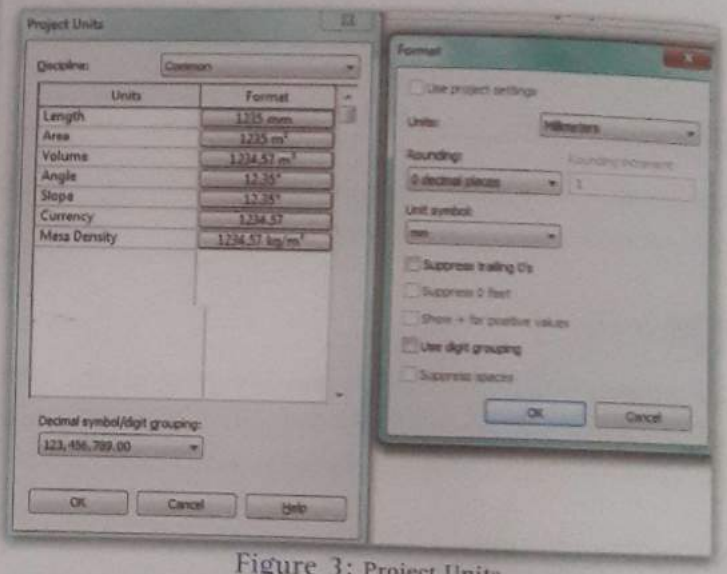


Figure 3: Project Units

The actual display of editable values that affect the size of the model may be different. For example, one may specify that dimensions be rounded off to the nearest 1 inch; however, if the dimension value is edited in the drawing area, it may show a value that has fractional inches.

2.2 Levels

Levels are 3D elements that are only visible in views that intersect the level extents. Most building elements such as floors and beams are hosted by levels. Other elements such as columns and walls are constrained to levels.

The Level tool is used to define a vertical height or story within a building. Creating a level for each known story or other needed reference of the building (for example, the first floor, top of wall, or base of the foundation) is now simple with this tool. Levels can be added only on the section or elevation views, and adding levels helps create an associated plan view. Levels are finite horizontal planes that act as a reference for level-hosted elements, such as roofs, floors, and ceilings. Level extents can be resized so that they do not display in certain views. One can also hide level annotations after adding them.

Step 1: Open a Project

1. Click on Application menu » New » Project » open Default Metric.rte (Figure 4).
2. In the project bowser, double click North elevation view.
3. Manage » Settings panel » Select Project units.
4. Select the length format: Millimeter. If requires give the Unit Symbol also (Figure 5).

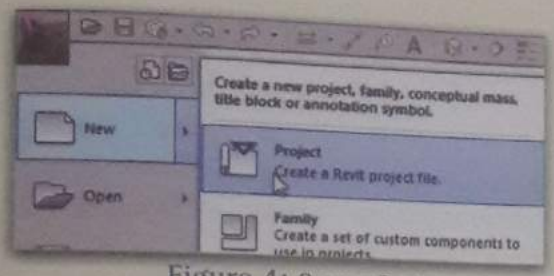


Figure 4: Open a Project.

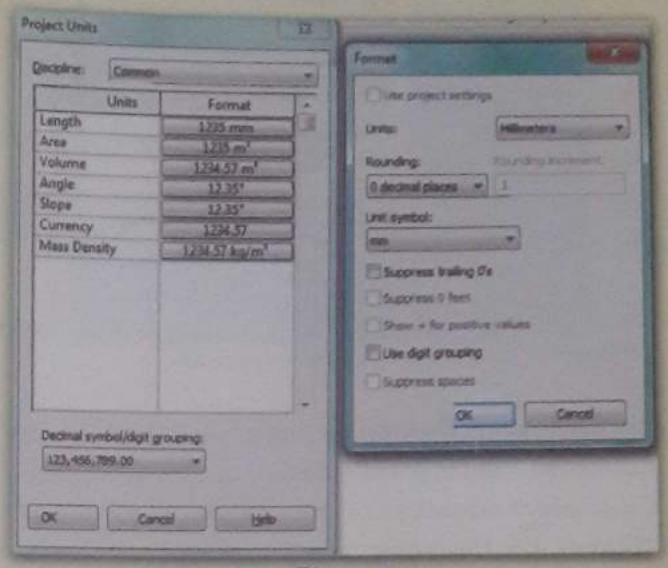


Figure 5: Unit

Step2: Creating and Editing Levels

1. Double click on the level 2 elevation value and enter 3000. (Figure 6&7)
2. Home tab » Datum panel » Click Level.
3. In the draw panel select pick lines, enter offset 3000 in the options bar.
4. Create a level by making level 1 as the reference.
5. In the same way create a level with an elevation of–1200 (Figure 8).
6. To rename the levels, double click on the level name and enter the new name. Say ground level for level 1 (Figure 9).
7. In the dialog box click yes for renaming the corresponding level.
8. Repeat the same for other levels also enter the names as shown in the (Figure 10).
9. To offset the foundation level line from its bubble, select the foundation level and click on the elbow mark (Figure 11&12).
10. Save the project *Home*.rvt

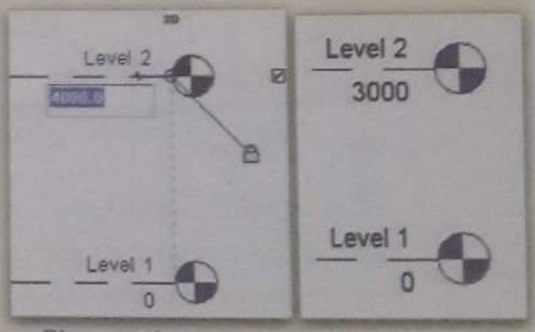


Figure 6&7: Editing the Elevation Value.

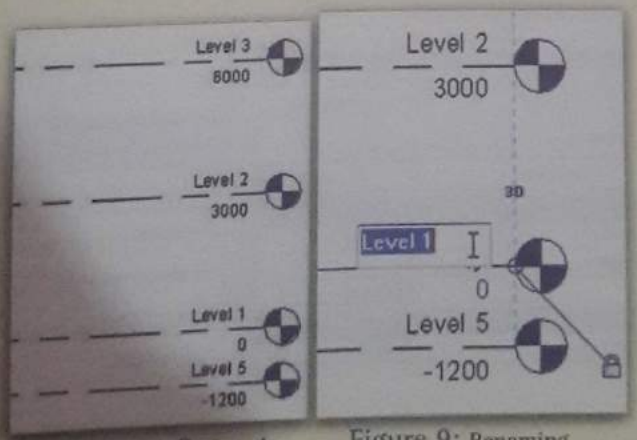


Figure 8: Levels.

Figure 9: Renaming level

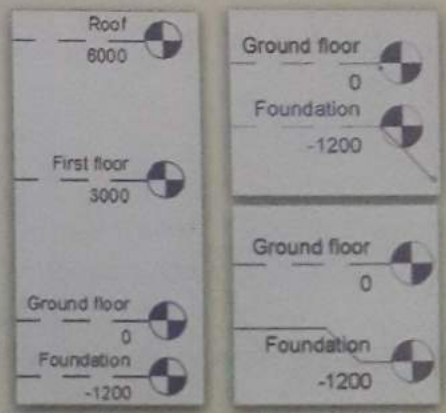


Figure 10: Rename Levels.

Figure 11&12: Offsetting the level bubble.

Step3: Creating a New Level Head

1. Application menu » New » Annotation Symbol » Metric Level Head (Figure 13).
2. Delete the note and detail line after reading. (Figure 14)

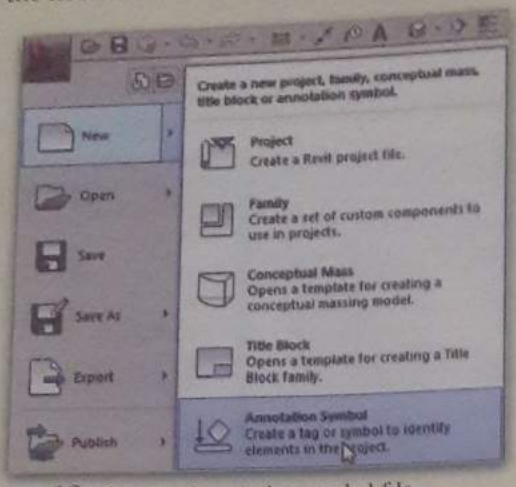


Figure 13: Opening Annotation symbol file.

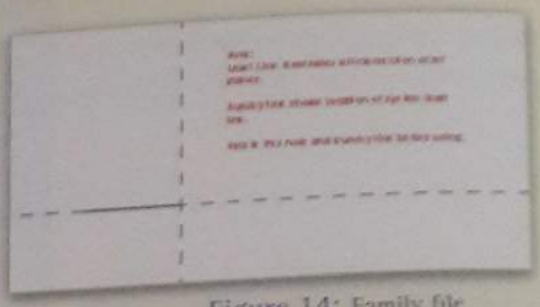


Figure 14: Family file

3. Create the level head using line tools
   a. Create tab » detail panel » line.
   b. Click inscribed polygon » enter radius value 5 mm on the options bar and sides: 6 (Figure 15).
   c. To place it in the correct position, select the polygon and drag (Figure 16).

Figure 15: Inscribed polygon–options bar

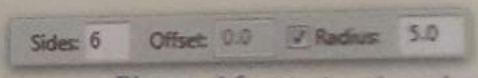


Figure 16: Moving the polygon

   d. Create » Detail panel » Filled region.
   e. Modify/Filled region boundary » create filled region boundary using draw tools as shown (Figure 17).
   f. From the properties palette » click on edit type » under other category select the fill pattern type and click ok (Figure 18).

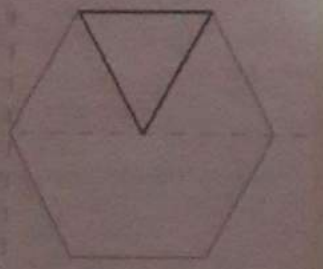


Figure 17: Filled region boundary

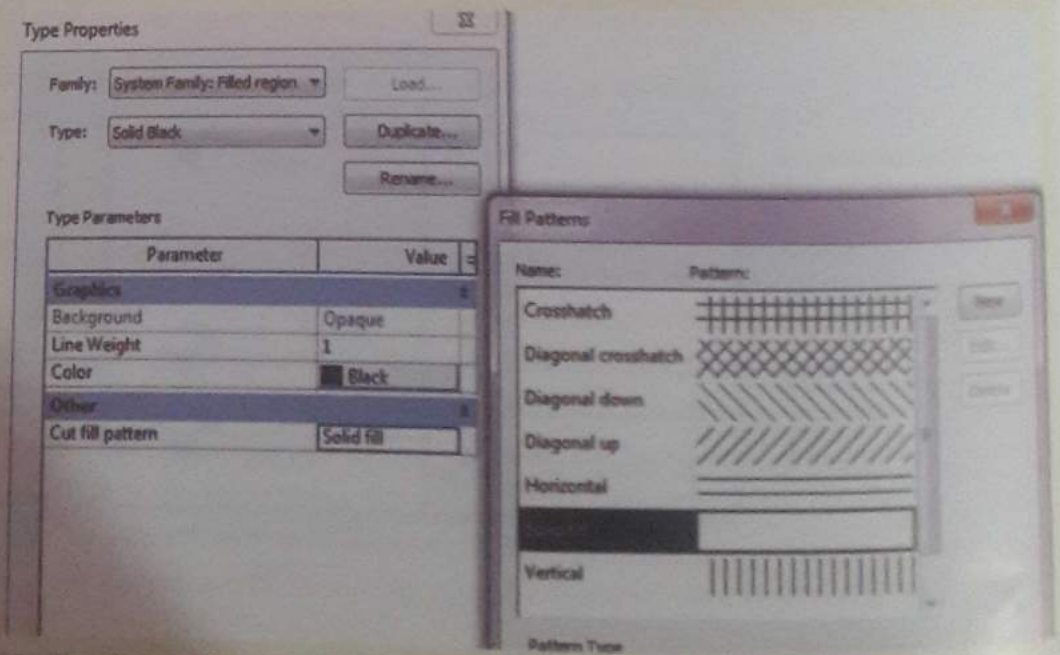


Figure 18: Selecting pattern type

g. Click on finish edit mode (Figure 19&20).

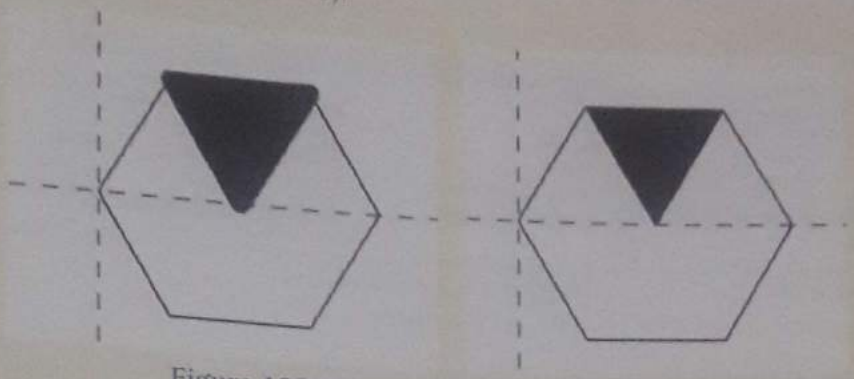


Figure 19&20: Before and after Line weight on.

view tab » click on thin line to switch off the line weight or press 'TL'.

h. Repeat the same on the opposite side.

4. To place the labels,
   a. Create tab » Text panel » Select label.
   b. Click on the left side of the vertical reference plane. It will open a dialog box. Select name from the category and parameter side and click add parameter button. And click ok.
   c. Same way place elevation label also.
   d. To relocate the position of the label, select the label and drag. To rotate the label, select the label and click on the rotate icon and rotate.
5. Click Save as from the application menu. Save the family with the name Level head.rfa.

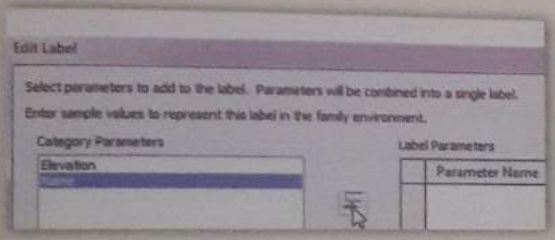


Figure 21: Edit Label

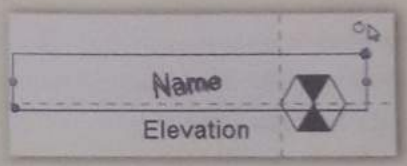


Figure 22: Relocating Position of Label

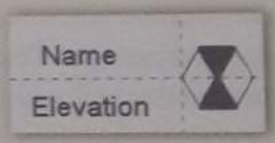


Figure 23: Level head

6. Close the family file.

Step4: To Load the family in to the Project

1. Open the project Home.rvt
2. Switch on Elevation view.
3. Insert tab » Load from the library panel » click on Load family.
4. Select the 'Level head .rfa' which you created.
5. Select the level tool; go to its type properties » Click Duplicate » Enter a name » *new level head* » Click OK. (Figure 24).
6. In the type properties box » under graphics select the symbol 'level head' » click ok (Figure 25).
7. New level creates with new level head.
8. To change all other level to the created level type, select all levels and change the level type name from the type selector (Figure 26).

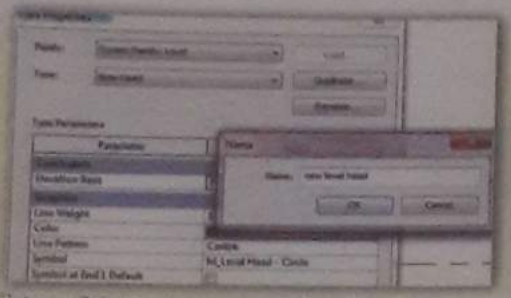


Figure 24: Duplicating level head

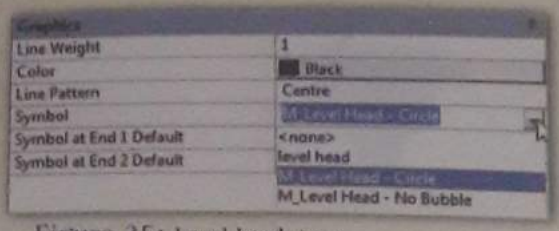


Figure 25: Level head–type properties

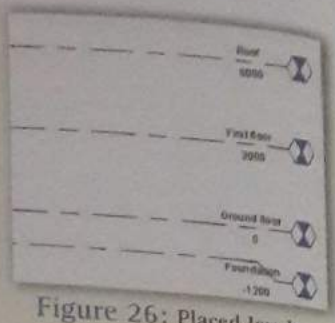


Figure 26: Placed levels

Use 'Cntrl' key for selecting more than one element.

2.3 Grids

Use the Grid tool to place column grid lines in the building design. You can then add columns along the column grid lines. Grid lines are finite planes. You can drag their extents in elevation views so that they do not intersect level lines. This allows you to determine whether grid lines appear in each new plan view that you create for a project. Grids can be straight lines, arcs or multi–segmented.

Step4: Adding Grids

1. Open the project Home.rvt.
2. Change to Ground floor plan (Figure 27).
3. Architectural tab » Datum panel » Grid.
4. Select the sketch options from the draw tool.
5. Draw the grid in desired length.
6. Revit Architecture automatically numbers each grid. To change the grid number, click the number, enter the new value, and press ENTER. You can use letters for grid line values. If you change the first grid number to a letter, all subsequent grid lines update appropriately.
7. As you draw grid lines, the heads and tails of the lines can align to one another. If grid lines are aligned and you select a line, a lock appears to indicate the alignment. If you move the grid extents, all aligned grid lines move with it.
8. Place the remaining grids using draw tool or pick line tool.
9. You can edit the grids with the help of temporary dimensions (Figure 28).
10. Complete the grid lines as shown in the below figure (Figure 29).

Figure 27: Ground Floor Plan.

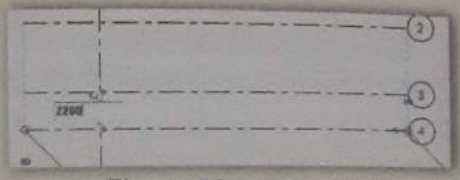


Figure 28: Temporary Dimensions.

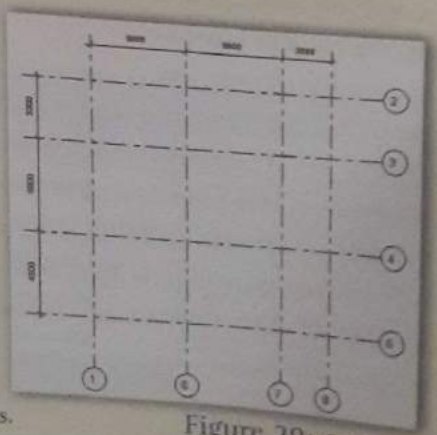


Figure 29: Grids.

To show or hide individual grid bubbles

Select the grid line, do one of the following,

- Revit Architecture displays a check box near the grid bubble. Clear the check box to hide the bubble, or select it to show the bubble (Figure 30).
- Select a grid line, dropdown Type Properties from the instance properties box. In the Type Properties dialog, do any of the following: To display grid bubbles at the start point of grid lines in a plan view, select Plan View Symbols End 1 (Default).
- To display grid bubbles at the endpoint of grid lines in a plan view, select Plan View Symbols End 2 (Default).
- In views other than plan views (such as elevations and sections), indicate where to display grid bubbles. For Non–Plan View Symbols Default, select Top, Bottom, Both top and bottom, or None (Figure 31).

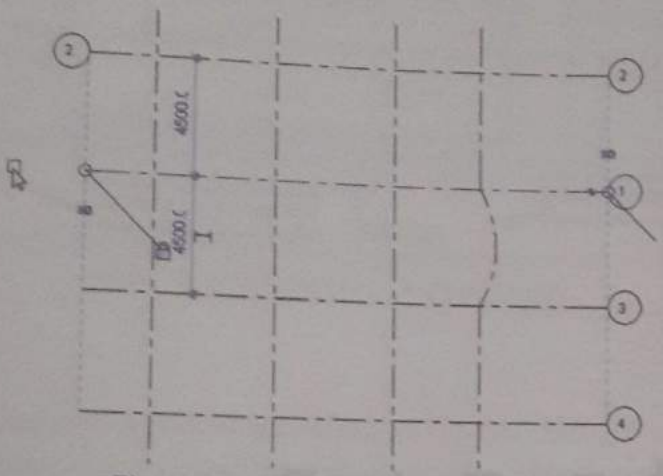


Figure 30: Hiding Grid Bubbles

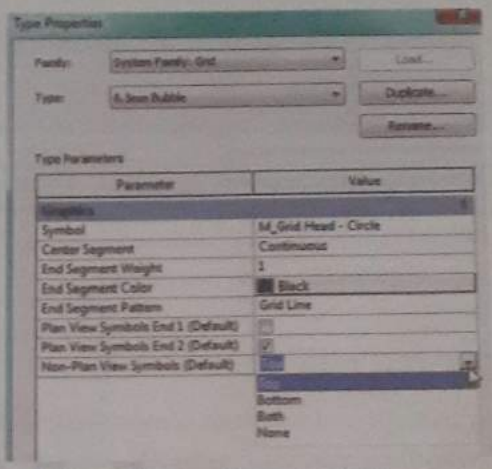


Figure 31: Type Properties–Grid

2.4 Walls

Like other basic elements in a Revit building model, walls are instances of predefined system family types, which represent standard varieties of wall function, composition, and thickness. You can customize these characteristics by modifying a wall's type properties to add or remove layers, divide them into regions, and change their thickness or assigned material. You add walls to a Revit building model by clicking the Wall tool, selecting the desired wall type, and placing instances of that type in a plan view or 3D view.

After you place a wall in a drawing, you can add sweeps or reveals, edit the wall's profile, and insert hosted components such as doors and windows. Revit Architecture contains three family types of walls.

1. Basic Wall
2. Stacked Wall
3. Curtain wall

Location Line

A wall's Location Line property specifies which of its vertical planes is used to position the wall in relation to the path you sketch or otherwise specify in the drawing area.

In other way, the location line is a plane in the wall that does not change, even if the wall type changes. For example, if a wall is drawn and its location line specified as Core Centerline, the location line remains there, even the particular wall is later changed to another type or its structure modified (Figure 32).

- **Wall Centerline**: The geometric center of the wall construction (Figure 33).
- **Core Centerline**: The geometric center of the core components. (Figure 34)
- **Finish Face Exterior and Interior**: The location line that forms the outer edges of the wall construction.

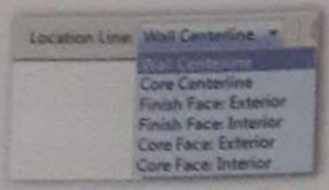


Figure 32: Locationl Line

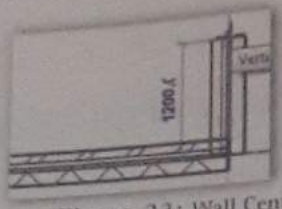


Figure 33: Wall Centreline

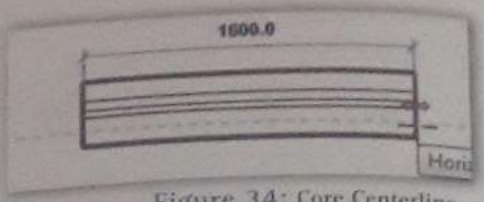


Figure 34: Core Centerline

If the drawing direction of wall changed, the location line: Finish face exterior will change to Interior and vice versa

In the following example, with the Location Line value specified as Finish Face: Exterior, the cursor is placed on a dashed reference line, and the wall is drawn from left to right. (Figure 33)

- **Core Face**: Exterior and Interior: The line that forms the outer edges of the core components. (Figure 33)

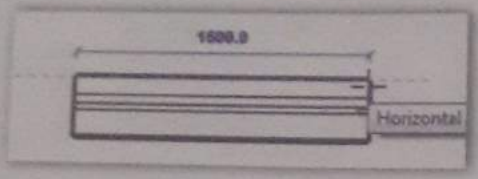
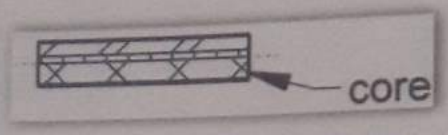


Figure 35: Finish face exterior



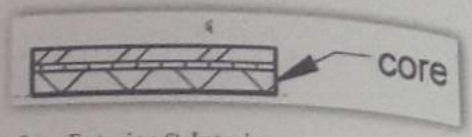


Figure 36&37: Core face Exterior & Interior

2.4.1 Compound Wall

Walls, floors, ceilings, and roofs can comprise parallel layers. The layers can consist of a single continuous plane of material (such as plywood) or multiple materials (such as gypsum board, studs, insulation, air spaces, bricks, and sheathing). In addition, each layer within the component serves a particular purpose. For example, some layers provide structural support, while others act as thermal barriers. Revit Architecture considers the function of each layer and matches the layers appropriately. Each layer represented by setting the layer's material, thickness, and function. Typically compound geometry is used in floor plans, reflected ceiling plans, and sections. They display in hidden line and wireframe views. Each layer is assigned a specific function so the layer can join to its corresponding functional layer. Layer functions have an order of precedence.

Layers can be assigned the following functions:

- **Structure** [1]: Layer that supports the remainder of the wall, floor, or roof.
- **Substrate** [2]: Material, such as plywood or gypsum board, which acts as a foundation for another material.
- **Thermal/Air Layer** [3]: Provides insulation and prevents air penetration.
- **Membrane Layer**: A membrane that commonly prevents water vapor penetration. The membrane layer should have zero thickness.
- **Finish 1** [4]: Finish 1 is typically the exterior layer.
- **Finish 2** [5]: Finish 2 is typically for the interior layer.

2.4.2 Create and Modify Walls

Step1: Create Wall.

1. Open the Project Home.rvt
2. Select the wall tool from the home tab.
3. In the properties palette, click edit type to open the type properties box.
4. Click on duplicate for duplicating the wall type. Enter name Wall 23 (Figure 38).
5. Click Edit structure under construction parameter.
6. In the Edit assembly dialog box, click insert twice to insert two more wall layers.

7. Using up and down adjust the position of the layers (Figure 39).

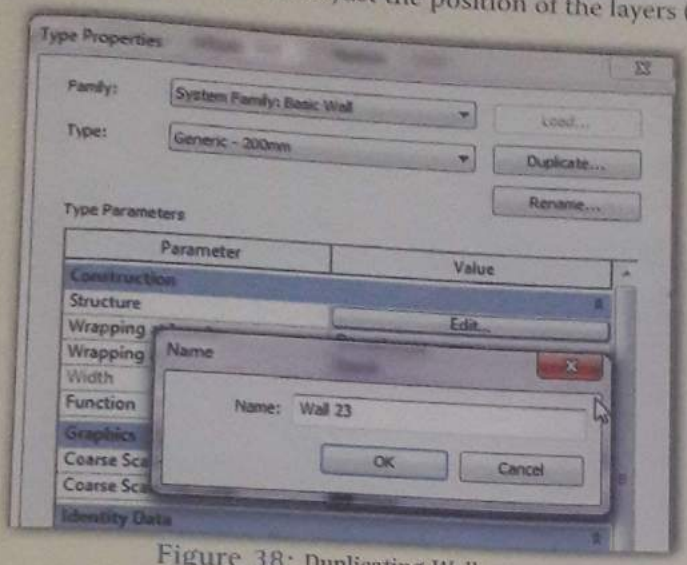


Figure 38: Duplicating Wall.

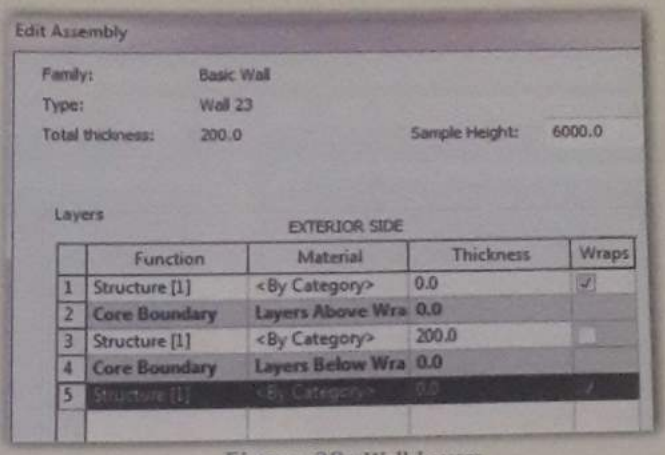


Figure 39: Wall Layers.

8. Select the function of wall layers as shown Figure.

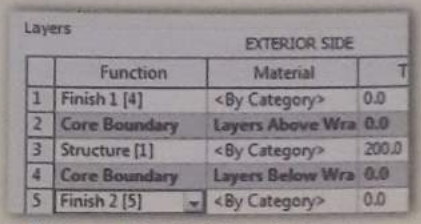


Figure 40: Wall layer's function.

9. Apply material for each layer.
   a. In the material column, click on the browse button to open the material dialog box.
   b. Select a material. Based on your requirement change the color and surface pattern of the selected material.
10. **Eg**: for finish (1)–select paint as the material. To change the material properties click edit material icon (Figure 41)
    a. It opens Edit material dialog box. In the material editor dialog box, under Assets » select graphics to dsiplay the graphics properties.
    b. Under garphics properties, select the shading color by clicking the swatch »If requires select the surface pattern also (Figure 42).
    c. Repeat the same for other layers.

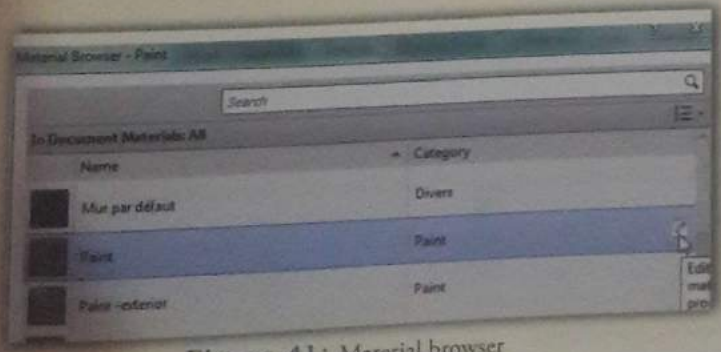


Figure 41: Material browser

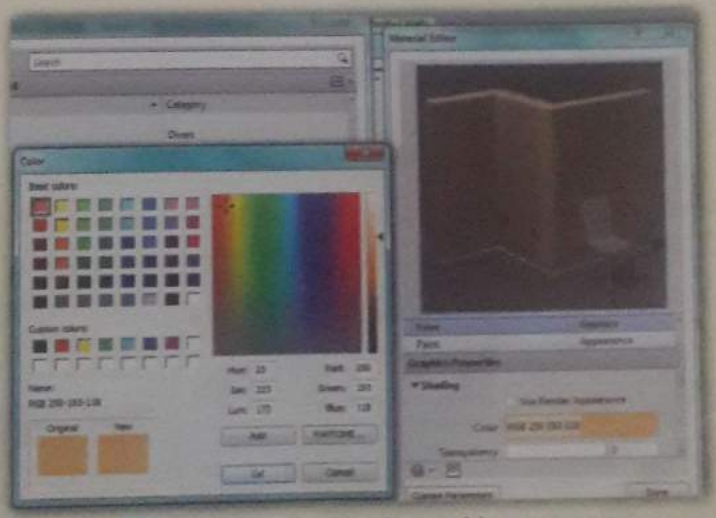


Figure 42: Selecting the graphic appearance.

Don't assign same material for more than one element. Because if one element's material properties changed all other will change accordingly.

d. To duplicate the material, from the material editor dialog box » Drop down the bottom left icon » Select Duplicate Material » Enter a new name and change the graphic appearance (Figure 44).

11. Enter thickness for each layer (Figure 45).

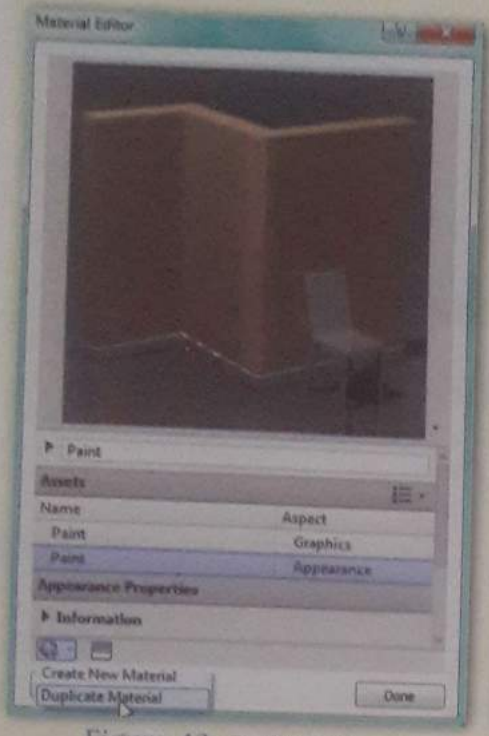


Figure 43: Duplicate Material

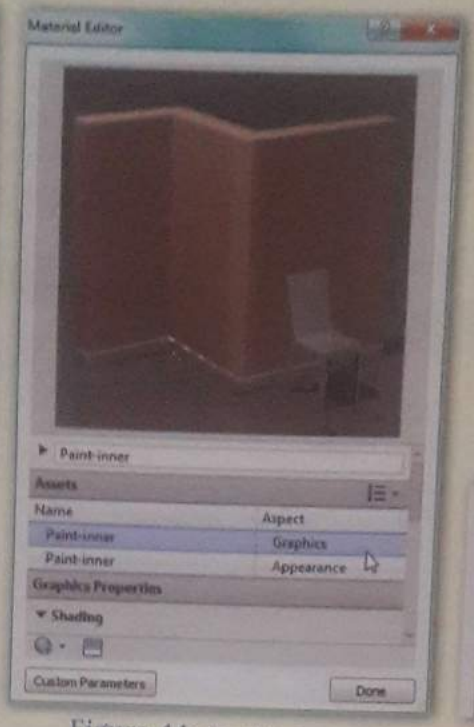


Figure 44: Graphic Appearance

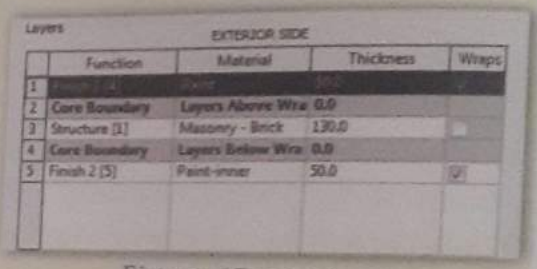


Figure 45: Wall layers.

12. In the options bar, set the *Wall Center line* as Location Line; *First Floor* as height constraint .
    a. **Level 3D views only**: Choose a level as the base constraint. You can choose a non–storey level.
    b. **Height**: Set the height of a wall to go up to a level. The default value is Unconnected, which allows you to specify a value for Height.

When you draw a foundation wall type, the option name is displayed as Depth.

13. Complete the plan as shown below using Draw tools in the Draw panel.

As you draw a wall, you can quickly set its length by entering a value on the keyboard, taking advantage of the listening dimension feature.

14. If you want to flip the orientation of the wall about its location line, press the Spacebar as you draw the wall (Figure 46).
15. In view control bar change the detail level to medium. And change the visual style to Shaded (Figure 47).
16. Check whether the wall orientation is changed or not. If it is changed select the wall and click on flip icon to flip the wall face (Figure 48ß49).

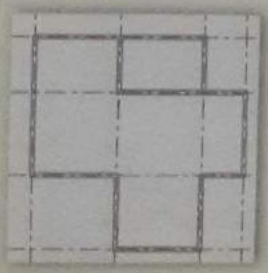


Figure 46: Plan.

Figure 47: Deatil level.

Figure 48: Wall Face.

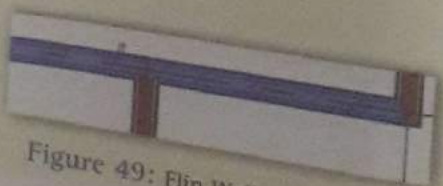


Figure 49: Flip Wall Orientaion.

17. Select the bottom left side wall and set the inner dimension to 6500 by editing the temporary dimension. (Figure 50).
18. Increase the wall length of same wall to 5600 with help of grip editing and temporary dimension (Figure 51).
19. Complete the wall connection as shown in the below image. Wherever requires, use the Delete tool and Grip editing.
20. In the same way, complete the plan as shown in the below image (Figure 52&53).

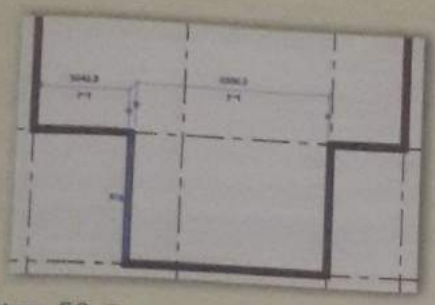


Figure 50: Temporary Dimension.

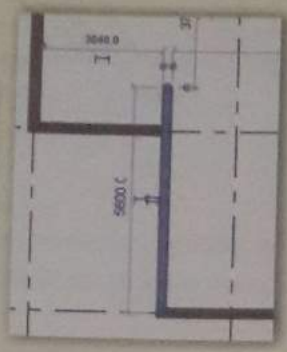


Figure 51: Editing wall length.

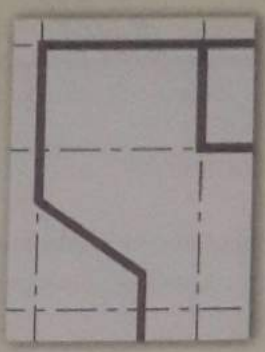


Figure 52: Wall editing.

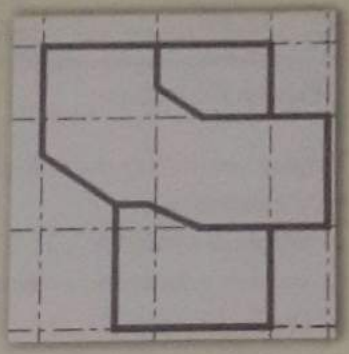


Figure 53: Plan.

Step2: Add partition wall

1. Create wall element type for wash room.
   a. Name–Partition wall
   b. Thickness–120mm &
   c. Assign material.
2. Draw the wall with dimension as shown in below image.

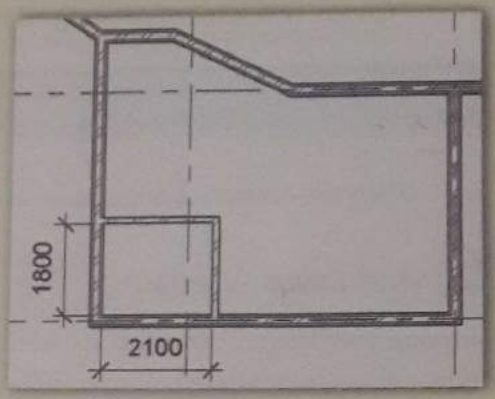


Figure 54: Partition Wall.

2.4.3 Wall Joins

Revit Architecture automatically joins the walls at the intersections. When walls intersect, Revit creates a butt join by default and cleans up the display in plan view, removing visible edges between the joined walls and their corresponding component layers. Wall joins can be edited when necessary.

To Change the configuration of Wall Join

1. Click Modify tab »Geometry panel » (Wall Joins).
2. Move the cursor over the wall join, and click within the grey square that displays.
3. On the Options Bar, select one of the available join types:
   a. **Butt** the default join type (Figure 55).
   b. **Miter Join:** It creates a miter join between the walls. All joins less than 20 are mitered (Figure 56).
   c. **Square Off**: Squares a wall end to 90. This option is not available for walls already joined at 90 (Figure 57).
4. If the selected join type is Butt or Square off, you can click the Next and Previous buttons to cycle through previews of the possible join orders. For the squared–off join shown above, the following alternative order would be available (Figure 58).

You cannot square off or miter the join between a wall and the interior of another wall, nor change the order of the butt join, because only one configuration of butt join is possible.

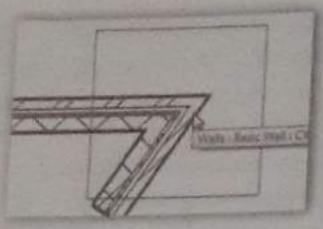


Figure 55: Butt Join

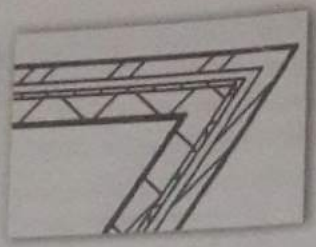


Figure 56: Miter Join

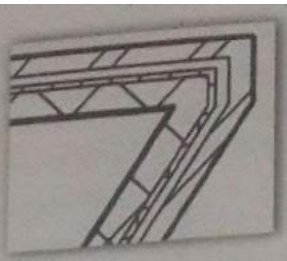


Figure 57: Square off join

Figure 58: Square off join–45 angle

The display setting has the following options.

- Clean the join
  Displays a smooth join. While the join is selected for editing, temporary solid lines indicate where the wall layers actually end, as shown below; these lines disappear when you exit the Wall Joins tool and do not print (Figure 59).
- Don't clean join
  Displays the wall ends butting up against one another as shown (Figure 60).
- Use View Setting
  Cleans wall joins depending on how the property Wall Join Display is set.

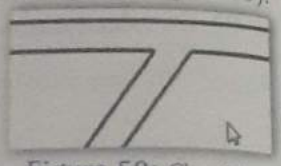


Figure 59: Clean join

Wall Joins tool is not recommended for complex wall joins (for example, a wall join with more than 4 walls, a wall join on many floors, or a wall join that is in more than one workset).

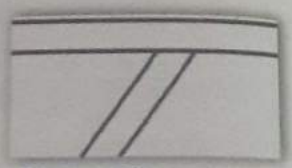


Figure 60: Don't clean join

5. When the desired configuration is displayed, click Modify to exit the tool.

2.4.4 Wall Layer Wrapping

Compound wall layers can wrap at inserts and at the end caps of the wall. Layers can wrap around complex inserts, such as non–rectangular shapes, doors, and windows. You can set layer wrapping using the type properties of the wall or by editing its structure.

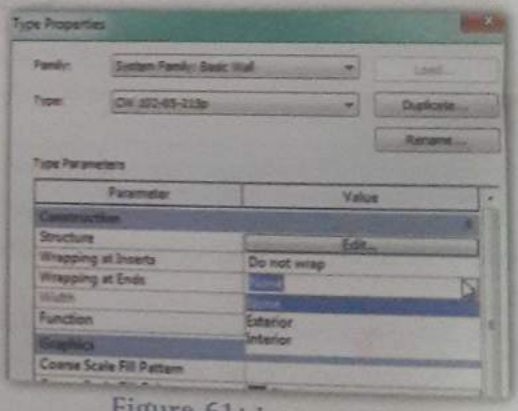


Figure 61: Layer wrapping

To set layer wrapping using type properties

1. Select a compound wall, and click Modify/ Walls tab » Element panel » Element Properties drop–down » Type Properties.
2. If you want wrapping at inserts, for Wrapping at Inserts, select Exterior, Interior, or Both.
3. If you want end cap layer wrapping, for Wrapping at Ends, select Exterior or Interior.
4. To set individual layers to wrap, select the Wraps check box at the end of each layer (Figure 61).

To set layer wrapping by editing structure

1. For Structure, click Edit.
2. If you want wrapping at inserts, for Wrapping at Inserts, select Exterior, Interior, or Both.
3. If you want end cap layer wrapping, for Wrapping at Ends, select Exterior or Interior.

Figure 62&63: Wrapping at ends–Exterior and Interior

Figure 64&65: Wrapping at inserts–Exterior and interior

4. Click ok.

2.4.5 Stacked Wall

Revit includes a Stacked Wall system family for modeling walls that comprise 2 or more subwalls stacked on top of each other. The subwalls can have different wall thicknesses at different heights. All the subwalls in a stacked wall are attached and their geometry is joined.

Only wall types in the Basic Wall system family can function as subwalls. Using stacked wall types, you can define different wall thicknesses at different heights. You define its structure using Type Properties.

2.4.6 Creating Stacked Wall

Ex: Add Foundation to the model Home.rvt

Step6: create wall element

Name	Thickness
F1	1000
F2	800
F3	400

1. Click wall from Architecture tab. Select default 200mm wall, click on edit type to open type properties.
2. Duplicate the wall type » enter a name F1.
3. Click edit structure under construction. In the edit assembly box enter the thickness 1000mm and apply material (Figure 66).
4. Repeat the above steps for creating walls F2 and F3.

Step2: Creating Stacked wall

1. In the type properties box change the family type to system family: stacked wall.
2. Duplicate the wall and name as Foundation.
3. Click on edit under construction.
4. Enter the Height for the subwalls. Select the wall name from the drop down menu. Create the assembly as shown below (Figure 67).
5. Switch on foundation floor plan.
6. If the plan is not visible, in the properties palette under graphics select underlay *Ground Floor.* (Figure 68).

Layers — EXTERIOR SIDE

	Function	Material	Thickness	Wraps
1	Core Boundary	Layers Above Wra	0.0	
2	Structure [1]	Concrete - Cast	1000.0	☐
3	Core Boundary	Layers Below Wra	0.0	

Figure 66: Wall type–F1

Types — TOP

	Name	Height	Offset
1	F3	Variable	0.0
2	F2	600.0	0.0
3	F1	150.0	0.0

Figure 67: Edit assembly.

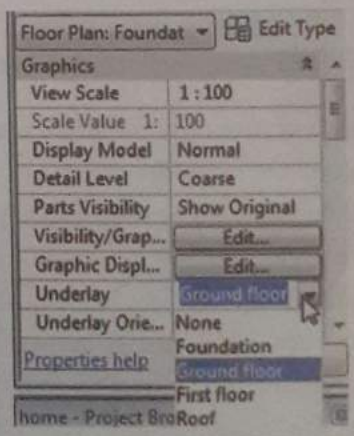


Figure 68: View properties.

1. One subwall is required to have a variable height. Its height changes relative to the heights of the other subwalls. You cannot edit the Height field when the subwall is variable. To change the height of the variable subwall, change another subwall to variable by selecting its row and clicking Variable.
2. To flip the subwall about the reference line (Offset) of the main stacked wall, select Flip.
3. To rearrange rows, select a row and click Up or Down.s

4. To delete a subwall type, select its row and click Delete.
5. If you delete a subwall with an explicit height, the variable subwall extends to the height of the other subwalls.
6. If you delete a variable subwall, the subwall above it becomes variable.
7. If there is only one subwall, you cannot delete it.

8. Select wall tool and Select the created Foundation wall from the type selector.
9. In the options bar change the height to Ground floor.
10. Create the foundation along walls (Figure 69).
11. To switch on 3D view, view tab » create panel » 3d view drop down » select Default 3D view.

To break up a vertically stacked wall, select the wall » Right click and click on Break up. Once a stacked wall is broken up, the subwalls become walls on their own. There is no reassemble tool to restack such a wall.

Figure 69: Foundation wall.

2.4.7 Guidelines for creating Stacked Wall

- All subwalls use the same base constraint and base offset as the stacked wall. This means that a subwall can be on a certain level, but is actually based on the same level as its associated stacked wall. For example, if a stacked wall is based on Level 1 but one of its subwalls is on Level 7, the Base Level of that subwall is Level 1.
- You can edit the Type Properties of a basic wall that is also a subwall.
- When you create a wall schedule, the vertically stacked wall does not schedule, but its subwalls do.
- When you edit the elevation profile of a stacked wall, you edit one main profile. If you break up the stacked wall, each subwall retains its edited profile.
- When you highlight a vertically stacked wall in the drawing area, the entire wall highlights first. Press Tab to highlight the component subwalls. Using a pick box selects only the stacked wall.
- You can embed a vertically stacked wall.
- Subwalls can host wall sweeps; stacked walls cannot.
- Subwalls cannot be in different phases, worksets, or design options from that of the stacked wall.
- To place inserts in a vertically stacked wall, you may need to use the Pick Primary Host tool to switch between the vertically stacked wall and one of the walls that compose it.

2.4.8 Vertically Compound Wall

e structure of vertically compound walls is defined using either layers or regions. A region is any shape in the wall that does not meet the criteria of a layer. Regions can have either constant or variable thickness. In a row assigned to a region, if region has a constant thickness, a numeric value appears for it. If the region has a variable thickness, the value is variable. A region's thickness cannot be changed in the row that is assigned to it. Note that the thickness value appears shaded, indicating that it is unavailable for modification. A region's thickness and height can however be changed graphically in the preview pane. Because core thickness can vary in vertically compound walls, the core centerline and core face location lines are determined by the core thickness at the bottom of the wall. For example, if the wall core is thicker at the top than at the bottom, and you specify the location line as Core Centerline, the centerline of the core is measured between the core boundaries at the bottom.

2.4.9 Creating Vertically Compound Wall

Step8: Duplicate Exterior Wall

1. Open the project Home.rvt
2. Select an outer wall and go to its type properties.

3. Duplicate the wall with a name: Exterior wall. And click ok.
4. Click on edit under construction.
5. In the edit assembly box switch on preview.
6. Change the view to Section: Modify type attributes (Figure 70).

The vertically compound wall tools are available in the section preview only. Use them to modify the wall type only, not an actual wall instance.

7. Select row1 and click insert to insert one layer.
8. Change the function name: finish (1). Apply material (Figure 71).

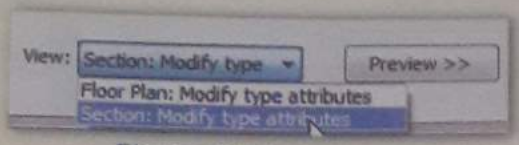


Figure 70: Preview.

	Function	Material	Thickness
1	Finish 1 [4]	Paint - exterior	0.0
2	Finish 1 [4]	Paint	50.0
3	Core Boundary	Layers Above Wra	0.0
4	Structure [1]	Masonry - Brick	130.0
5	Core Boundary	Layers Below Wra	0.0
6	Finish 2 [5]	Paint-inner	50.0

Figure 71: Insert Layer.

Do not enter thickness.

Step9: Split region

When editing vertically compound walls, the Split Region tool divides a wall layer (or regions) horizontally or vertically into new regions. When you split a region, the new regions assume the same material as the original.

1. Select split region (the cursor will change to knife symbol) and split the exterior wall as shown in the figure (Figure 72).
2. Click modify.

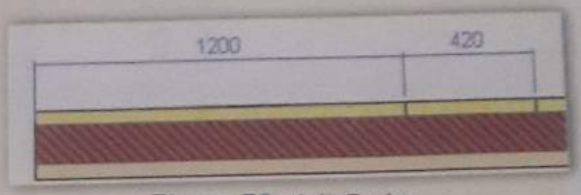


Figure 72: Split Region.

Step10: Assign Layer

When editing vertically compound walls, the Assign Layers tool assigns a row to a layer or region. (It assigns the number, material, and function of that row.)

1. Select row1 layer (which is the layer we want to insert in the splited portion)
2. Select assign layer.
3. Then pick on the splited portion as shown in the below image (Figure 73).
4. Click ok twice.
5. Check the model in 3D view (Figure 74).

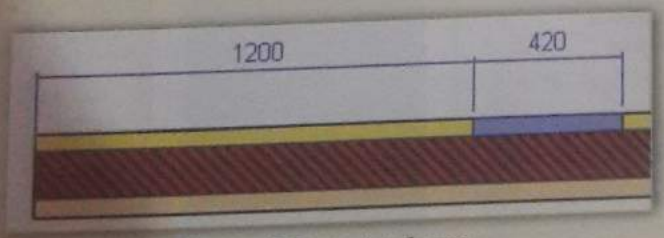


Figure 73: Assign Layer.

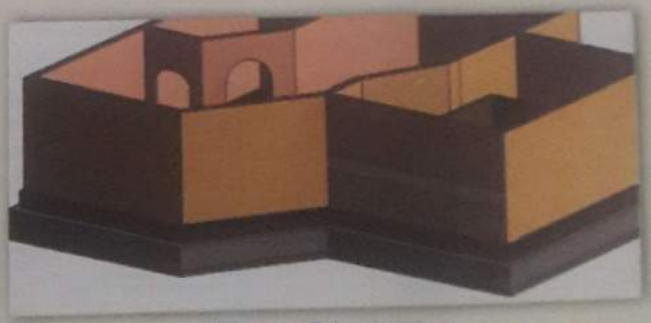


Figure 74: 3D View.

6. Switch on Ground floor plan.
7. To break the continuity of the wall, Modify tab » Modify panel »select split element tool.
8. Pick the intersection point of the wall as shown in below image. (Figure 75&76).

9. Repeat the same for opposite wall also (Figure 77).

Figure 75: Split Element

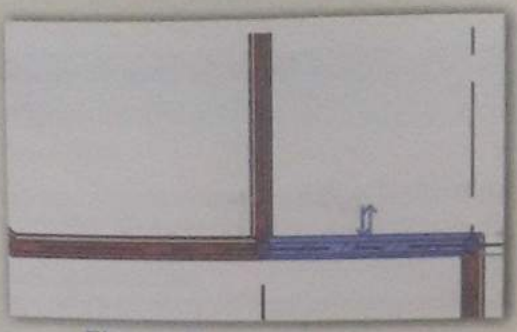


Figure 76: Splited Wall.

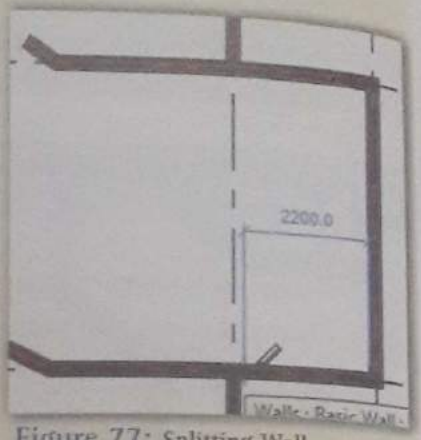


Figure 77: Splitting Wall.

10. To match the properties of Exterior wall type to other outer walls, select Match properties tool from modify tab » Clipboard panel (Figure 78).
11. Pick the Exterior wall type first and pick other outer walls to match the properties (Figure 79).

Figure 78: Match Properties.

Figure 79: 3D View.

Allowing Wall layer Extension

Select the horizontal boundary at the top or bottom of the wall, and a padlock displays. A locked padlock indicates that the selected layer cannot be extended. Click the padlock to unlock it, and the layer can be extended.

When you unlock layers for extension, two instance properties of the wall become enabled: Top Extension Distance (for layers at the top of the wall) or Base Extension Distance (for layers at the bottom of the wall). You can enter values for these properties or you can drag the unlocked wall layers in a view.

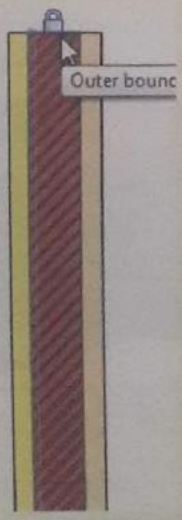


Figure 80: Pad Lock

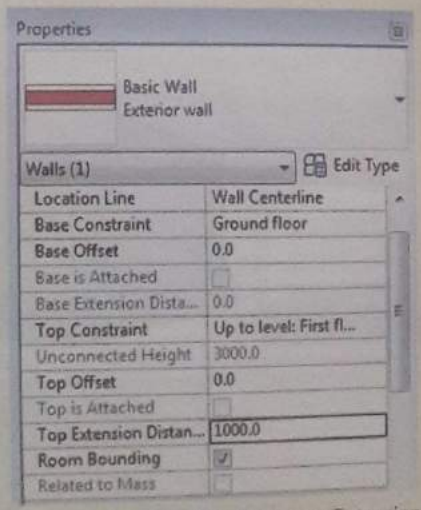


Figure 81: Top Layer Extension

Figure 82: Middle Layer Extended

To drag wall layers, modify them in section, 3D, and elevation views.

If you join 2 walls and they both have a vertical extension, the extended portions will be horizontally joined. The extension joins must be the same, top-to-top or bottom-to-bottom.

Merge Region

When editing vertically compound walls, the Merge Regions tool merges wall regions together horizontally or vertically into new regions. Highlight a border between regions and click to merge them.

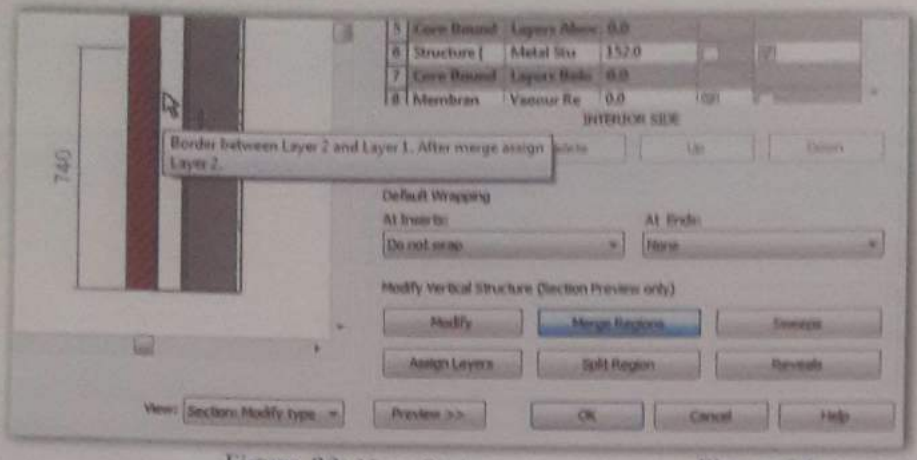


Figure 83: Merge Region

Figure 84: In 3D View

When you merge regions, the position of the cursor when you highlight a border determines which material prevails after the merge.

Layer Assignment Guide Lines

- Rows of the sample wall in the preview pane must remain in a sequential order from left to right. To test the sample wall, select row numbers sequentially and observe the selection in the preview pane. If the layers do not highlight in an order from left to right, Revit Architecture cannot produce this wall.
- A row cannot be assigned more than one layer.
- You cannot have the same row assigned to regions on both sides of the core.
- You cannot apply a thickness to a membrane layer.
- Non-membrane layers cannot have a thickness smaller than ⅛" or 4 mm.
- A layer in the core must have a thickness greater than 0. You cannot specify a layer in the core as a membrane layer.
- The exterior and interior core boundaries and the membrane layer cannot rise up and down.
- You can add thickness only to a layer that is straight from the top of the wall to the bottom. You cannot add thickness to a complex layer.
- If You cannot split a wall horizontally and then move the outside boundary of one of the regions independently of the other. For example, if you select the left outer boundary of the lower region, the left outer boundary of the upper region is also selected.
- Layer function priorities cannot ascend from the core boundary to the finish face. For example, you cannot have a finish layer in the core boundary and then a structure layer at the exterior side.

2.4.10 Wall Shapes or Openings

When sketching a wall by picking two points, Revit Architecture draws a rectangular wall by default. The shape of the wall can be modified or openings added by editing its elevation profile. To edit a wall's elevation profile, the view must be parallel and can be either a section or elevation view. The elevation profile of an arc wall can, however, not be edited.

2.4.11 Create Wall Opening

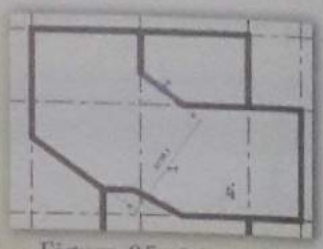


Figure 85: Select Wall

Step11: Create Entrance to Kitchen Hall

1. Select the wall as shown in the below image and select the 'Edit Profile' tool from the mode panel.
2. Opens Go to view dialog box. Select the Elevation: South view to see the selected wall's side view (Figure 85).
3. Create Arch opening using draw tools (Figure 86).

If you select a wall in a plan view, the Go To View dialog displays. Select an elevation view, and click Open View.

wall opening should be a closed profile.

   a. To split the intersected line, select split tool from modify/edit profile tab.
   b. Select delete inner segment from the options bar (Figure 87,88).
   c. Click on finish edit mode.
4. Check the opening in 3d view (Figure 89).

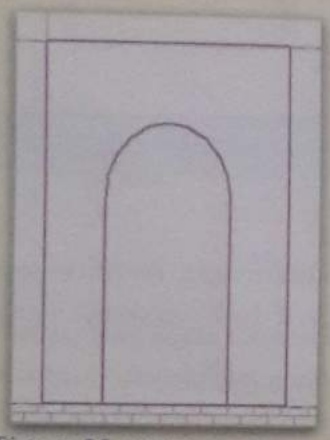


Figure 86: Wall Opening Profile.

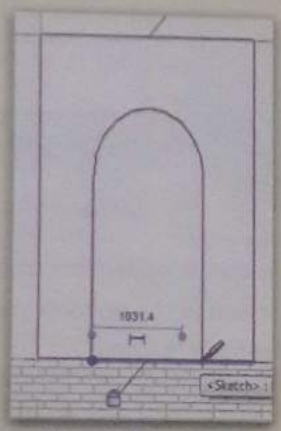


Figure 87: Spilt Tool.

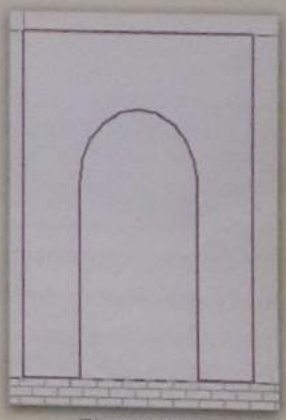


Figure 88: Wall Opening.

Figure 89: Wall Opening.

5. In the same way create another opening as shown in the (Figure 90,91&92).

To revert an edited wall to its original shape, select the wall and click Modify Walls tab » Modify wall panel » Reset Profile.

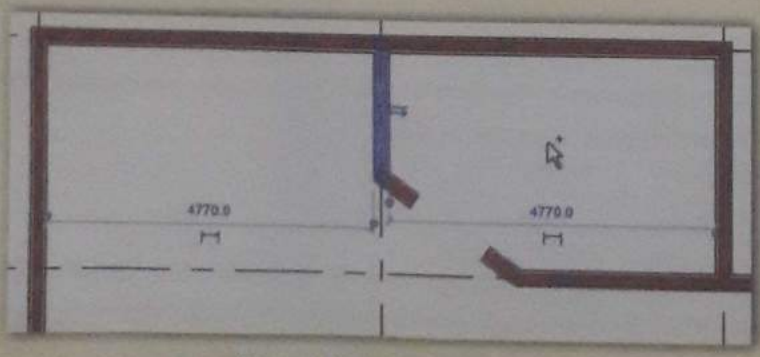


Figure 90: Select Wall.

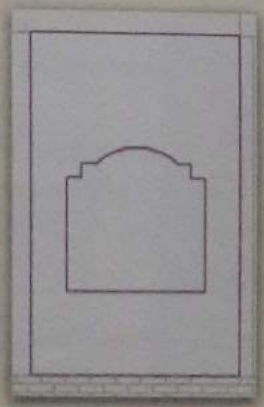


Figure 91: Wall Profile.

Figure 92: Wall Opening.

2.4.12 Sweeps and Reveals

Wall sweeps are the tools to add base board or decorative horizontal or vertical projection to a wall. And the wall reveals are the tool to add decorative horizontal or vertical cutout to a wall. We can add Wall sweeps and reveals in two ways.

- Add the sweep and reveals to a wall from 3D view or elevation view.
- To add sweep and reveals for all walls of a type, you modify the wall structure in the wall's type properties.

Add Wall Sweep to a Wall in 3D view or Elevation view

Step12: Create Wall Sweep Profile

1. Application menu » New » Family » Open Metric Profile.rft.
2. Create a closed profile using line tools from detail panel (Figure 93).

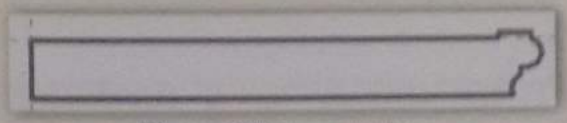


Figure 93: Sweep Profile.

3. Save the family. And click on Load in to project.

Step13: Create Sweep Profile

1. In the project open 3D view.

Wall sweep and wall reveal will activate only in elevation and 3D views.

2. Home tab » wall drop down » select wall sweep.
3. In the properties palette, click edit type and open type properties box.
4. Duplicate the sweep type. And click OK.
5. Under construction select the profile to created one.(Figure 94).
6. Under Materials and finishes, apply material and click OK.
7. Placed it on the wall where we created the wall opening..(Figure 95).

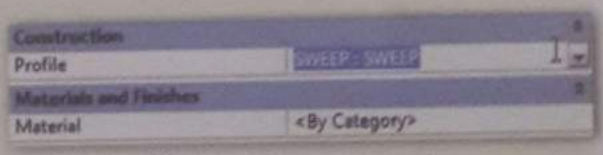


Figure 94: Type properties

Figure 95: Wall Sweep

To Add Wall Sweep or Reveal to Wall Structure

Step14: Add Skirting to the Exterior Wall

1. Create Skirting profile in the Matric Profile Family file (Figure 95).
2. Save the family file. And select Load in to Project.
3. In the Project, Select any of the exterior wall » Go to type properties » change the preview: view to Section.
4. Click on sweeps.
5. In the wall sweep dialogue box. Do the following,
   a. Click add.
   b. Select the profile from the list. If there is no profile in the list click load profile to load the profile from the library. (Metric/imperial » profiles).
   c. Specify material for the sweep.
   d. For Distance enter 0.00 and select the side *Interior*.
   e. Select Cuts Wall if you want the sweep to cut geometry out of the host wall. When a sweep is offset and embedded in the wall, it cuts the geometry from the wall. In complex models with many sweeps, you can increase performance by clearing this option.

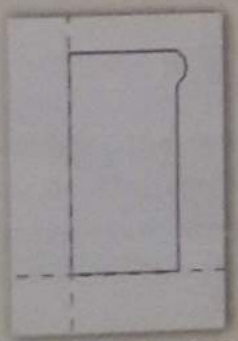


Figure 96: Sweep Profile

f. Select Cuttable if the sweep should be cut by wall inserts.

6. Click apply to see the changes in the preview (Figure 97).
7. Click OK.
8. Select Reveal » Opens Wall Reveal dialog box. Do the following
   a. Click add
   b. Select the profile M_Reveal Brick course 1 Brick from the list.
   c. Select From–Base
   d. Enter the Distance 1000.
   e. Select the side Exterior.
   f. Enter the offset: 20. A negative value moves the reveal toward the wall core.
   g. Enable Flip. Flip measures the distance from the top of the reveal profile rather than the bottom
   h. Click OK (Figure 98).

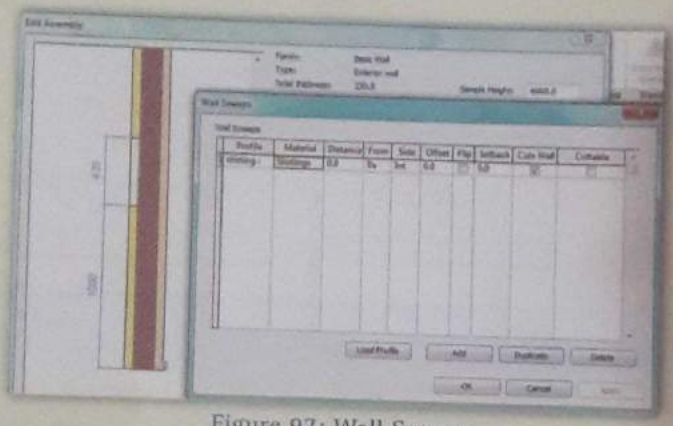


Figure 97: Wall Sweeps

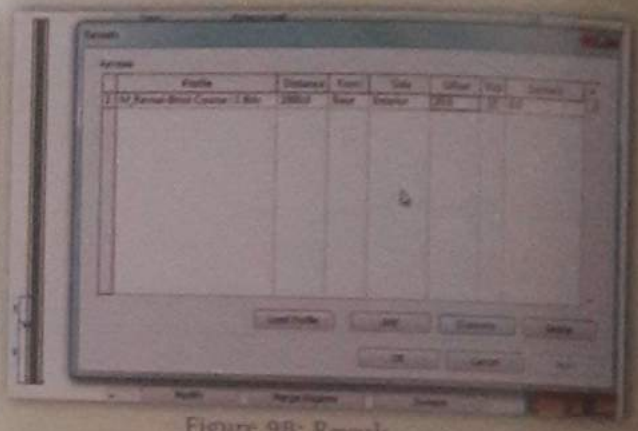


Figure 98: Reveals

9. Open the 3D view and check the sweeps and reveal created.

Figure 99&100: Sweep and Revel Applied to Wall

2.5 Construction Modelling Tools

Autodesk added new modeling tools to help Revit Architecture users to be able to manipulate most objects such as walls, floors, and roofs to create more accurate represented construction methods. These new tools will also make easier to create shop drawings for contractors.

The following Revit categories are designed to support construction modeling workflows:

2.5.3 Parts

You can divide a model element into discrete parts that can be independently scheduled, tagged, filtered, and exported. You can also divide a part into smaller parts. Parts are automatically updated to reflect any changes to the element from which they are derived. Modifying a part has no effect on the original element.

Parts can be generated from elements with layered structures, such as:

- Walls (excluding stacked walls and curtain walls)
- Floors (excluding shape–edited floors)
- Roofs (excluding those with ridge lines)
- Ceilings
- Structural slab foundations

In the case of elements with layers or subcomponents, such as walls, individual parts will be created for those layers. For other elements, a single part element is created. In either case, the resultant part or parts can then be divided into smaller parts.

Divide Parts

After an element has been designated as a part, that part can be divided into smaller parts, either by sketching division lines or by selecting reference elements that intersect the part.

Dividing Parts by sketching

1. Click Modify|Parts tab » Part panel » Divide Parts.
2. The Modify|Division tab displays with the Line tool selected on the Draw panel.
3. Use the tools on the Work Plane panel as needed to display or change the active work plane on which the dividing geometry will be sketched.

To set the work plane, home tab » work plane panel » click on set. You can select the work plane by choosing the view name or by picking elements.

4. Specify start and end points for the sketch line, or select a different drawing tool and sketch the dividing geometry as needed.
5. Click on finish edit mode to exit the tool.

To edit the parts geometry, click the desired part » instance properties box » activate show shape handles. You can use this technique to prepare a view that effectively shows the composition of the various layers.

Dividing Parts by Reference

1. In the drawing area, select the part or parts to be divided.
2. Click Modify|Parts tab » Part panel » Divide Parts.
3. Click Modify|Division tab » References panel » Intersecting References.
4. In the Intersecting Named References dialog, use the Filter drop–down control as needed to view the levels, grids, and reference planes that can be used to divide the selected parts (Figure 101).
5. Select the desired references, and enter positive or negative offsets as needed.
6. Click OK.
7. Click on finish edit mode to exit the tool.

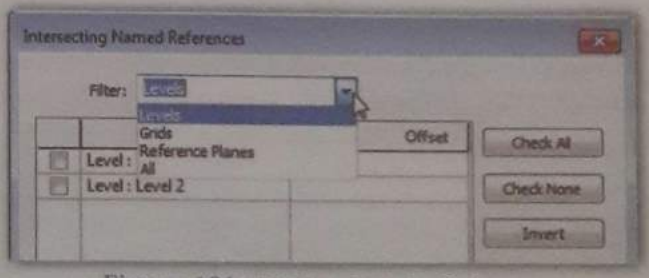


Figure 101: Dividing Parts by Reference

Editing Part Divisions

1. Use this procedure to edit the sketched geometry or reference elements (levels, grids or reference planes) that define the division of a part or parts into smaller parts.
2. Select one of the parts that resulted from dividing a larger part.
3. Click Modify|Parts tab » Part panel » Edit Division.
4. The original part displays in light blue and the division lines in magenta.
5. In the edit mode, you can do the following:
   a. Select a different reference as a divider.
   b. Use the tools on the Draw panel to add further dividing geometry.
   c. Select a division line and drag it to a new position or delete it.
   d. Add other parts to the division by clicking Modify|Division tab » Divided Parts panel » Add and then selecting the parts to be added. If the division is defined by sketched lines, the lines must extend through the dashed line that displays outside the border of a selected part in edit mode.
   e. Remove parts from the division by clicking Modify|Division tab » Divided Parts panel » Remove, and then clicking any of the parts within the division.
6. Click finish to exit the mode.

2.5.2 Assemblies

Select any number of element instances or groups to create an assembly. Assemblies constitute a distinct category of Revit elements. They can be edited, tagged, scheduled, and filtered. After creating an assembly, you can select an instance and generate one or more types of detail views, having them automatically placed on a sheet if desired.

Creating Assemblies

1. In the drawing area, select the elements you want to include in the assembly.
2. Click Modify » Create panel » Create Assembly.
3. In the New Assembly dialog, if the assembly is unique, you can edit the default Type Name value, which is auto-generated by appending a sequential number to the last assembly type name assigned in the specified naming category. If the assembly includes elements from different categories, you can select a different value for Naming Category.
4. Click ok to finish. And add assembly to the project browser. (Figure 102)

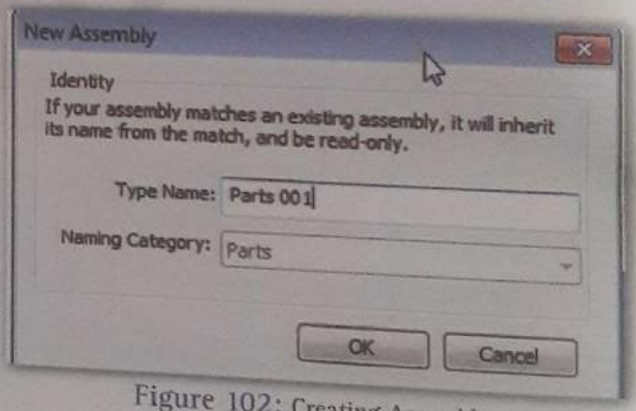


Figure 102: Creating Assembly

Creating Assembly views and Sheets: You can create assembly views and assembly sheets for an assembly type, but these drawings are always associated with a particular instance of the type, and only one instance of a type can have assembly views. If that instance of the assembly is deleted from the project or disassembled, all associated assembly views are deleted as well.

Assembly detail views contain only those elements that make up the assembly instance. You can add annotations to an assembly view, but you cannot add any model elements, nor can you edit the assembly or its member elements.

1. Select an instance assembly from the drawing area, click on modify/assemblies tab » assembly panel » create views.
   Or
2. Select the assembly type from the project browser, right click the view name and click on create assembly views.

3. In the assembly create views dialogue box, select the views which you want to create and choose the scale and if sheet is selected, specify title block information also (Figure 103).
4. Click OK. The views are added to the Assemblies category in the Project Browser under the assembly type name (Figure 104).

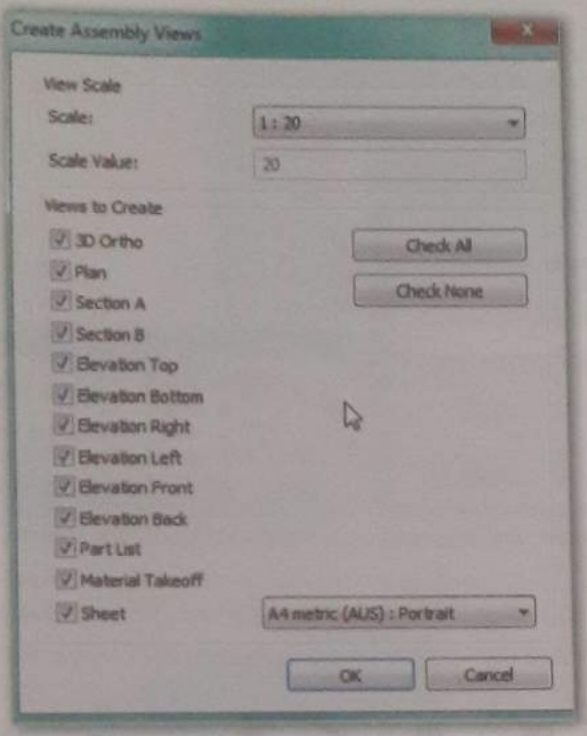


Figure 103: Assembly Views

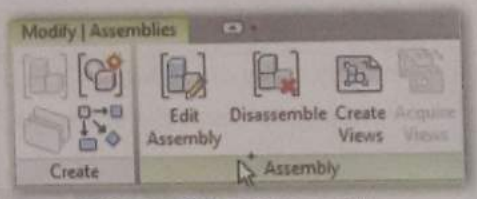


Figure 104: Edit Assembly

You can add elements to an assembly, remove elements from an assembly or perform certain edits on selected elements within the assembly by clicking add/ remove icon from the assembly panel.

To edit an element in the assembly, Press Tab until the element you want to edit is highlighted. Click to select the highlighted element. You can now move the element, change its properties, or perform other typical element edits.

You can remove the assembly relationship between individual elements in a selected assembly at any time by selecting disassemble icon from the assembly panel.

To place Assembly on Sheet

1. In the Project Browser, under Assemblies, expand the node for the assembly type, and double–click the name of the sheet.
2. Drag the desired detail view from the Project Browser onto the open sheet view, and release the mouse button to display an outline of the detail view.
3. Move the cursor to position the outline as desired, and then click to place the view on the sheet (Figure 105).

You can also place drafting views on assembly sheets.

How to add dimensions, tags and annotation to the details views will cover in the future chapters.

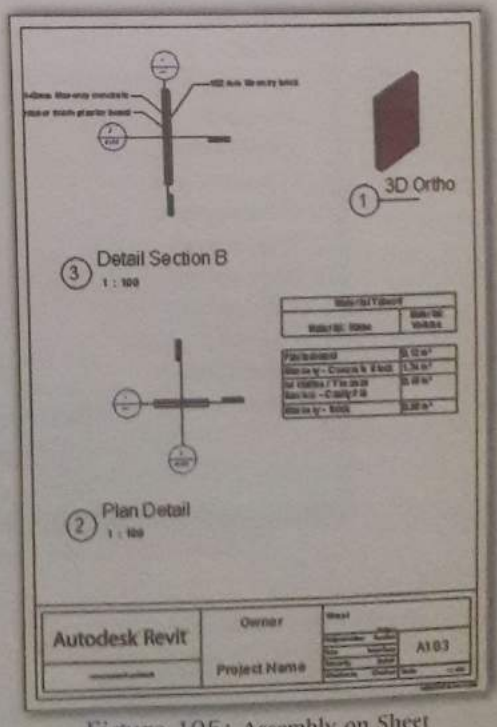


Figure 105: Assembly on Sheet

2.5.3 Construction Modeling

1. Open the project Home.rvt
2. Select one of the Exterior wall » Select create parts icon from the create panel.
3. The wall divides in to different parts since it is a compound wall (Figure 106).
4. Select the divided parts to create the assembly. Select the parts divided and select Assembly icon from the create panel.
5. Opens a *new assembly* dialog box. Enter a name and click OK (Figure 107).
6. In the assembly panel select create views icon(Figure 107).

Figure 106: Create Parts

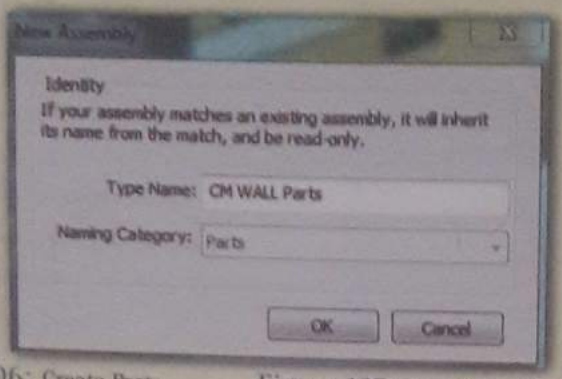


Figure 107: New Assembly

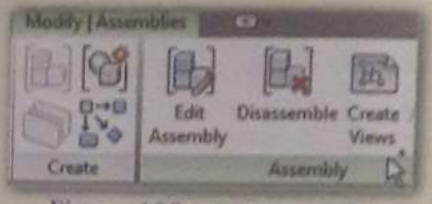


Figure 108: Modify Assemblies

7. Opens create assembly views dialog box. In that select the scale, and select which are the views you want to generate.
8. Near the sheet option drop down the arrow mark and load A4 sheet from the library. Click OK to close the dilog box (Figure 109).
9. Automatically opens one of the assembly views. In the project browser a set of views created under assembly. Expand it and check the different views created (Figure 110).

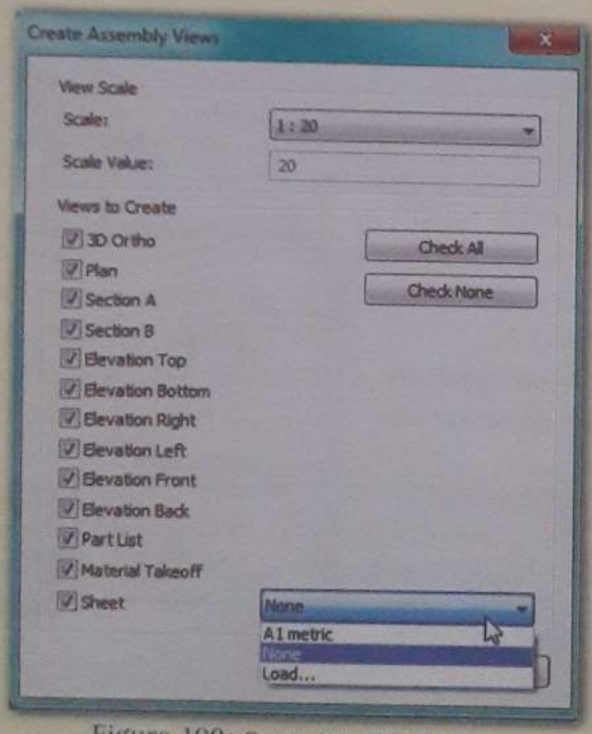


Figure 109: Create Assembly views

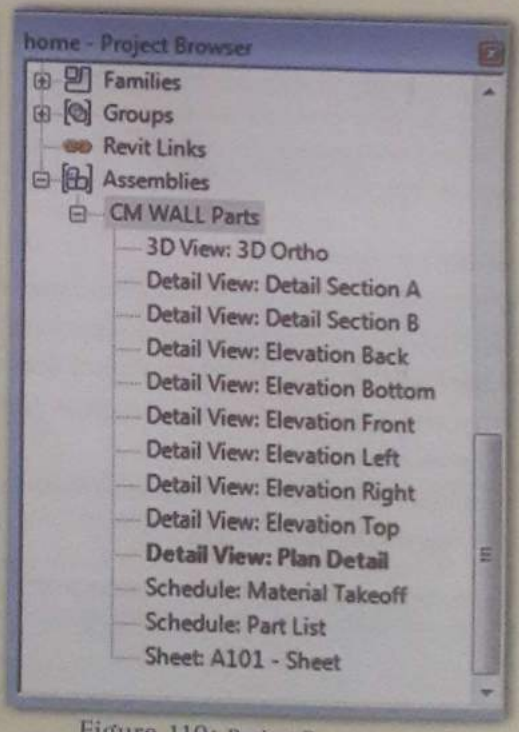


Figure 110: Project Browser

10. To edit the assembly,
    a. Open 3d view: 3D ortho.
    b. Select he element wall » Select edit assembly icon from the assembly panel.(Figure 111).

c. Select each part and enable show shape handles from the instance properties.(Figure 109).

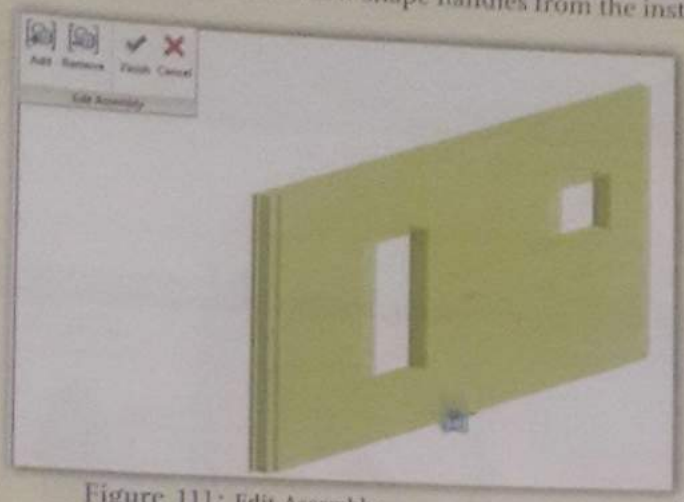


Figure 111: Edit Assembly

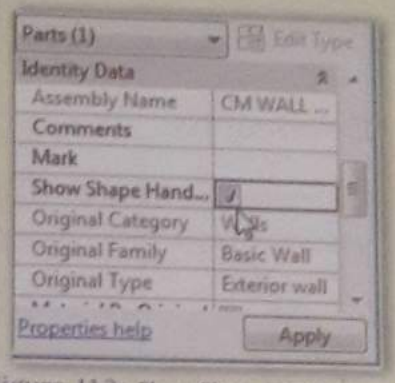


Figure 112: Show Shape Handles

d. Blue handles appears on the parts. Resize the parts using blue handles.(Figure 109).
e. Repeat the same for other parts too.
f. Click finish icon from the edit assembly panel.(Figure 109).

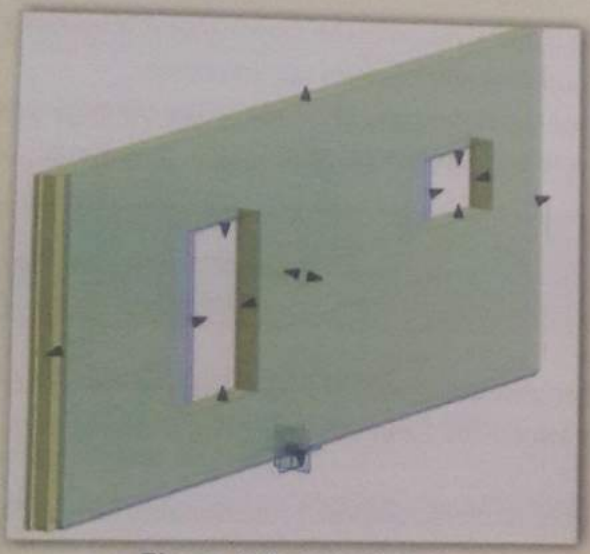


Figure 113: Resize Parts

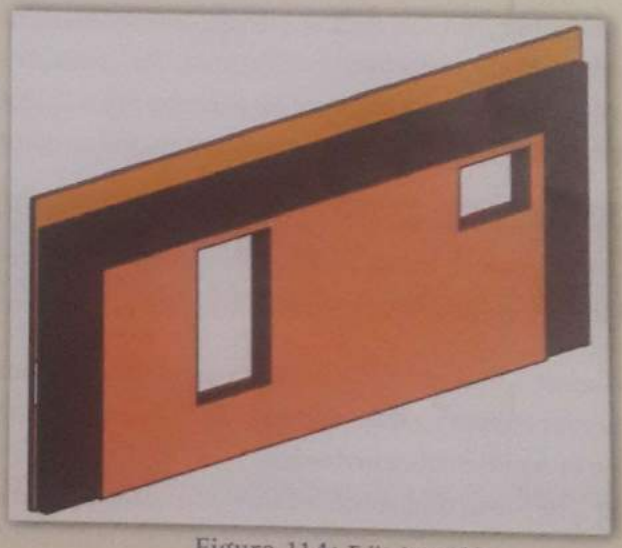


Figure 114: Edit Assembly

11. Save and close the project.

QUESTION

[1] You can modify the project unit settings anytime during a project. (T/F)
[2] Which template file is using for Level head creation.
[3] By default, when you sketch a wall from left to right, the lower face becomes the external face. (T/F)
[4] The _____ dimension appears after you specify the start point of the wall and move the cursor.
[5] Which of the following keys can be used to constrain the cursor such that it moves along the orthogonal direction only?
a) TAB b) SHIFT c) ALT d) F3
[6] What is the default wall join in Revit Architecture.
[7] The vertically stacked wall does not schedule. (T/F)
[8] Stacked walls can host sweeps. (T/F)