

AS322407

Reduce Errors by Creating Intelligent Sections and Elevations in AutoCAD Architecture

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Learning Objectives

- Learn how to create a building section of a 3D model
- Learn how to create interior and exterior elevations
- Learn how to create subdivisions in the sections to add visual depth
- Learn how to update Section and Elevation views upon drawing open

Description

So we've already created our shell and modeled our critical systems; now what? Time to add details and use sections to keep track of the minute internals that are easily overlooked. A section lets architects create vertical slices of a complex system to view through surrounding structures. This class will walk through the workflows involving section and elevation views that can be used to improve productivity and reduce errors in building design. We'll create section and elevation views, and then progress to a live preview of the modifications we make. We'll then introduce subdivisions to our sections to add visual depth or zoom out as needed. We'll use the Styles Editor to update our sections and elevations graphically based on set rules. We'll also learn how to automatically update section/elevation views automatically on drawing open. Finally, we'll add chutzpah to our drawing with materials, and see how we can automatically apply fill patterns to our designs.

Your AU Expert:

Sridhar Subramani has more than 20 years of CAD experience, working as Senior Product Owner at Autodesk, Inc. A frequent presenter at AutoCAD University for the last 6 years. A seasoned professional in software testing, he has also been actively involved in news groups of AutoCAD Mechanical software and AutoCAD Architecture software and resolved over 1500 issues reported by customers. Sridhar conducts in-house training in AutoCAD software and AutoCAD Architecture software. He has written several technical solutions that are published on the Autodesk support website.

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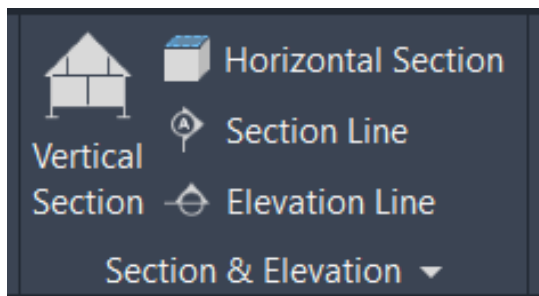
1. Introduction to Sections and Elevations:

A section represents a building model as if the model were cut vertically or horizontally to show interior detail. You can create two-dimensional (2D) or three-dimensional (3D) section objects or a live section view of the model. You can control the size and shape of the section you generate and assign materials to the section for an optimal visual representation of the sectioned objects. Section objects remain linked to the building model that you used to create them unless you explode the section. Because of this link between the section and the building model, any changes to the building model can be reflected in the section as well.

The section line defines the extents of the section that you extract from the building model. Sections lines can be straight or jogged and you can also specify the length, depth, and height of the area defined by the section line. Section marks appear at each end of the section line. Learn how to set up a project in AutoCAD Architecture

2D elevations are created by drawing an elevation line in front of a number of objects and then creating a 2D elevation object from them. The elevation object is drawn without hidden and overlapping lines. You can edit a 2D elevation by changing its object display properties or its style display properties.

2. Create Building Section View



1. Launch AutoCAD Architecture 2020 or MEP 2020 using the *Imperial* profile
2. Open Sample drawing sample.dwg
3. Select "Vertical Section" command from Ribbon Home Tab > Section & Elevation tab
4. Pick a point above the wall of the upper left room and drag all the way down and pick a second point outside the building and press Enter Key
5. At Enter length, drag the mouse to the left of the building so that all objects are in the selection and pick a point on the screen. (By default, all objects are selected for the section)
6. At "Specify insertion point or [Dialog]:" Pick a point anywhere in the drawing to insert the section result.

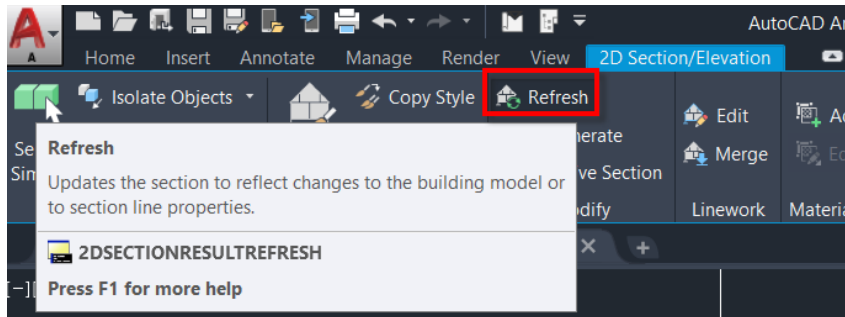
2.1 Jogged Section View:

We created a vertical section view. Similarly, you can create a horizontal section view. Let's review how to a jogged section view.

1. Open Sample drawing sample.dwg
2. Select "Vertical Section" or BldgSectionLineAdd command from Ribbon Home Tab > Section & Elevation tab
3. Pick points in the form of a Z letter so that you create a section line which looks like a Z letter. (Horizontal line>Vertical line and a horizontal line) in the plan view. The starting point and end point of section line will be outside the building
4. At Enter length, drag the mouse upwards so that all objects are in the selection and pick a point on the screen.
5. At "Specify insertion point or [Dialog]:" Select "Dialog option" > Review the options in the dialog. If you want to remove any objects that are not required to be seen in the section

view, Pick “Select objects” option and use the shift key to select or unselect any objects > Click Pick point option to insert the section result anywhere in the drawing.

Tips: Select the section line in the drawing. A “Building Section line” Contextual tab will be seen in the ribbon. Click the “Reverse” option to reverse the section viewing direction. Hit Escape key to remove the section line selection. Now select the “Section result” and from the Ribbon > Pick Refresh option to refresh the Section result to see the updated view.

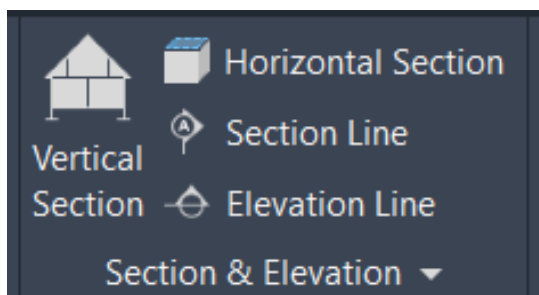


2.2 Updating a Section View

The building model evolves with new revision changes. However, Section and Election views are already created. This is where AutoCAD Architecture helps in automatically updating the section/elevation views on demand or automatically on drawing open. Let's review how to update a section view manually to reflect new changes.

1. Add/modify few openings like Doors, Windows to the building model. (Notes, these new changes are not reflected in the Section or Elevation view)
2. To Reflect these changes > Select the “Section result” and from the Ribbon > Pick ‘Refresh’ option to refresh the Section result. The new result will include any changes to the building model.

3. Create Building Elevation View



1. Launch AutoCAD Architecture 2020 or MEP 2020 using the *Imperial* profile
2. Open Sample drawing sample.dwg
3. Select “Elevation line” command from Ribbon Home Tab > Section & Elevation tab
4. Pick below and to the left of my building and pick a second point below and to the right of the building, which creates the Building Elevation Line object that has width, depth, and height,
5. At “Specify insertion point or [Dialog]:” Pick a point anywhere in the drawing to insert the section result.

3.1 Update Elevation View

Updating an Elevation view is same as Section view. Whenever the model is modified, follow steps from 2.1.1 to update the Elevation view.

4. Create Subdivisions to Sections and Elevation Views

The subdivision components partition an elevation object. They are useful to create perspective effects, where parts closer to the viewer are drawn with darker, stronger lines and parts farther from the user are drawn with lighter, thinner lines. Subdivisions can have no individual material assignments. However, the display properties of the subdivisions can be used for the surface hatching of the subdivisions by selecting Use Subdivision Properties for Surface Hatching in the Other tab of the 2D elevation display properties. Subdivisions are a display component of both 2D and 3D elevation objects. The subdivision components are either controlled by the 2D Section/Elevation Linework component of the material or by the 3D Body component of a material.

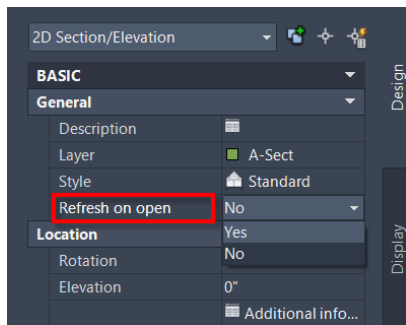
1. Open Sample drawing sample.dwg
2. Select "Vertical Section" or BldgSectionLineAdd command from Ribbon Home Tab > Section & Elevation tab
3. Pick 2 points to create a horizontal section line.
4. Select the Building Elevation Line entity used to generate the section, and in the Properties palette, Dimensions group, is the Subdivisions option. Click the option. There are currently 0 (zero) listed.
5. In the Subdivisions dialog box, Add two subdivisions, 10' and 20'.
6. Select the section line. From the contextual tab, modify panel, use the Refresh tool. The layers and colors of entities in the Elevation that fall within the new subdivisions change.
7. In the contextual tab, General panel, click the Edit Style tool, which opens the 2D Section/Elevation Style Properties dialog box. On the Display Properties tab, click the Edit Display Properties button on the upper-right to open the Display Properties dialog box. On the left is the Display Component column. Focusing on Subdivisions 1, 2, and 3, the colors are currently yellow, 13, and 31.
8. Adjust these to what may be more appropriate colors based on your plotting standards. For this exercise, change the colors of Subdivision 2 to red, and 3 to blue, then click OK twice to dismiss the dialog boxes.
9. Some of the lines in the 2D Section Elevation object have ended up in the wrong subdivision because of where the roof split occurs. To edit those individual lines, from the contextual tab, on the Linework panel, click the Edit tool, which opens the Edit in Place: Linework tab. select the lines, then, on the Profile panel, pick the Modify Component tool to open the Select Linework Component dialog box. select the Match existing linework tool, then one of the yellow lines, then click OK. repeat the process for the front door and the window assembly on the left. In the Edits panel, pick the Finish tool.
10. Use the colors to control line weights, thus adding visual depth to the Elevation.

5. Automatically update section/elevation views

In a single drawing, you may have inserted many Section and elevation views. However, you would like to see the selected section/elevation views updated when the drawing is open.

5.1 Automatic update using property palette.

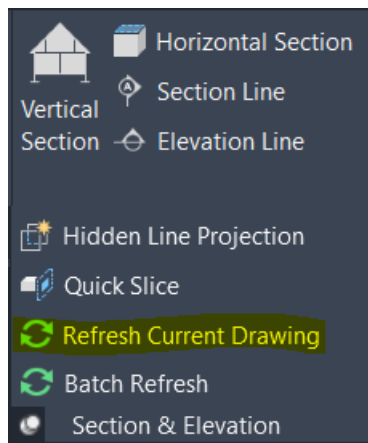
1. Open Sample drawing sample.dwg
2. Create a section or elevation view
3. Select the Section Result > From the property palette, select "Refresh on open" and select Yes.



4. Modify the building model by adding or modifying some objects like Doors, Windows, etc.
5. Save the drawing and open.
6. Result: The Section Result will be updated on drawing open.

5.2 Batch auto update all modified views.

1. Open Sample drawing sample.dwg
2. Create few section and elevation views
3. Modify the building model by adding or modifying some objects like Doors, Windows, etc.
4. Click "Refresh current drawing" option from the [Ribbon Home Tab > Section & Elevation tab](#)



6. Working with Materials

1. Open the sample drawing
2. Open Property Palette
3. Select a wall > From the Ribbon, select "Select similar"
4. From the Property palette > Click Browse > From the Styles Browser > Select "Brick-4 Brick-4 Furring" Style > Right click and select "Apply style to selection"
5. Create a 2D Section/Elevation view.
 - a. Note: The hatch pattern used for the walls represents Brick. Because the information is in the Wall
 - b. Hatch pattern in the wall components is also controlled by the Material Definition used. So, Material Definitions that are assigned to Style components will have a direct affect on what your plans, as well as 2D Section/Elevation objects look like.
6. By default, the section result is created with material definitions.
7. You can disable the material definition from the Object Display Properties tab.
 - a. Select the Section View > Right click and select Edit "2D Elevation/Section Style"
 - b. In the Dialog > Select "Edit display properties" button
 - c. On the Layer/Color/Linetype tab, By Material is checked for all the Boundary Display Components.

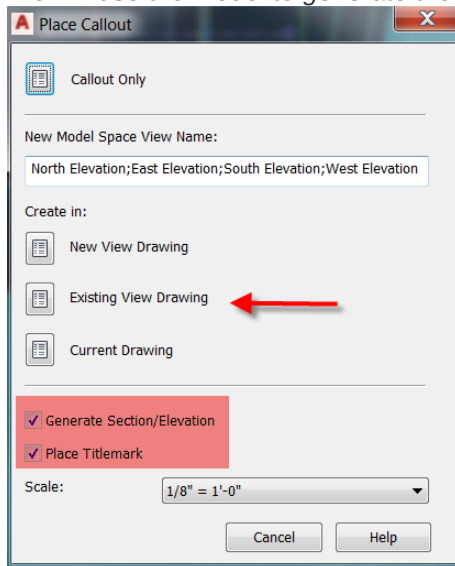
7. Working with Live Sections

1. Open Sample drawing sample.dwg
2. Select "Elevation line" command from Ribbon Home Tab > Section & Elevation tab
3. Pick below and to the left of the building and pick a second point below and to the right of the building, which creates the Building Elevation Line object that has width, depth, and height,
4. At "Specify insertion point or [Dialog].:" Pick a point anywhere in the drawing to insert the section result.
5. Switch to Isometric view and Shaded view
6. Grip select the Elevation line and pick the middle grip point
7. Move the grip point into the building to see Live Section view of the building interiors.
 - a. At any point of time in live section > Click on the Generate Elevation to insert a new Elevation or section view.

8. Sections and Elevations in Project Navigator

8.1 Creating Elevation Views

We will use the model to generate the exterior elevation views of the building.



1. *Open Project Browser and Set Sample project as current.*
2. Open Exterior Rendering.dwg from the views Tab>>isometric Category
3. Open Tool Palette and Select Documentation Palette Group.
4. To generate the building elevations, from the Tool Palettes>>Callouts palette, click the Exterior Elevation Mark A3 tool. *This places an elevation symbol on all four sides of the building and generates the four elevation views automatically.*
3. At the Specify first corner of elevation region prompt, pick a point above and to the left of the plan. At the Specify opposite corner of elevation region prompt>> pick a point below and to the right of the plan.
4. Ensure that Generate Section/Elevation, and Place Titlemark are selected. Also, ensure that the Scale is set to 1/8"=1'-0".
5. In the Place Callout dialog box, select the new view drawing.
6. In the Add Section/Elevation View dialog box, on the 1st page, General, for the Name, enter "Building Elevations".
7. Expand the Category drop down, choose the folder Section-Elevations. Select accept the default Drawing Template file and click Next.
8. Select all levels under Division Phase 1.
9. Under Content, deselect all the Constructs that are not to be xrefed>> click Finish
10. At the Specify insertion point for the 2D elevation result prompt, pick a point above the site boundary and pick a point to specify the spacing and direction of elevations prompt.

On the Views tab, in the Section-Elevations category, under the Building Elevations file, there are four named model space views.

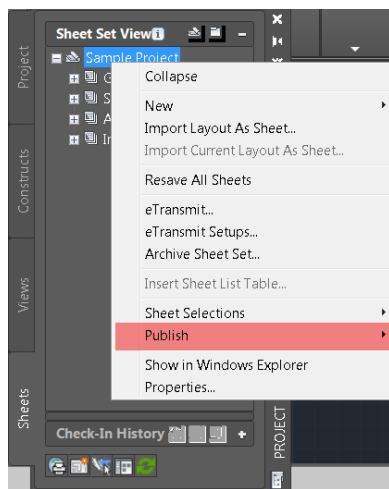
8.2 Creating Section Views

I will use the model to generate the section views of the building.

1. To generate the building sections, from the Tool Palettes, Annotation Palette, click the Section Mark A3T tool.
2. At the Specify first point of section line prompt, pick to the left of the indent in the plan. At the Specify next point of line prompt, pick past the building to the right in plan, press ENTER.
3. At the Specify section extents prompt, drag up past the top of the plan, and pick.
4. In the Place Callout dialog box, at the top in the New Model Space View Name area, rename it to "East-West Section".
5. Make sure that the boxes are checked for Generate Section/Elevation, and Place Titlemark. set the plot Scale to 1/8"=1'-0".
6. Click the New View Drawing button. In the Add Section/Elevation View dialog box, enter "Building Sections for the name. Expand the Category drop down and select the folder Section-Elevations. Click Next.
7. Select all Levels under Division Phase 1.
8. Deselect all the constructs not to be xrefed and click Finish
9. At the Specify insertion point for the 2D section result prompt, pick a point above the site boundary.

Similarly create a North-South Section view by selection "Existing drawing" option in the Callout dialog box while create a section view.

8.3 Publishing Project Drawings



1. Open any project. E.g. Sample Project or continue using the above project
2. Select the Sheet Tab in the Project Browser
3. Right- click Project>> Publish>>Publish Dialog Box
4. In the Publish dialog box click "Publish to" drop down and choose PDF format or DWF format
5. Review the sheets that will be published
6. Click "Sheet set publish options". Ensure "Multi sheet" checkbox is checked
7. Click Publish
8. Select a location to save the output file
9. Once publish is completed, review the log file for errors and final *.pdf or *.dwf file.