

AS124867

## Tips and Tricks: Effective Ways to Improve Productivity Through AutoCAD Architecture

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### Learning Objectives

1. Learn how to create and set up display representations
2. Learn how to perform Wall cleanup and sweeps
3. Learn about schedule tags
4. Learn about wall openings

### Description

[This class will show you how to get the most out of the powerful features of AutoCAD Architecture software and improve your productivity. You'll learn valuable tips and tricks and proven techniques to save time and make your drawings more accurate. You'll learn how to create and apply display configurations, as well as how to override display representation to define how an object appears; how to extract the quantities of materials in a selection of walls; how to perform wall cleanups; how to use multiple insertion points for AutoCAD Architectural multiview blocks, which you can toggle through using the Control key; how to display a graphic line to verify which object a schedule tag is anchored to; how to let one insert cut an opening through multiple walls; how to create an endcap that joins 2 wall components; and how to add a wall parapet using a sweep.]

### Speaker

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1.	Create and apply display configurations .....	3
1.1	Display representations .....	3
1.2	Display Sets.....	3
1.3	Display Configurations .....	5
1.4	Override display representation .....	5
1.4.1	Override display by Style .....	5
1.4.2	Override display by Object .....	6
2.	Wall related tips.....	7
2.1	Materials Quantity .....	7
2.2	Wall Cleanups.....	9
2.2.1	Joining Cleanup.....	9
2.2.2	Intersection Cleanup .....	9
2.2.3	Priority Cleanup.....	10
2.2.4	Cleanup Radius:.....	11
2.3	Wall Sweep.....	12
2.4	Wall Roof and Floor Line.....	13
3.	Wall Endcap .....	13
4.	Opening through multiple walls.....	14
5.	Schedule tags.....	15
6.	MvBlocks.....	15

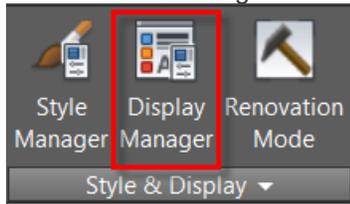
## Display Manager:

The Display Manager is the central location of display system information for your drawing in AutoCAD Architecture. You use the Display Manager to create and modify display configurations, display sets, and display representations. You can also assign a display configuration to a viewport and view how objects are displayed in different representations.

### 1. Create and apply display configurations

#### 1.1 Display representations

1. Launch AutoCAD Architecture
2. Open sample drawing `display_representation_modify_default.dwg`
3. Switch to Manage Tab>Style & Display Panel>Select Display Manager



4. Select the "Representation by Object" and Expand to see the objects.
5. Pick the Door object>click the Plan representation>all of the settings on the tabs on the right, including Layer, Color, Linetype, and settings on the Other tab, are applied to all the Doors in the drawing at either the Style, or Object level.
6. For example, if I wanted all of my Doors to have a 45-degree swing in plan.
7. Select the other tab> bottom left>select the Override Opening Percent/Swing Angle check box, and change the Swing Angle value to 45> click OK.
8. Notice all the Doors have changed to 45-degrees, regardless of which Style they are.

#### 1.2 Display Sets

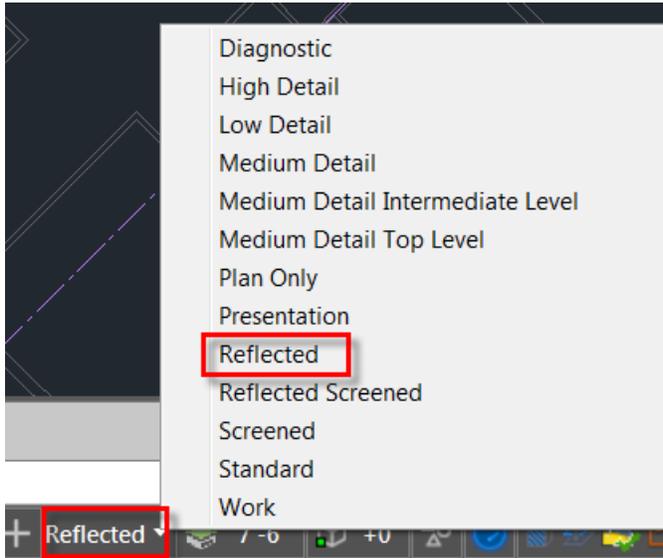
Display Sets determine if any Representation for that object will be included, and if so, which one.

Display Sets are then assigned to Display Configuration View directions.

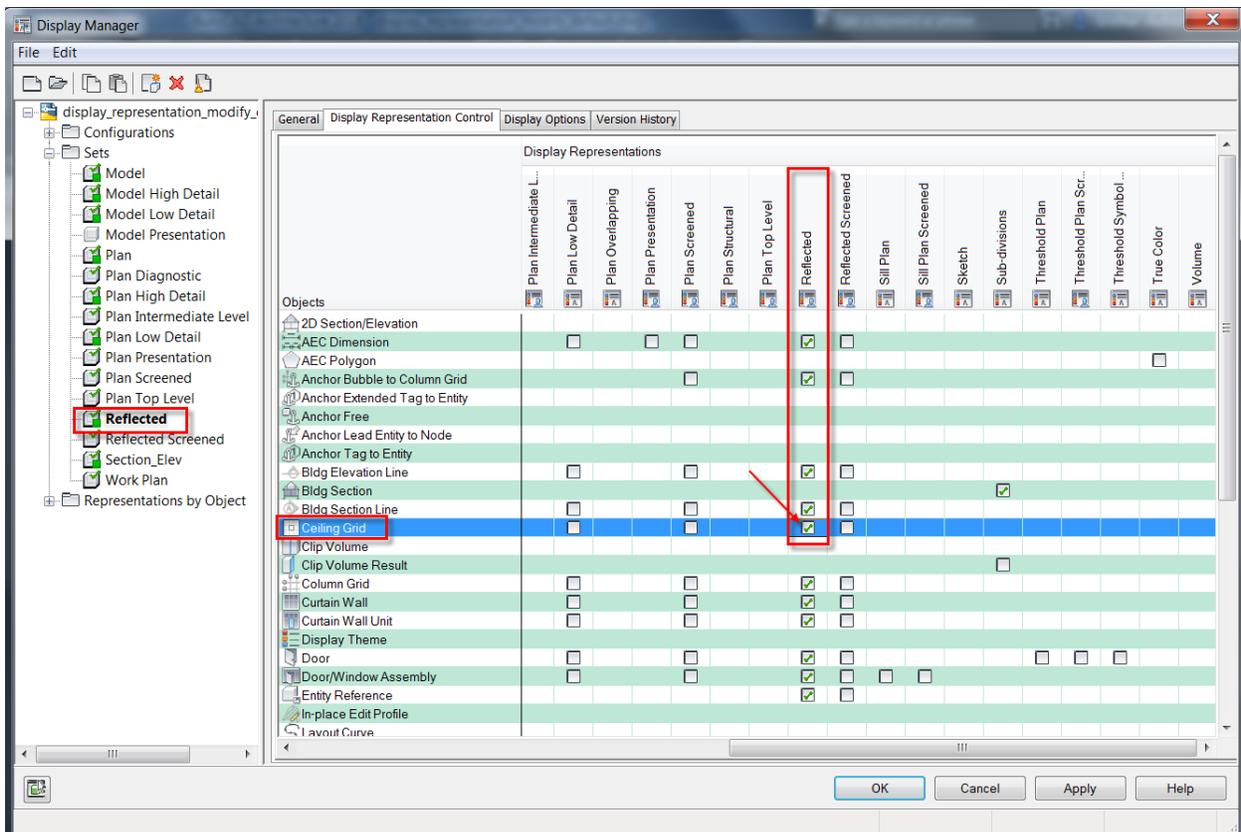
In the Display Manager, expand the Representation by Object group, pick the Door object, then the Plan Representation, and we can see that the Display Components Panel, Frame, and Swing are all turned on. On the left, pick the Reflected representation, and we see that the Display components for these same objects for Below Cut Plane are turned off. If I want to see the Frames Below Cut Plane, turn that Display Component on. The cut plane for the Reflected Display Configuration is 7'-6". Since most doors are shorter than this, the Components for Below Cut Plane control visibility. Expand Ceiling Grid on the left under Representations by Object, then, when I select the Plan Representation, notice that the X and Y Axes are turned on. This is true also for the Reflected Representation. So why are we not seeing the Ceiling Grids in the Medium Detail Display Configuration? It is because it's being controlled at the Sets level.

In this example, let's hide Ceiling Grid under "Reflected" display configuration.

1. Open sample drawing `display_sets.dwg`
2. On the status bar>Display configuration>Select "Reflected"



3. Re-open Display Manager, and expand Sets. Reflected is currently highlighted, meaning it is the Set being used for the current View direction of the current Display Configuration.
4. Select Reflected, and on the right, for Ceiling Grid, scroll to the right, that the Plan Representation is checked. This means Ceiling Grid will display using this Representation.
5. Uncheck the check box for Reflected and click OK.



Notice, the Ceiling Grid is invisible in the Reflected configuration.

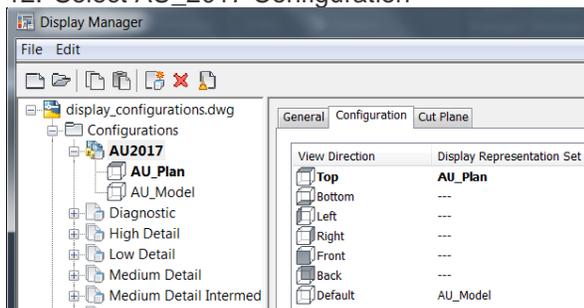
This allows you to control which objects are seen and which Representation is being used for those objects

### 1.3 Display Configurations

Configurations control which Set displays from which View direction, and the Cut Height of the view.

In this session, lets create a custom display set for Plan and Model view and assign these display sets to a new Display configuration.

1. Display\_configurations.dwg
2. Switch to Manage Tab>Style & Display Panel>Select Display Manager
3. Select Sets
4. Under Sets>>Right click on Plan and select Copy>Paste the Set
5. Rename the Set as "AU\_Plan"
6. Select AU\_Plan Set>Select Space on the right hand side>Under Plan Representation>Un check the check box so that Space is not seen in the plan view
7. Create a AU\_Model Set using Model Set by Copy and Paste
8. Select AU\_Model Set>Make sure the check box is on for Under Model Representation so that the spaces are seen in Model view
9. Let's create a new Configuration
10. Select Configurations>Right click and select new
11. Name the Configuration as AU\_2017
12. Select AU\_2017 Configuration



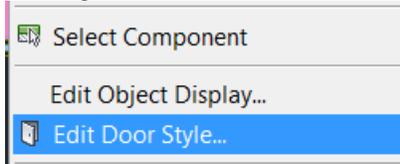
13. Select Configuration tab on the right hand pane
14. Under the view Direction>Top>Select the Display Representation set as "AU\_Plan"
15. Under the view Direction>Default>Select the Display Representation set as "AU\_Model"
16. Click OK to close the dialog box.
17. On the status bar>Switch to AU\_2017 Display Configuration
18. Note; the Spaces are not visible in the plan view
19. Switch to one of the Isometric view
20. Note; the spaces are visible in the model view

### 1.4 Override display representation

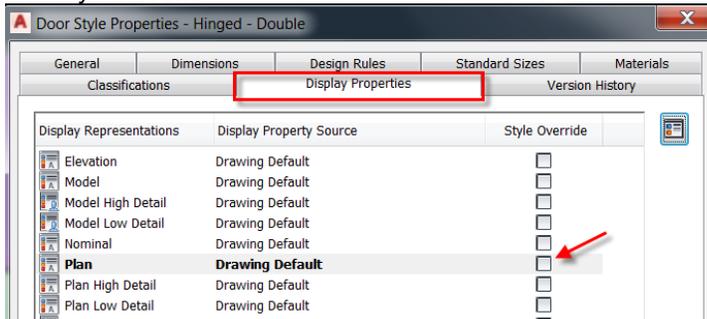
#### 1.4.1 Override display by Style

In AutoCAD Architecture's Display Manager dialog box, we are able to control the Drawing Default Representations for all of our AEC Objects. What if we want to change the Representation only at the Style Level?

1. Open display\_rep\_modify\_default.dwg  
In this drawing, I want to modify the swing angle for the Double Hinged doors and all other door styles should not be affected.
2. Select a Double hinged door
3. Right Mouse click and select “Edit Door Style” from the context menu



4. In the Door Style Properties dialog box>Under Display Representation>Select Plan>click on the Styles override check box.

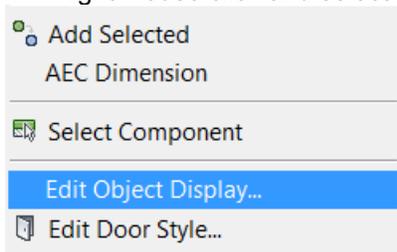


5. Switch to ‘Other tab’ on the Display Properties dialog box
6. Select check box “Swing Angle”
7. Enter 45 degrees as the swing Angle
8. Click OK to close all the dialog boxes.
9. Note: Only the double hinged doors are set to a swing angle of 45 degree.

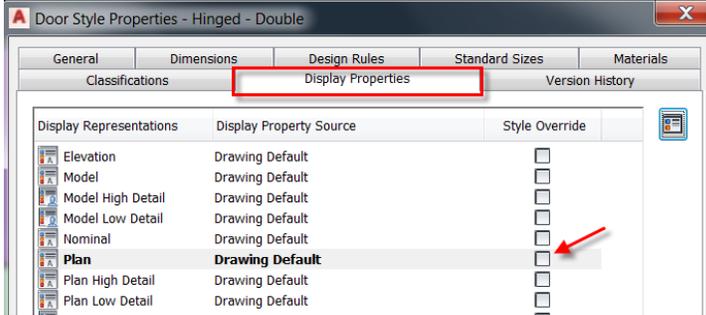
### 1.4.2 Override display by Object

In AutoCAD Architecture's Display Manager dialog box, we are able to control the Drawing Default Representations for all of our AEC Objects. In the Style Properties dialog box, we are able to override these defaults at the Style level. What if we want to change the Representation only for a single object of that Style at the Object Level?

1. Open display\_rep\_modify\_default.dwg
2. In this drawing, I want to modify the swing angle for only 1 door. Let’s select a Single Hinged.
3. Select a Single hinged door in the drawing
4. Right Mouse click and select “Edit Object Style” from the context menu



5. In the Door Style Properties dialog box>Under Display Representation>Select Plan>click on the Styles override check box.



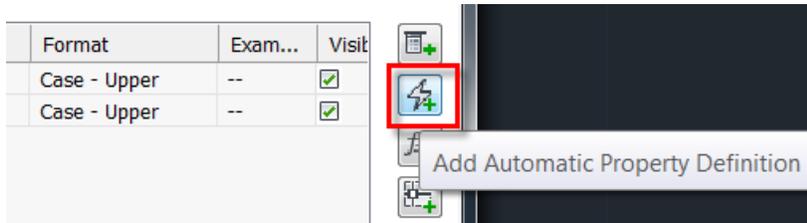
6. Switch to 'Other tab' on the Display Properties dialog box
7. Select check box "Swing Angle"
8. Enter 45 degrees as the swing Angle
9. Click OK to close all the dialog boxes.
10. Note: The swing angle is updated to 45 degrees only for the selected door. Remaining doors in the drawing are unaffected.

## 2. Wall related tips

### 2.1 Materials Quantity

In the example, we shall extract the total volume of each wall component used in the drawing. We will be extracting both Net Volume and gross Volume of the wall components.

1. Open drawing WallComponentVolume.dwg
2. Ribbon Manage Tab>Style & Display Panel>Style Manager
3. Select Documentation Objects>Property Set Definitions>Wall Styles
4. Select Definition Tab>click "Add Automatic Property Definitions" button on the right-hand side.

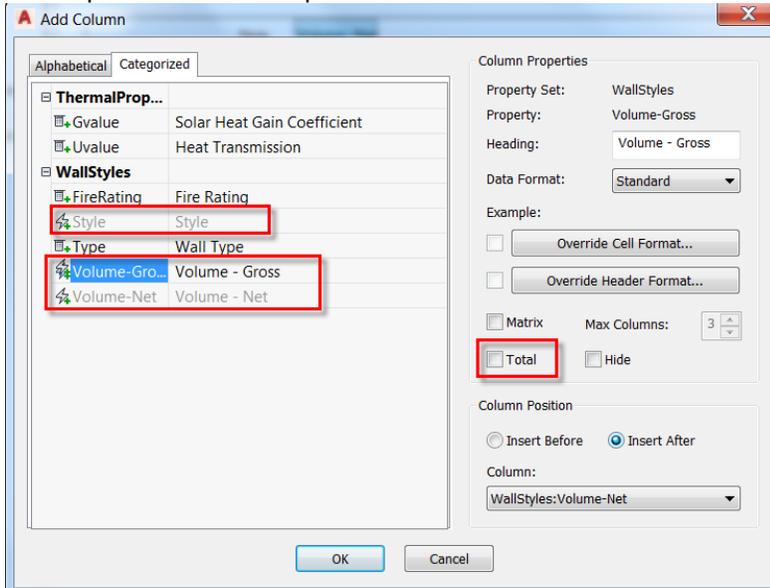


5. Select 'Style', 'Volume - Net' and 'Volume - Gross' from the Automatic Property Source dialog box.

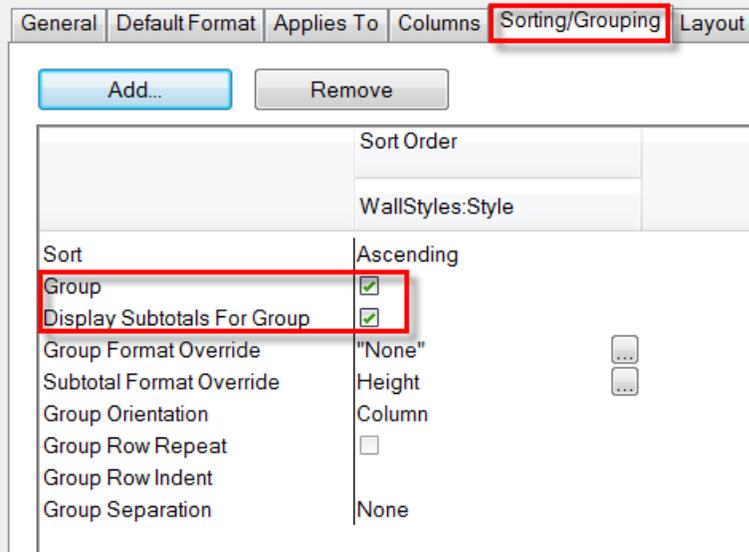
Name	Description	Type	Source
FireRating	Fire Rating	Text	
Type	Wall Type	Text	
Volume-Gross	Volume - Gross	Automatic	Wall:Volume - Gross
Style	Style	Automatic	Wall:Style
Volume-Net	Volume - Net	Automatic	Wall:Volume - Net

6. Select 'Schedule Table Styles' >Right mouse click>New>Enter the name as "WallMaterialVolume"
7. Select 'Applies To' tab on the right side>Select Wall from the list
8. Switch to Columns Tab
9. Click Add Column at the bottom of the dialog box>Select 'Style'>Click OK

10. Click Add Column at the bottom of the dialog box>Select 'Volume- Net'>Enable 'Total'>Click OK
11. Repeat the above step for 'Volume- Gross'



11. Switch to Sorting/Grouping Tab
12. Click Add button
13. Select 'WallStyles Styles' Option from the 'Select property' dialog box.
14. Enable the checkbox for 'Group' and 'Display subtotals For Groups' checkbox



15. Switch to Annotate Tab>Scheduling Panel>Slide out>Select Wall Schedule
16. In the property Palette>Select the Style as 'WallMaterialVolume'
17. Select all the walls in the drawing using window select
18. Insert the schedule table
19. If the Schedule table is empty>Select the Schedule table>Select 'Add All Property Sets' from the Ribbon.

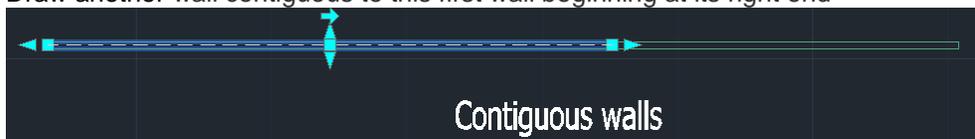
Notice a schedule table is inserted in the drawing with the net and gross volume for each wall component and their associated total volume.

## 2.2 Wall Cleanups

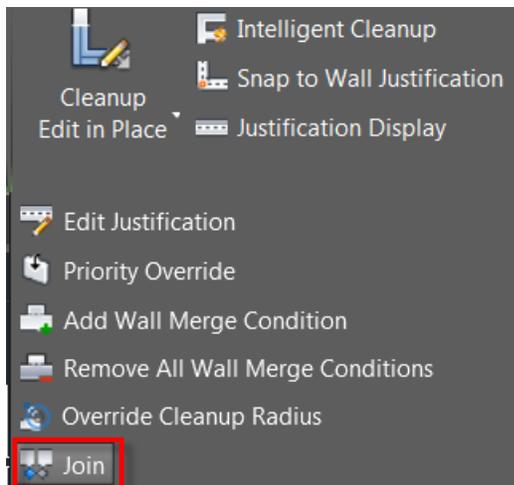
We'll review joining and intersection clean ups, as well as resolving component priority cleanup issues.

### 2.2.1 Joining Cleanup

1. Open a new drawing
2. Draw a wall with any style
3. Draw another wall contiguous to this first wall beginning at its right end



4. We now have two walls that may need to be joined.
5. Select the wall on the left
6. From the Wall contextual panel>Cleanup Panel>Slide out>>Select Join



7. Pick the other wall on the right side
8. Notice both walls join into a single wall.

### 2.2.2 Intersection Cleanup



1. Let's continue in the same drawing.

2. Draw a vertical wall below horizontal wall, right-click and click Enter
3. Then another one below and to the left of this same horizontal wall, right-click, and click Enter to end the command.
4. Select the first wall>on the Wall tab>Cleanup panel>Select the Intelligent Cleanup tool for L and T intersection conditions
5. Pick the vertical wall to see the T intersection cleanup done automatically
6. Repeat step-4
7. Pick the other vertical wall to the side of horizontal wall>> on the Wall tab>Cleanup panel>Select the Intelligent Cleanup

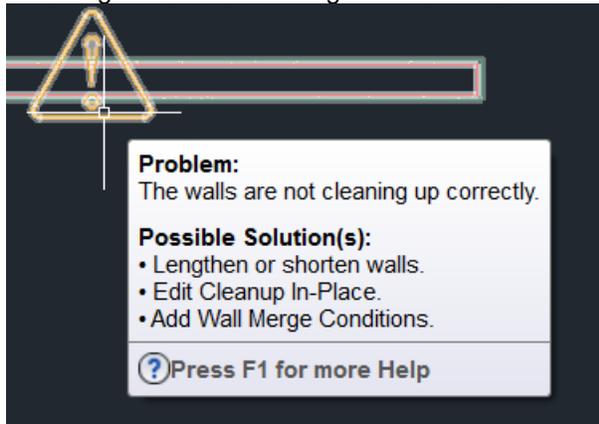
### 2.2.3 Priority Cleanup

1. Open wall\_cleanup.dwg

In the drawing, there are 2 walls. A CMU style wall using Center justification. A Stud wall draw to the CMU wall's right end center.

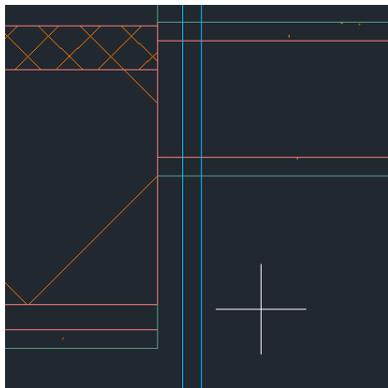
Note: The justification lines find each other, but because of an unequal number of layers and priorities in these walls' components, we now see these yellow triangles, which are warnings.

Hovering over one of them gives us some indication of what might be wrong with the wall cleanup.



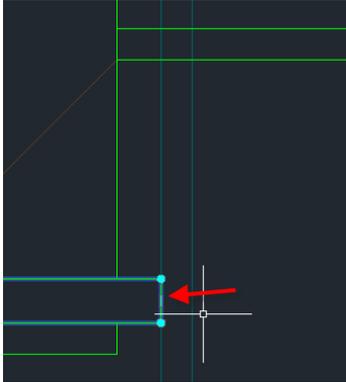
One of the solutions is to use Edit Cleanup In-Place.

2. Zoom in on the lower right intersection at the CMU wall. I want the lower components of the CMU wall to wrap the corner in order to clean up with the Stud wall.
3. Measure the distance of these two layers. The inner one is 7/8" and the outer one 5/8".
4. Draw 2 construction lines as shown below using values 7/8" and 5/8"

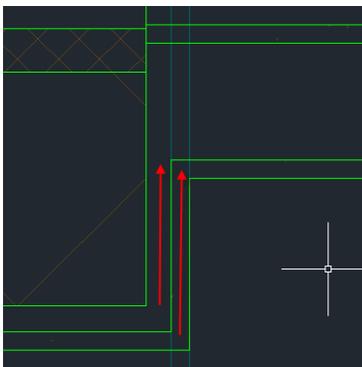


5. Select the CMU wall>on the Wall tab>Cleanup panel>select the Cleanup Edit in Place tool.

6. Select the inner component layer, and you see grip points that appear>pick the middle edge grip and drag it over to intersect with the left construction line.



7. On the Profile panel>choose Add vertex>select the same component that you are working on>pick at the corner of the CMU component>press the ESC key.
8. Pick the same inner component, there is now a new edge grip to the right of the new vertex.
9. Pick that grip, and then drag it up to where it intersects the stud component of the wall above.



10. Select the lower wall component and repeat this process.
11. Finally, in the Edits panel>click the Finish tool.
12. Select the two Construction lines and press the DELETE key.
13. As you can see, we've been able to wrap the CMU wall component layers around the corner to clean up up with the Stud wall and the warning triangles are now gone.

#### 2.2.4 Cleanup Radius:

One of the reasons Walls clean up with each other is because their Justification lines are touching. Another involves something called the Cleanup Radius.

1. Open wall\_cleanup\_radius
2. Select both the wall to notice the justification lines (blue lines) are different. (left and right)
3. Let's check the cleanup radius value. Options>>Select AEC Object Settings tab> at the top left are checkboxes for Autosnap New Wall Justification Lines, which is what just happened between the vertical and horizontal Walls. The next option is Autosnap Grip Edited Wall Justification Lines, and Autosnap Radius, which is currently set to 6".
4. We can manually adjust the cleanup radius so that the walls cleanup automatically
5. Select the wall which is 6" width



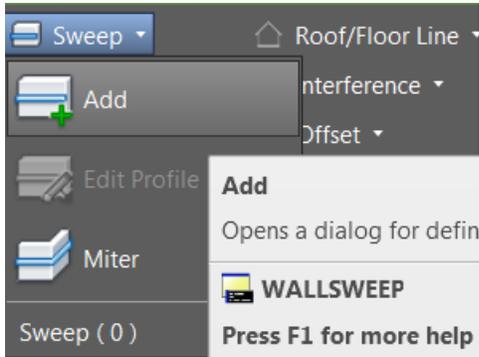
6. Select that arrow grip and drag it, and notice the circle that appears. When this circle crosses over the other wall justification lines, select a second pick.
7. The walls cleanup automatically
8. Select this wall and open property palette
9. Cleanup override is set to yes and there is an override value to this wall. Keep in mind that this Cleanup radius override is now part of the wall. If you copy this wall, be aware that it may start to find more walls than you want. You may want to reset it back to zero after copying.

### 2.3 Wall Sweep

A wall sweep is a wall or a wall component whose shape is extruded horizontally from a profile that was created from a closed polyline. The profile “sweeps” along the length of the wall to define the shape of the wall.

The height and the width of the polyline you use to create the profile define the height and the width of the wall component. The profile is not scaled when swept on the wall. The insertion point of the profile becomes the lower-left corner of the wall component.

1. Open walls\_sweep.dwg
2. In the drawing, there is a CMU wall and a closed polyline.
3. Select the polyline> right-click, and in the pop-up menu>Convert to menu>Select the Profile Definition option>At the Insertion point prompt>select the bottom right corner.
4. In the New Profile Definition dialog box, for the New Name>enter "Complex Facade," and then pick OK.
5. We will replace one of the wall components with this particular object.
6. Switch to a Southwest Isometric View to show you how the wall currently appears.



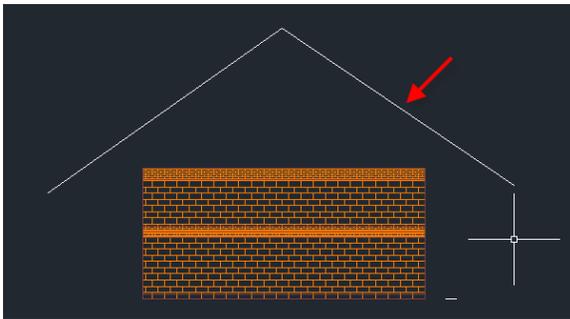
7. Switch to a Top View, and picking the wall> from the Sweep tool drop-DOWN ARROW>select the Add tool.

8. In the Add Wall Sweep dialog box> the profile will be assigned to the brick component>for the Profile Definition>from the drop-down list>choose "Complex Facade". Use the other default settings, and then click OK.
9. Switch to a Southwest Isometric View and changing to the Visual Style Conceptual, the brick component of the wall matches the shape of the profile/polyline.
10. Save the drawing

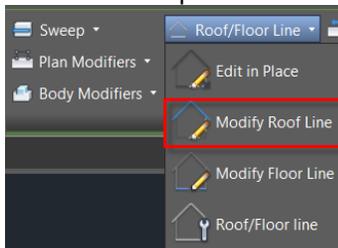
## 2.4 Wall Roof and Floor Line

You can modify the roof and floor lines of a wall to create a non-rectangular wall.

1. Continue with wall\_sweep.dwg file
2. Switch to a Front View>from the Home tab>Draw panel>draw a V-Shaped polyline above the wall.



3. Pick the wall, from the Wall tab, Modify panel, Roof/Floor Line drop-DOWN ARROW, pick the Modify Roof line option.



4. At the Roofline options menu>click Project to polyline>at the Select polyline prompt>pick the polyline we just drew, press ENTER> and then press the ESC key.
5. Switching to a Northeast Isometric View, and the Visual Style Conceptual, the wall components not containing the sweep have been extended to the polyline.

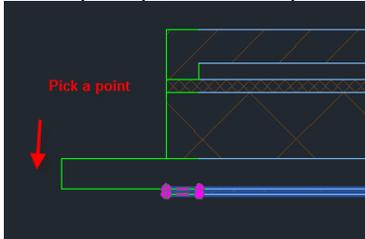
## 3. Wall Endcap

Wall Endcap and Wall Opening Endcap Styles in AutoCAD Architecture provide us with a powerful feature to control how the different Wall Components wrap. However, sometimes it's a bit too complex to create them initially. So AutoCAD Architecture provides some In Place Editing tools that will make it much easier.

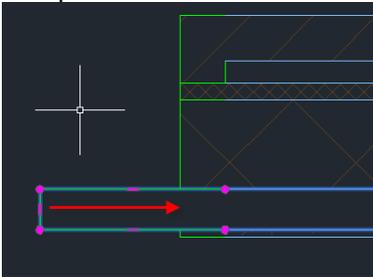
1. Open wall\_endcaps\_edit\_in\_place.dwg

The Wall Endcap Style on the upper Wall has polylines assigned to Components, allowing the Brick to Wrap the corner, and the other Components to align with the outside Brick edge. When the lower Wall Style was created, we simply copied the upper Wall Style and changed the thickness of the Stud Component. The existing Wall Endcap Style doesn't work very well with this change.

2. Pick the Wall>ribbon, Wall tab> Endcap panel>select the Endcap Edit in Place tool.
3. At the prompt, "Select a point near endcap", pick near the end of the projecting Stud Component.



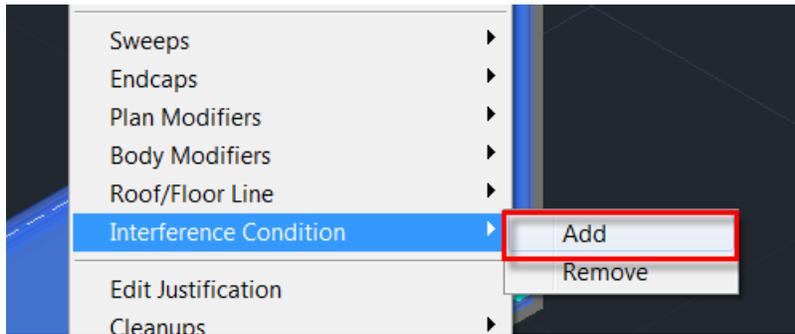
4. The polyline Endcap components highlight in a different color.
5. The GWB Component Endcap is currently highlighted. Press the ESC key, then pick the Stud Component.



6. Pick the far-left Edge Grip>then drag it back to align with the other Component polylines. On the Edits panel>use the Finish tool.
7. In the Wall Endcap In-Place Edit - Save Changes dialog box>select the Save as new style option. In the Wall Endcap Style dialog box>accept all of the settings, then click OK.
8. Now, when we zoom extents, we can see that both ends of the Wall have adjusted.
9. In the Upper Wall at the Window Opening, I want the Brick Component to wrap in the shape of the polyline I've drawn.
10. Press the ESC key, then pick the Wall>on the Wall tab>Endcaps panel>use the Calculate Automatically tool.
11. At the "Select polylines" prompt>pick the polyline in white color>press ENTER. In the Opening Endcap Style dialog box,
12. Accept all of the defaults, except the Apply the opening endcap style "as" option as I want this as an override for just this opening,
13. Select the lower radio button>click OK, then press the ESC key.
14. We've successfully cut back the Brick Component on both sides of the Window Opening. So, editing Endcaps In Place is easy to do, simply by using the Edit In-Place, or the Calculate Automatically tools.

#### 4. Opening through multiple walls

1. Open Wall\_Opening\_Multiple.dwg or draw 2 adjacent walls.
2. Switch to Home tab>Build Panel>Door dropdown>Select Opening and insert an opening in the bottom wall
3. Notice, the opening is created only on the bottom wall and the requirement is to have this opening along both walls.
4. Switch to Isometric view and Realistic visual style to display the drawing in Isometric shaded view
5. Select the other wall>>Interference condition>>Add (Command: WallInterferenceadd)

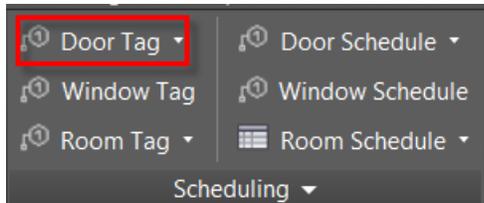


6. Select the opening
7. Select subtractive (to remove the material) as we need to cut the opening same as the one on the adjacent wall.
8. Repeat the above step and select add if you want to add material (i.e. delete the opening on the other wall)

## 5. Schedule tags

Let's review how to enable the display of graphic line to verify which object a schedule tag is actually tagging.

1. Open Schedule\_Tag\_AnchorLine.dwg
2. Notice, we see few doors are inserted in the drawing
3. Let's tag these doors first.
4. Switch to Annotate tab>>Scheduling Panel>Select Door tag dropdown and select Door Tag



5. Pick the door to schedule and pick anywhere near the door to insert the tag
6. Select OK in the Property set data dialog box.
7. Repeat the above step to tag another door
8. Try to move the door along the wall. Note: The tag moves with the door as the tag is anchored to the door. However, we are not sure to which point the tag is anchored. Let's enable the graphics line.
9. Click Manage tab> Style & Display panel> Display Manager.
10. Expand Sets.
11. Select the current display set, which appears in bold in the list under Sets.
12. Click the Display Representation Control tab.
13. In the Objects list, locate **Anchor Tag To Entity** and **Anchor Extended Tag to Entity**, and select the General display representation for both.
14. Click OK.
15. Regenerate the drawing, if necessary.

## 6. MvBlocks

Let's review how to toggle between multiple insertion points for MvBlock insertion

1. Open a new drawing file
2. Command: ADCenter or ADC to open AutoCAD Design Center

3. Switch to AEC Content tab
4. Select AutoCAD Architecture>Imperial>Design>Equipment>Food Service>Dish Washer
5. Select any content and Double click
6. Before inserting the content>press the Control Key on the keyboard
7. Notice how the insertion point of the content toggles and content preview changing.