

# *New Features in TurboCAD v16*



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## What's New in TurboCAD 16

- ▶ The following are a few new features which have been incorporated into TurboCAD v16 Professional and which are relevant to users of this TurboCAD 3D Training Guide.
- ▶ For New and Improved 2D features, please refer to the TurboCAD 2D Training Guide.

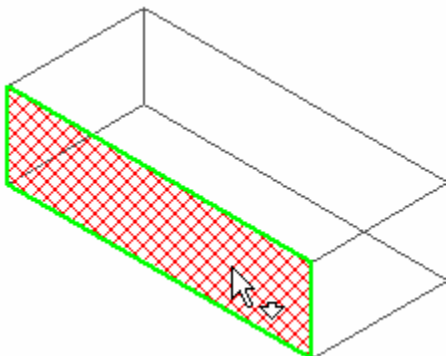
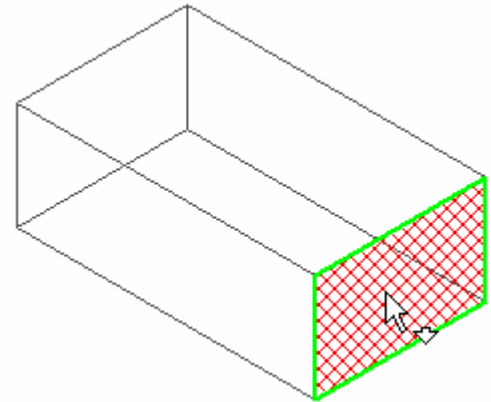


### Quick Pull

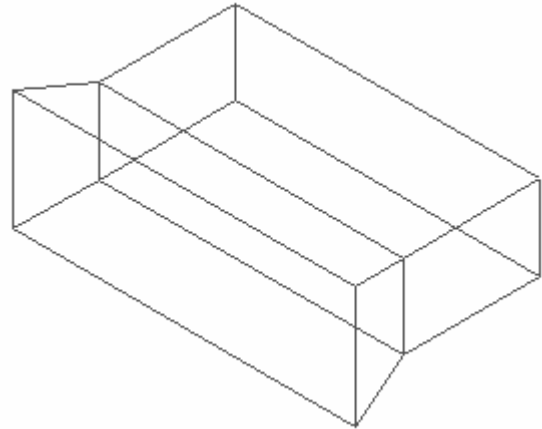
Insert > 3D Object > Quick Pull

- This tool allows for the planar extrusion of a face of a solid, either as a quick modeling function, or by a specific extrusion height/depth.
- Modeling features such as draft angle, fillet blends and chamfers can be applied to the new extruded face.
- The Part Tree records all extrusions created using Quick Pull tool as an Imprint and allows future modifications to be done using the relevant Part information in the Selection Info Palette.

- ▶ Draw a 3D box to measurements 100 x 80 x 50, shown right. The face shown shaded will be extruded to an additional outward height of 40.
- ▶ From the 3D Object menu panel select the Quick Pull tool and select the indicated face, shown right.
- ▶ TAB to the height field and input a value of 40.
- ▶ Next, a tapered extrusion of 15° will be applied to the face indicated below, with a new extrusion distance of 40.



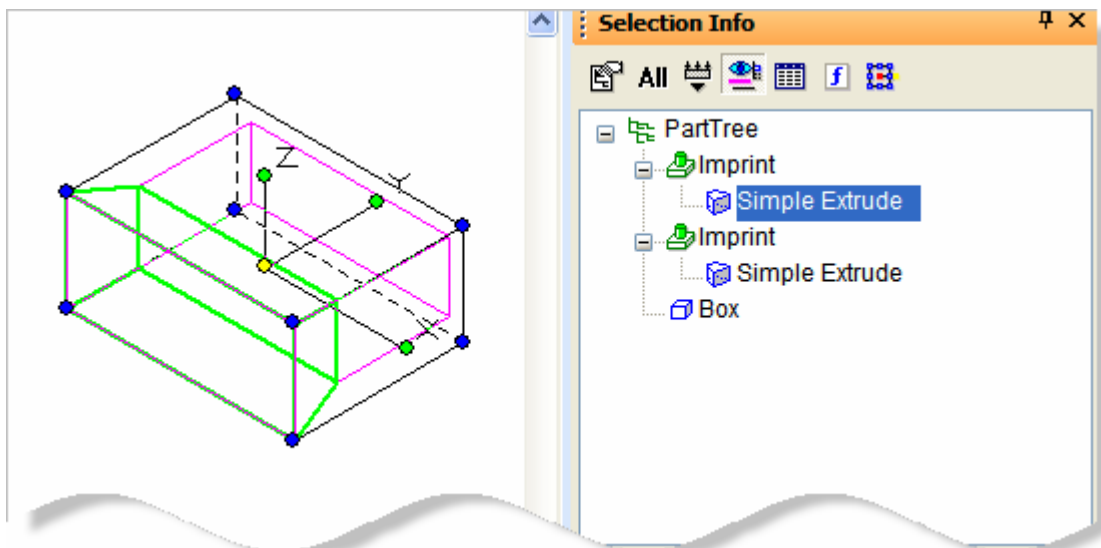
- ▶ Select the **Quick Pull** tool, right click and apply a draft angle of **15°** in the **Extrude Shape** options.
- ▶ Now select the face shown above and extrude to a new outward distance of 40 so that the result is similar to the illustration, right.



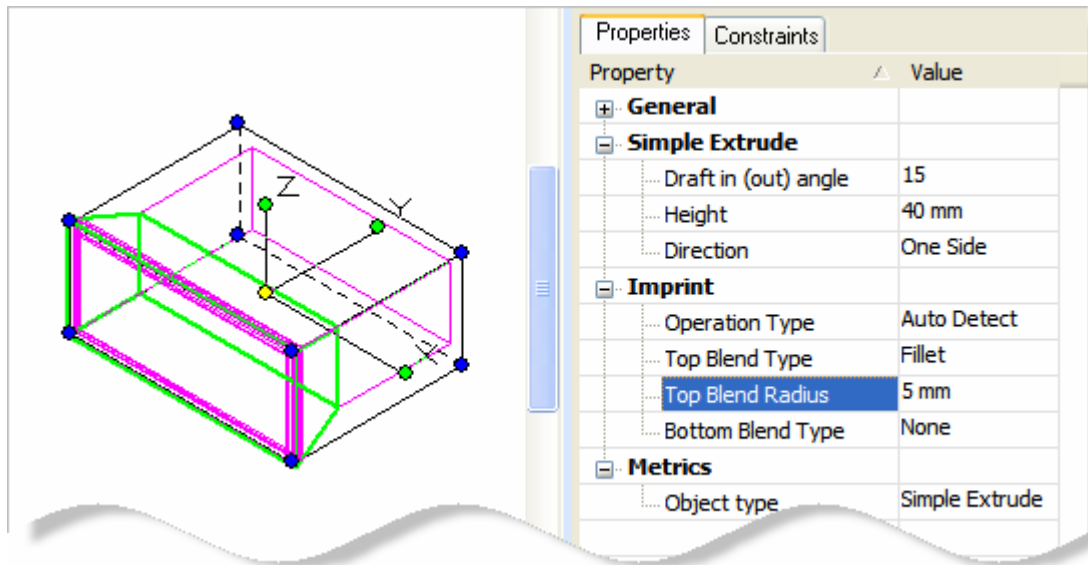
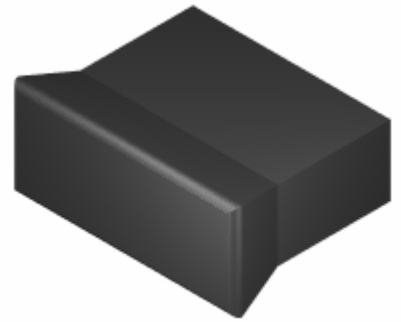
### Using the Part Tree to modify a solid

View > Selection Info Palette

- ▶ In the illustration below, the part has been selected and the information presented in the Selection Info Palette as **PartTree** components. In this example, the tapered extrusion is shown selected and highlighted.
- ▶ A Fillet with a radius of 5 will now be applied to the top edge of the new tapered extrusion by modifying the data in the **Selection Info Palette**.



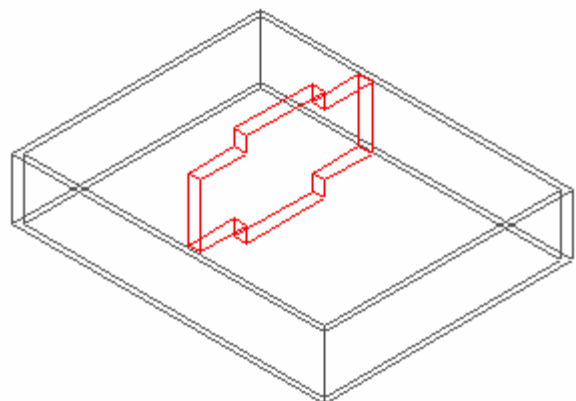
- ▶ Select the tapered extrusion part in the Selection Info palette, shown on the previous page, then select the **Fillet** option in the **Top Blend Type** field, shown right.
- ▶ Input a value of **5** to the **Top Blend Radius**. The result is shown right.



### Extrude to Face

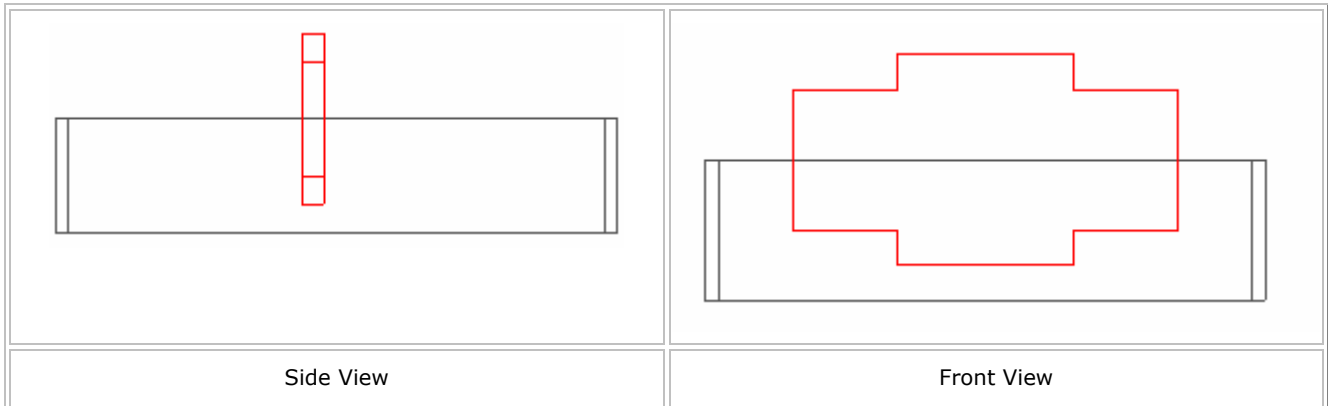
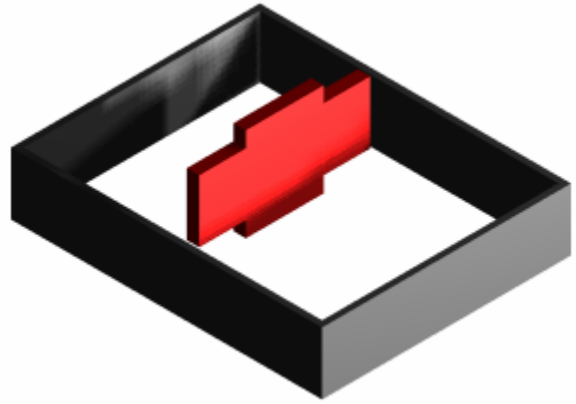
Insert > 3D Object > Extrude to Face

- This extrusion tool allows selected faces of solids to be extruded so that they intersect the face of the selected body, either adding or subtracting material during the extrusion.
  - Two faces can be extruded bi-directionally by selecting 2 faces in the same plane.
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- ▶ In this example, a 3D Box to measurements **100 x 80 x 20** has been drawn, then shelled out by creating an inner wall thickness of 2. The top and bottom faces were excluded from the shell function, shown below.

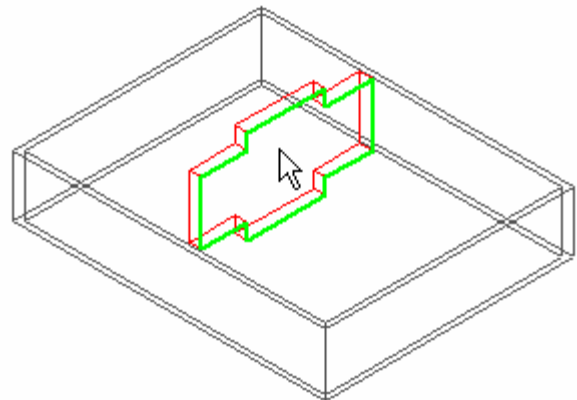


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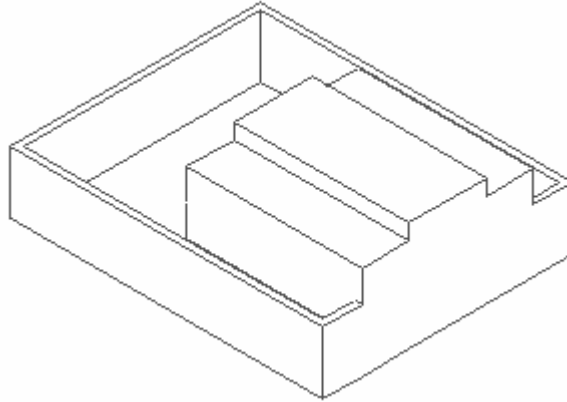
- ▶ A smaller profile has been drawn and placed in the interior of the box and a simple extrusion of 2 has been provided for the smaller profile.
- ▶ The illustrations below indicate clearly the position of the smaller solid in relation to the main solid body.



- ▶ The **3D Add** function shown above is the default option for the Extrude to Face tool .
- ▶ To extrude the profile shown right so that it intersects with the body of the box and combines (3D Adds) its volume with that of the primary solid, select the Extrude to Face tool from the 3D Object menu.
- ▶ Select the indicated face, then select the box.

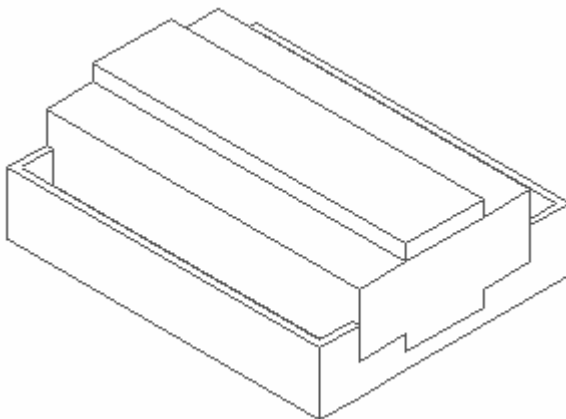
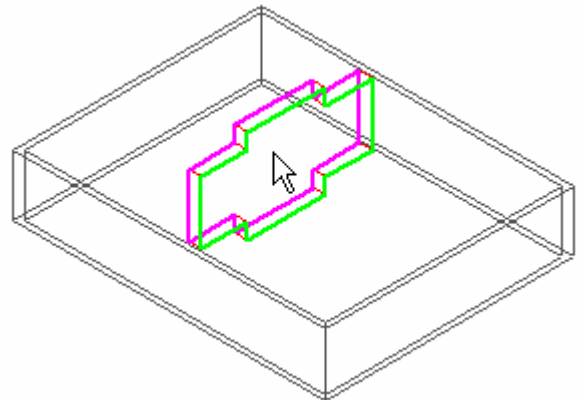


- ▶ The result is shown below.



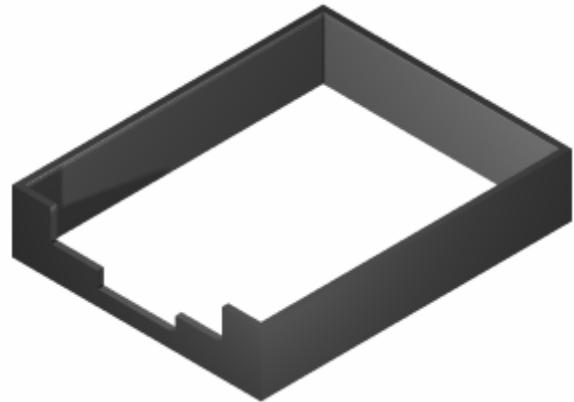
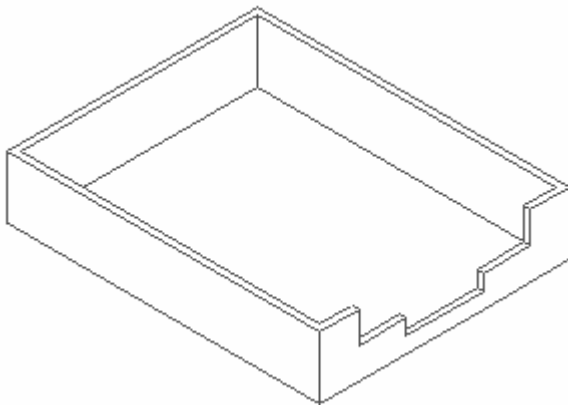
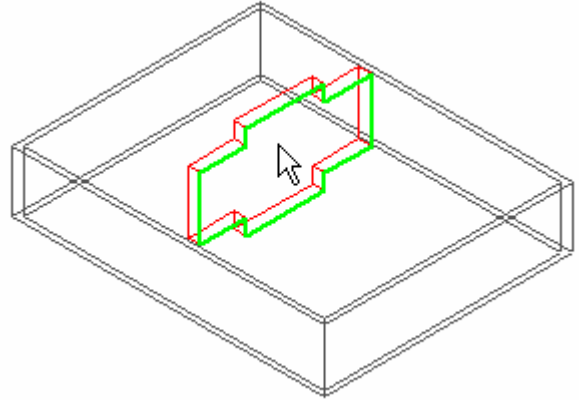
### Selecting 2 Faces to Extrude

- ▶ Two faces in the same plane can be extruded bi-directionally to extrude opposing faces to the body of the solid.
- ▶ In this example, both sides of the smaller extrusion were selected using the SHIFT tool.
- ▶ Both faces were then extruded bi-directionally using the default **Add** option to combine the volumes of the shapes, shown below.



### Using the Subtract option

- ▶ In this example, the **Subtract** option was used to create an extrusion of the face shown right to the body of the primary solid.
- ▶ The result is shown below.





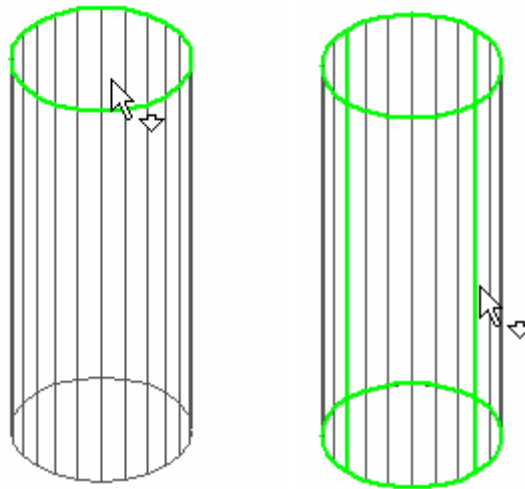
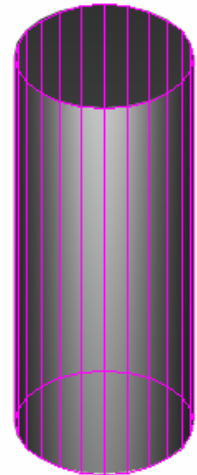
### Thread

Insert > 3D Object > Thread

- This tool applies a thread to a cylindrical face of an object by defining the pitch and the length of the thread.
- Internal threads can be created when a cylindrical shape is subtracted from the body of a solid.
- The **Part Tree** retains the individual history of both the thread and the cylinder and can be modified by means of the **Selection Info** Palette.



- ▶ The Thread tool will apply either a Schematic (diagrammatic), Simple or Genuine Thread to a pre-drawn cylinder.
- ▶ In this example, a cylinder with a radius of 10 and a height of 50 is drawn, shown right.
- ▶ Select the Thread tool from the 3D Object menu and select the Simple option, shown above.
- ▶ Input 3 into the Pitch field, then select the top face of the cylinder shown below left.



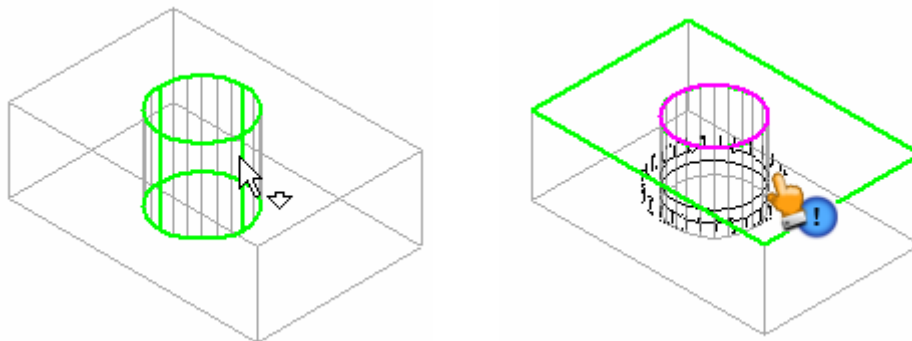
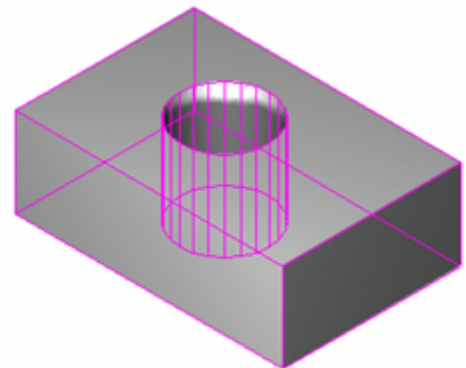
- ▶ Next, select the cylindrical body of the cylinder shown above right.

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- ▶ Now use the cursor to indicate the approximate threaded length similar to the illustration right. In this example, a threaded length of 30 was used.
- ▶ The result is shown below.



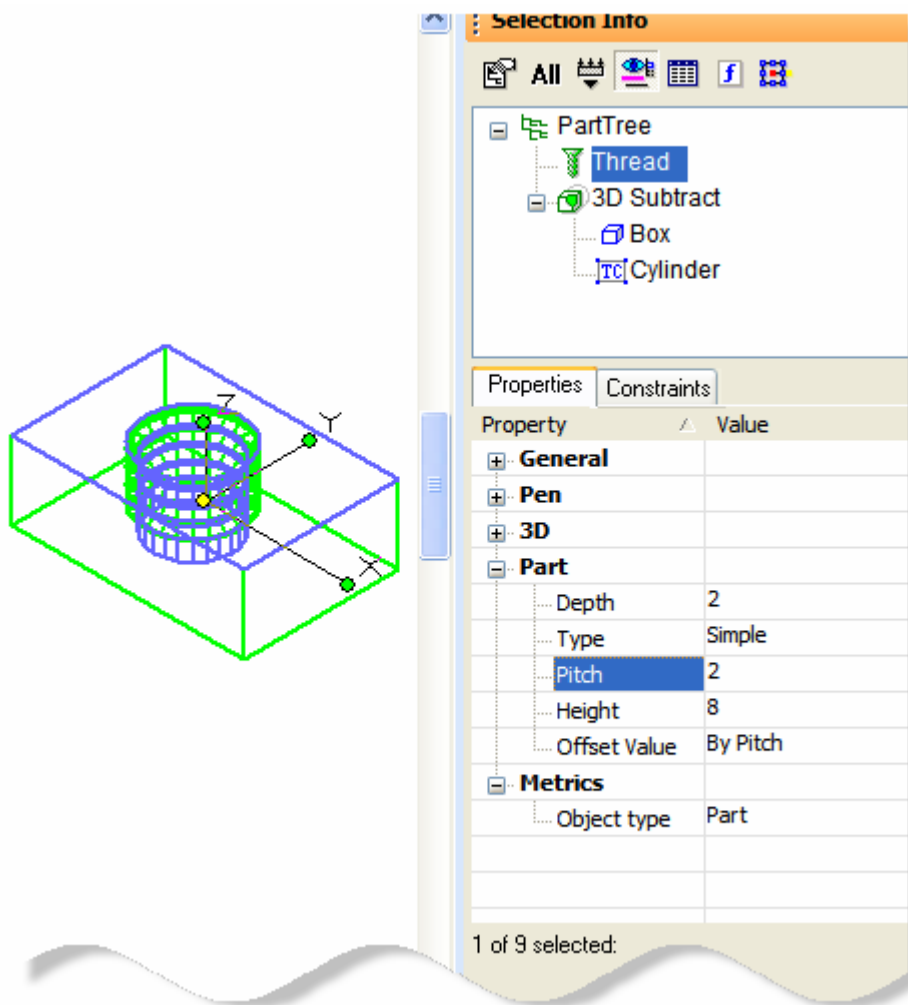
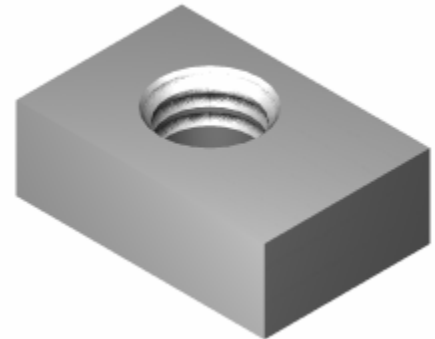
- ▶ In this example, a thread will be added to the interior of the cylinder shown right.
- ▶ A 3D box of 30 x 20 x 10 was drawn. A cylinder was then drawn from the bottom face of the box to a radius of 5 and a height of 10. The cylinder was then subtracted from the volume of the box.
- ▶ Select the Thread tool and activate the Simple option. Set the Pitch to 2 then select the top planar face of the combined solid, then the interior surface of the cylinder, shown below.



- ▶ Now indicate an approximate threaded length, similar to the illustration above right.

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- ▶ The result is shown right.
- ▶ The **Selection Info** palette is used to modify any component of the new thread. For example, the compound solid has been selected, shown below and each component in the Part Tree retains its original design parameters.
- ▶ Any value can now be updated in the **Part Tree** fields and such changes will automatically be reflected in each modified component.





## Twisted Extrude

Insert > 3D Object > Twisted Extrude

- The Twisted Extrusion tool extrudes a profile perpendicular to the workplane to create a solid object, allowing modeling features such as twisting and tapering to be created.
- This extrusion tool can create a bi-directional above/below workplane extrusion and modeling features such as a twist or taper can be applied at any position along the length of the extrusion.
- The Selection Info Palette is used to modify the individual modeling features of the extrusion.

- ▶ In this example, a 2D Polygon is drawn using the following measurement information :

Sides	Angle	Radius	Side length
6	60	20	23.09 mm

- ▶ An initial extrusion height of 100 with a twist of 90° starting from the bottom of the extrusion and ending halfway up the extrusion will be produced, similar to the illustration, right.
- ▶ Select the **Twisted Extrude** tool from the 3D Objects menu, then right click and apply the following settings :

**Twisted Extrude shape**

Height:

Direction:

Draft Angle:

Draft Start Distance:

Draft End Distance:

Offset:

Twist Options

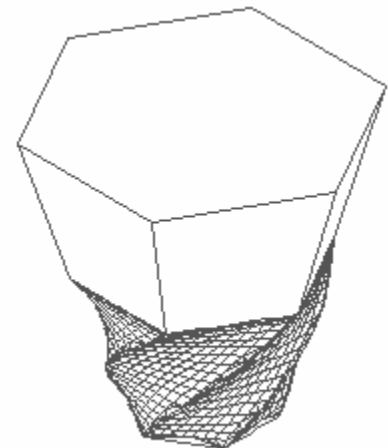
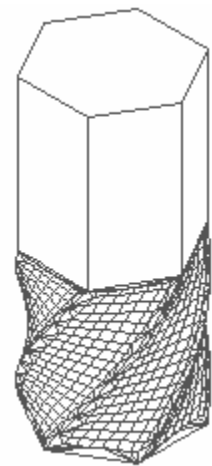
Twist Angle:

Distance Type:

Twist Start Distance:

Twist End Distance:

Continuity:



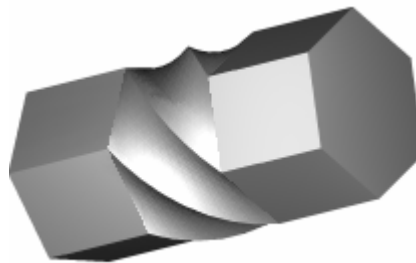
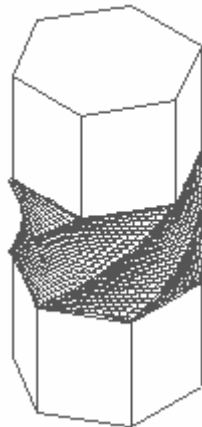
- ▶ Next, a draft angle (extrusion taper) of 15° will be applied from the top of the twisted portion (50) to the top of the extrusion (100), similar to the illustration, right.

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- ▶ Make sure the Selection Info Palette is activated (Ctrl-Shift-I) then select the extrusion so that the properties are shown in the Selection Info palette, right.
- ▶ Next, the Selection Info palette will be used to create an extruded rod with a twist midway up the extrusion. The extrusion height will be changed to 90, with the twist starting at 30 and ending at 60. The twist angle will be set to 90°, shown right.
- ▶ The result is shown in the illustrations below.

Property	Value
<b>General</b>	
<b>Pen</b>	
<b>3D</b>	
<b>Twisted Extrude</b>	
... Draft in (out) angle	15
... Start offset distance	50 mm
... End offset distance	100 mm
... Height	100 mm
... Direction	One Side
... Offset	0 mm
... Twist angle	90
... Distance type	Normal
... Twist start distance	0 mm
... Twist end distance	50 mm
... Twist Continuity	G0
<b>Metrics</b>	

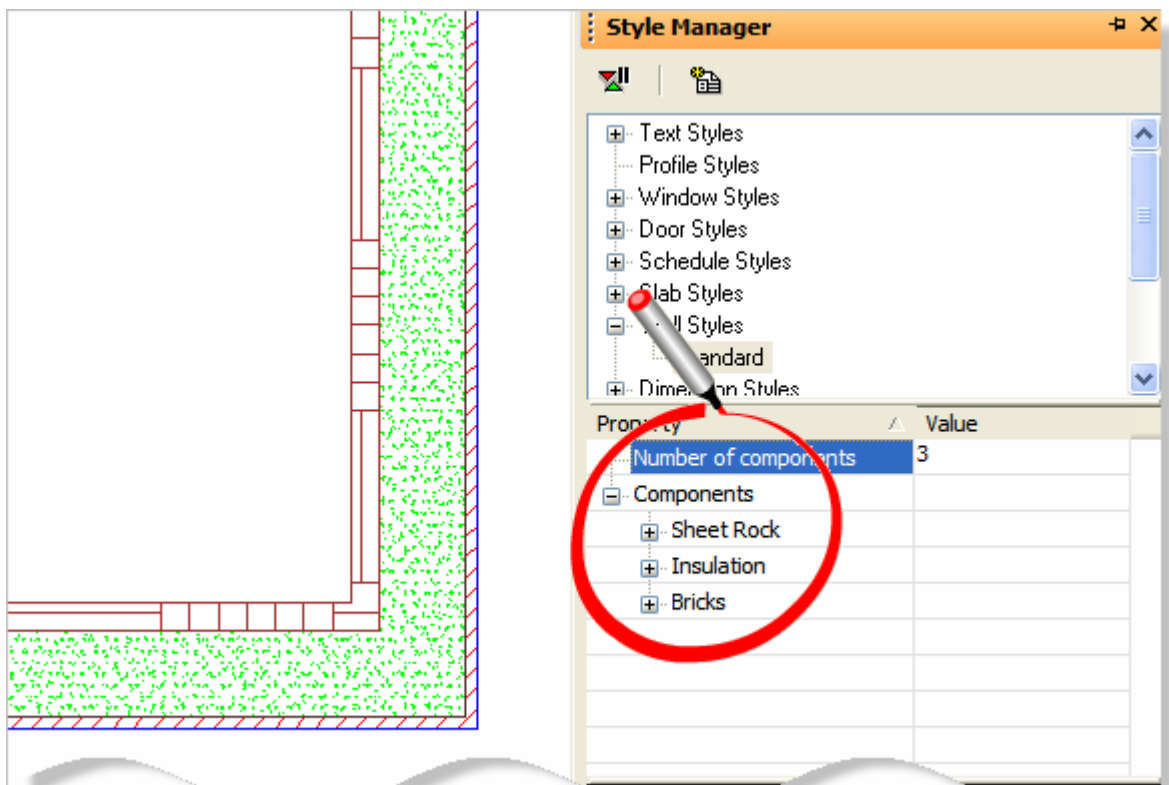
Property	Value
<b>General</b>	
<b>Pen</b>	
<b>3D</b>	
<b>Twisted Extrude</b>	
... Draft in (out) angle	0
... Start offset distance	0 mm
... End offset distance	0 mm
... Height	90 mm
... Direction	One Side
... Offset	0 mm
... Twist angle	90
... Distance type	Normal
... Twist start distance	30 mm
... Twist end distance	60 mm
... Twist Continuity	G0
<b>Metrics</b>	
... Object type	Twisted Extrude





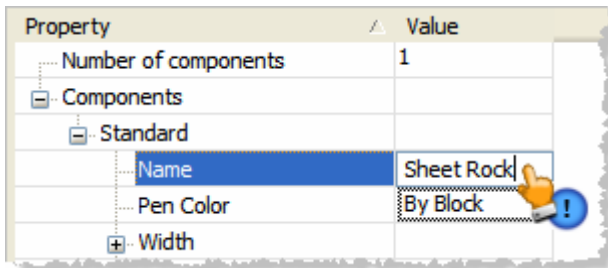
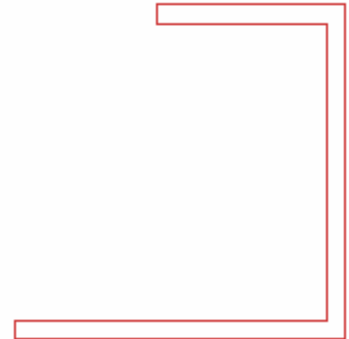
## Component Walls

- A wall consisting of multiple components can be drawn using the standard Wall tool and using the Style Manager to add additional wall components.
  - All components of walls are modified using the Style Manager and walls with specific components can be saved as a new style.
- ▶ In this example, 3 components of a standard wall will be created. The standard walls are drawn using the Architectural Wall tool and any conditions can be preset by right clicking onto the tool prior to drawing.
- ▶ In this example, a standard wall width (thickness) of 220 was preset, with a height of 1800.
- ▶ The Style Manager Palette is accessed from the View menu.

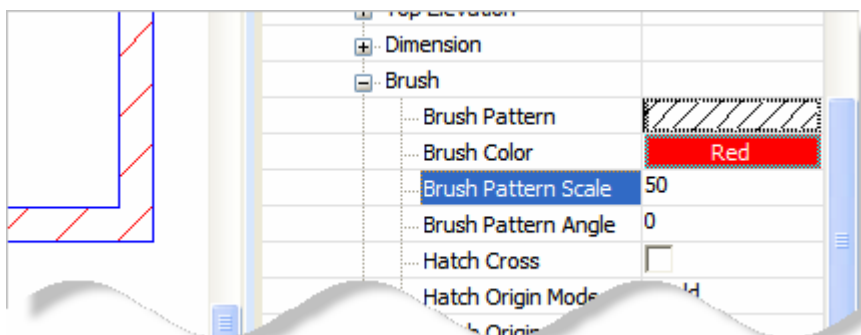
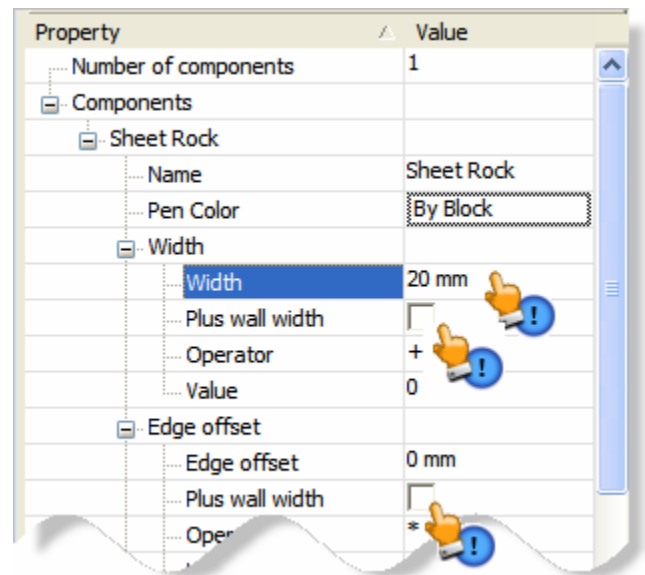


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- ▶ First draw a small section of wall similar to the illustration right.
- ▶ Open the **Styles Manager** palette and click onto the Wall Styles > Standard item.
- ▶ This wall consists of 1 component at this stage. Change the name of this first component to Sheet Rock, shown below.

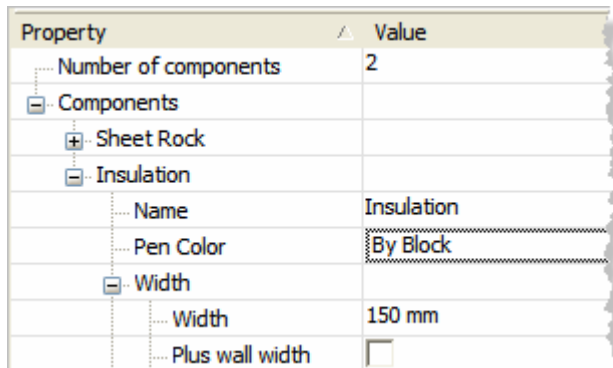
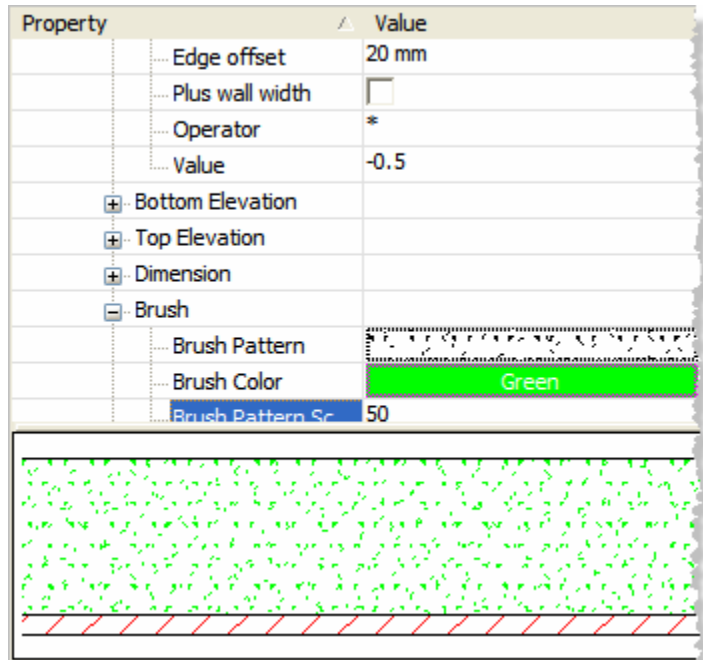


- ▶ Now input **20** into the width field, unchecking the Plus Wall Width and Edge Offset options, shown right.
- ▶ Input a suitable hatch pattern and pen color, similar to the illustration below. Adjust the hatch pattern scale accordingly.

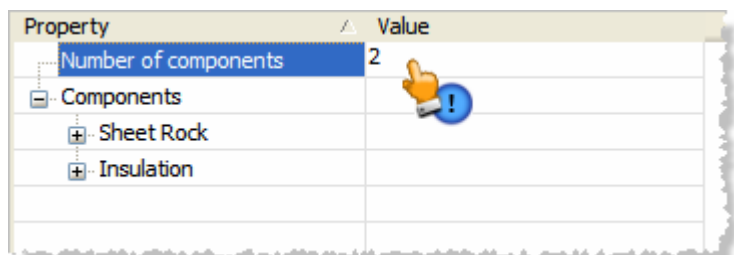


## Adding a New Wall Component

- ▶ First slide the bottom compartment of the Style Manager palette so that the representation of the walls is shown, illustrated right.
- ▶ To add another component to the existing wall structure, input 2 into the Component value field, shown right.
- ▶ Name this wall Insulation, creating a wall width of 150, unchecking the Plus Wall Width but inputting a value of 20 into the Edge Offset field.
- ▶ Apply a suitable Brush Pattern, Scale and Color, similar to the illustration right.



- ▶ At present, 2 components of the wall have been created, shown right.

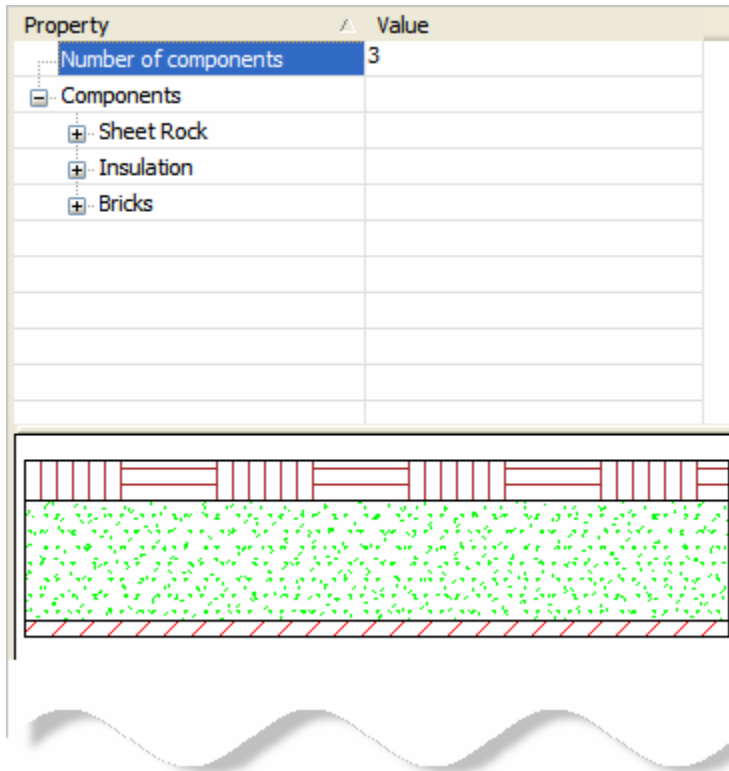
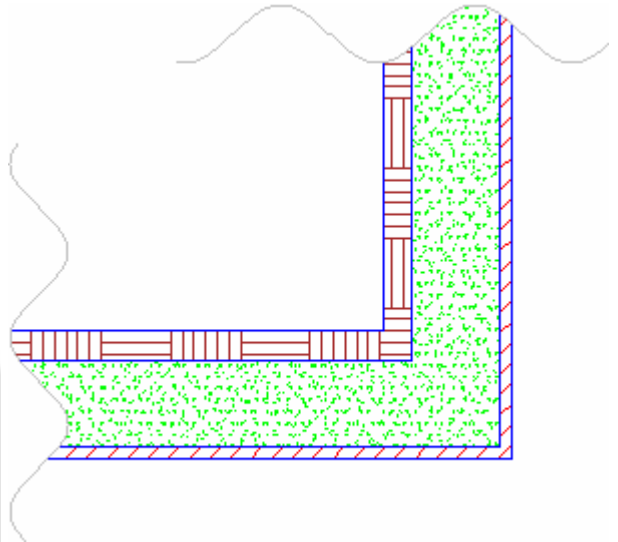


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- ▶ To add another component, change the value of 2 to 3 and create another wall using the following information :

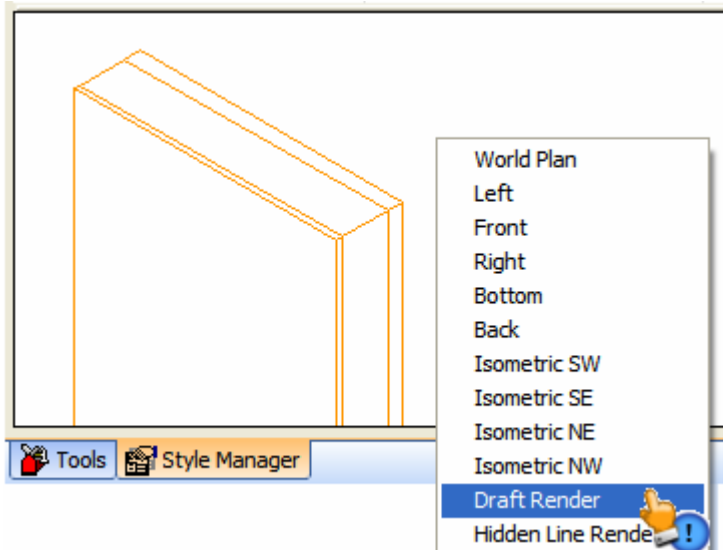
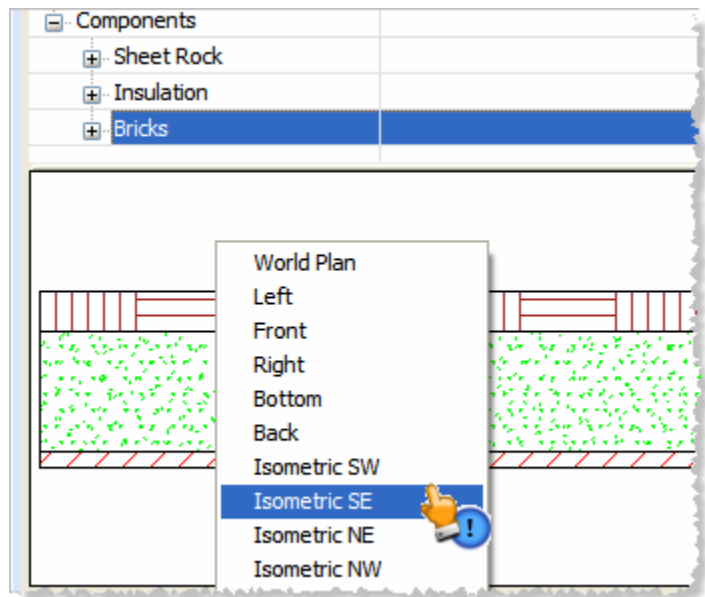
- ▶ Wall Name : Bricks
- ▶ Wall Width : 50
- ▶ Edge Offset : 170 (the total width of the previous 2 components)
- ▶ Uncheck the **Plus Wall** Width option
- ▶ Create a suitable brickwork pattern and color.

- ▶ The result should be similar to the illustration right.
- ▶ There should be 3 component walls at this stage, shown in the illustration, below.



## Using the Viewing Panel

- ▶ The walls can be viewed in the viewing panel of the Styles Manager by right clicking into the viewing panel and selecting a suitable view, similar to the illustration right.
- ▶ The zoom magnification can be increased by targeting the required center of the zoom, and using the left click tool, similar to the illustration below.



### Saving the New Component Wall Style

- ▶ A Component Wall Style can be saved to the **Style Manager** for future use by selecting the Create New Style option, shown right.
- ▶ Input a suitable name to store this style for future use.
- ▶ When drawing a new wall with these features, first right click onto the Wall tool in the Architectural menu panel, and select the new **Wall Style** from the General page.

