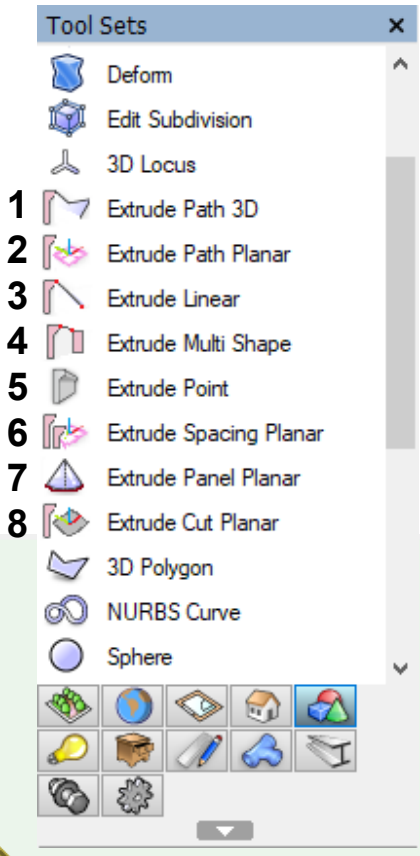
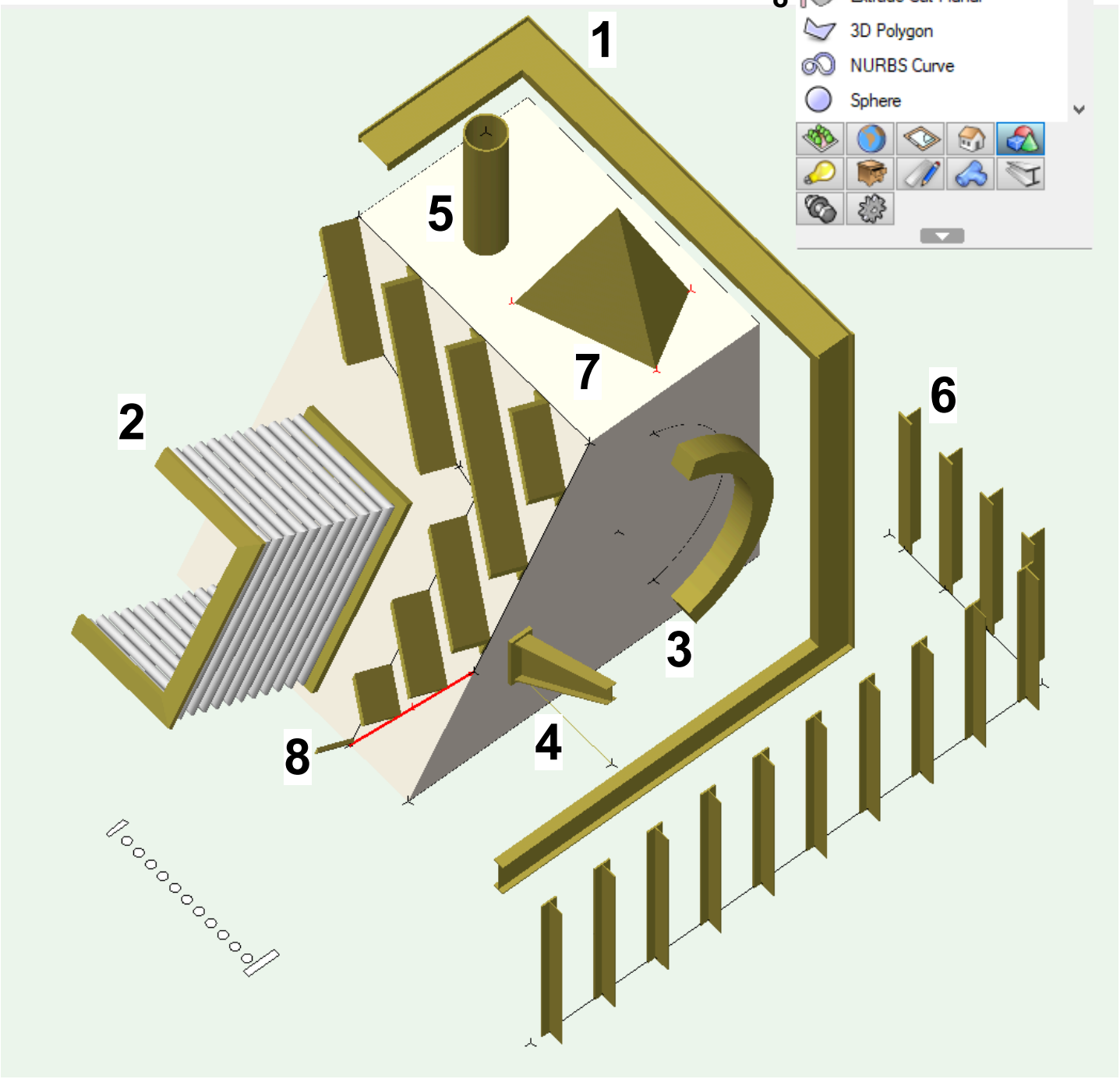
Vectorworks Extrude Tools 2024

A set of plugin objects that allow dynamic changes of a shape extruded along a path. Shapes can be defined as:

Geometric shapes eg rectangle, circle, arc
Section shapes eg wide flange
User defined shapes via a 2D symbol

Display is via class texture or
specific texture listed in the Object Info palette.





Vectorworks Extrude Tools 2024

Table of Contents

If interested, you can download the software from:
http://www.whwsolution.co.uk/vectorworks-extrude-path-tools

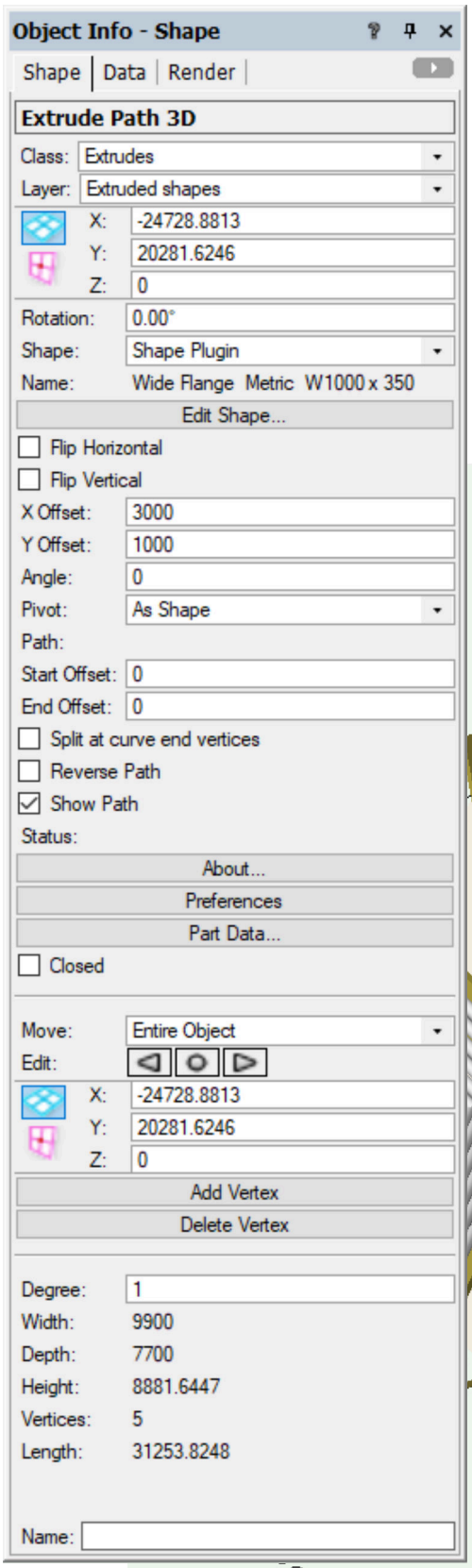
For any problems contact via email: info@whwsolution.co.uk

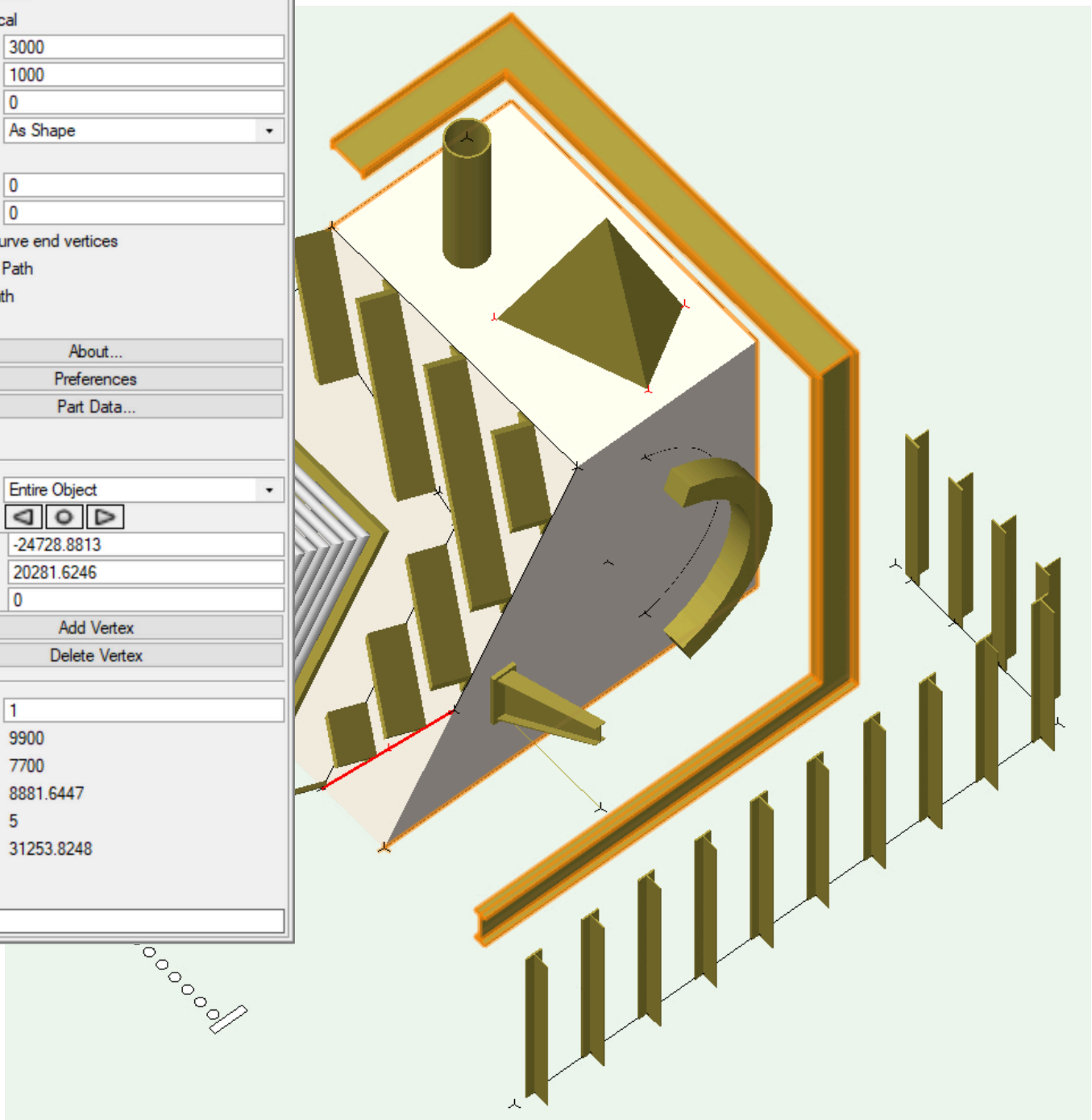
Initially, the software will be time limited as a testing period.

Also, use the software at your own risk and there will be no liability for any data loss from use of the software.

Extrude Path 3D plugin creates a nurbs curve path working in 3D only. Edit the path via Reshape tool or double clicking on the path

Parameters will be explained later.

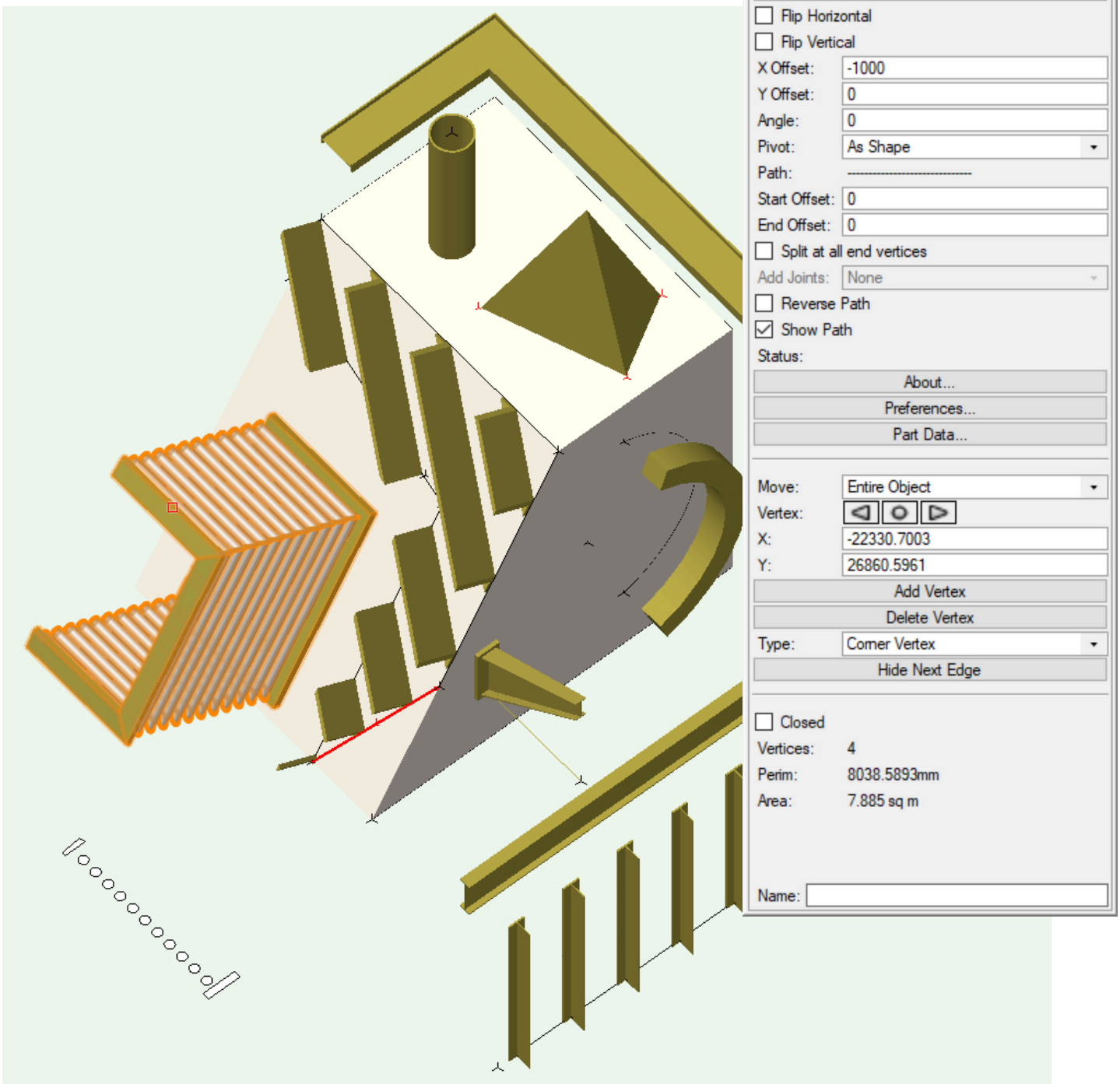


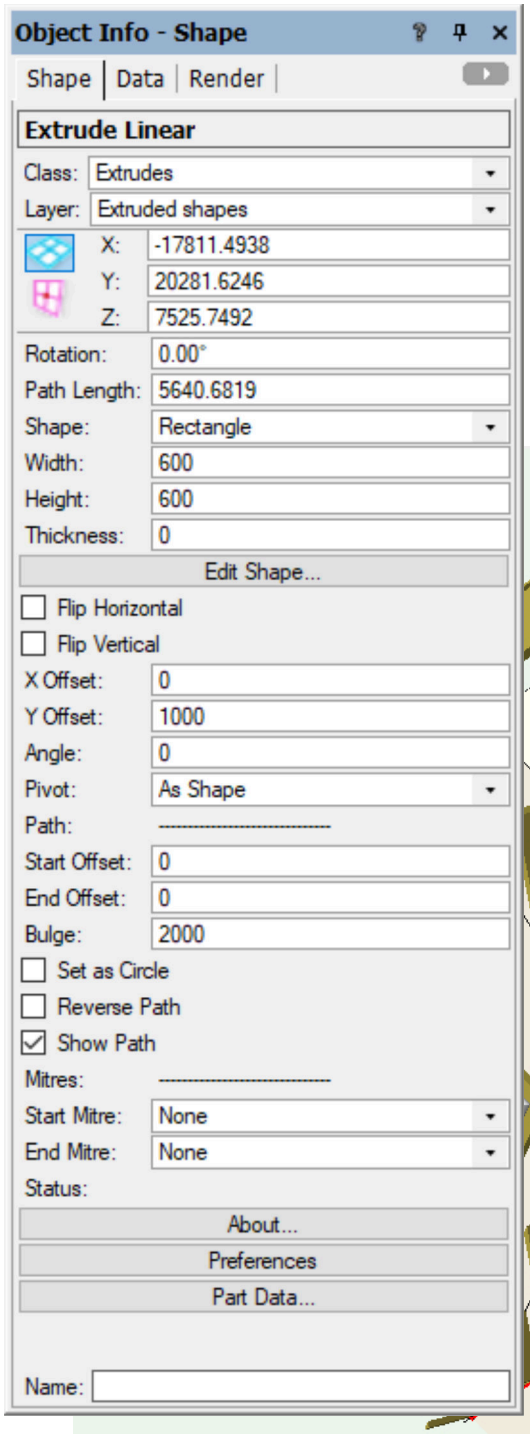


Extrude Path Planar plugin creates a polyline path working in planar 3D and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the path via Reshape tool or double clicking on the path.

Parameters will be explained later.

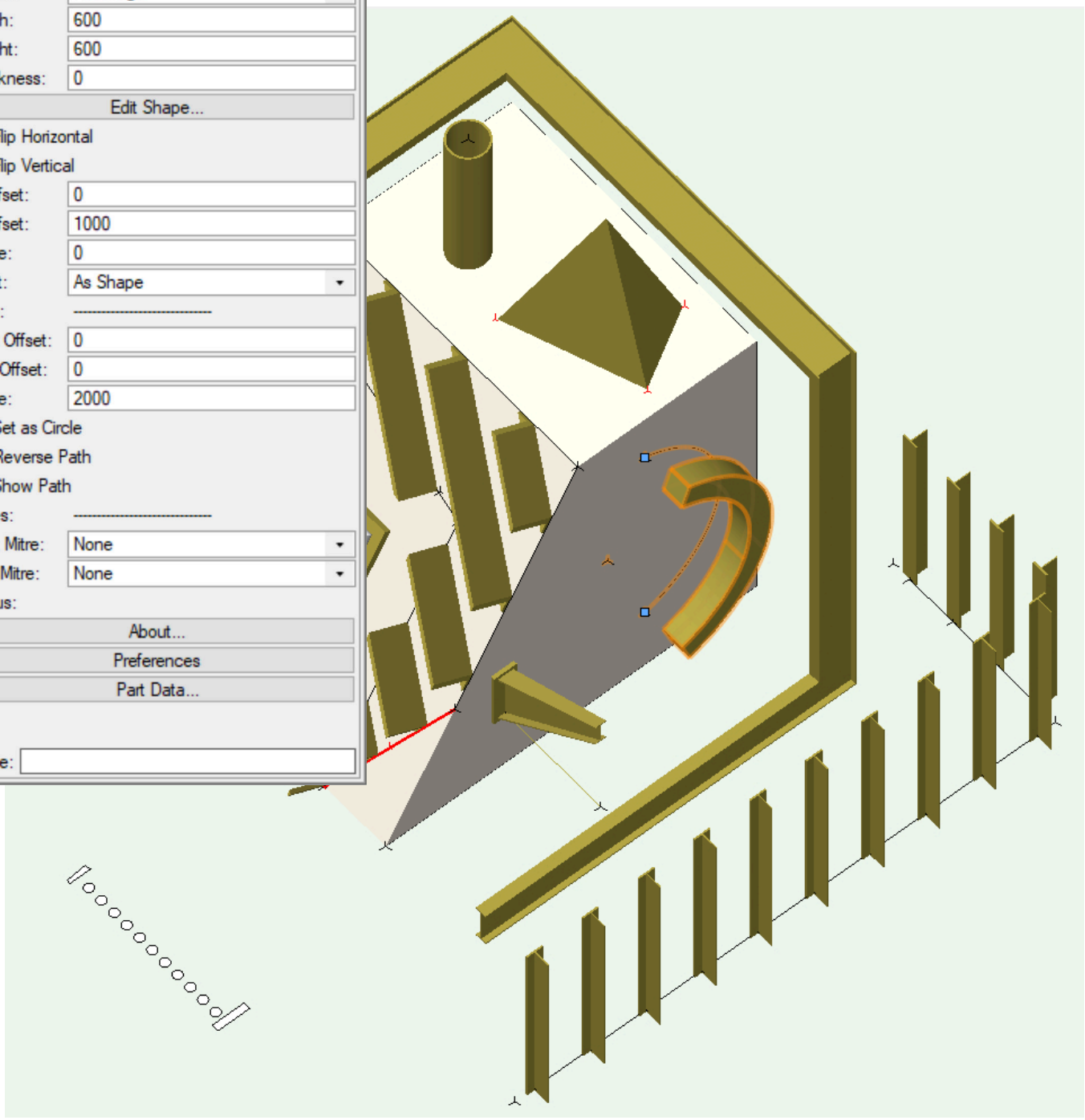


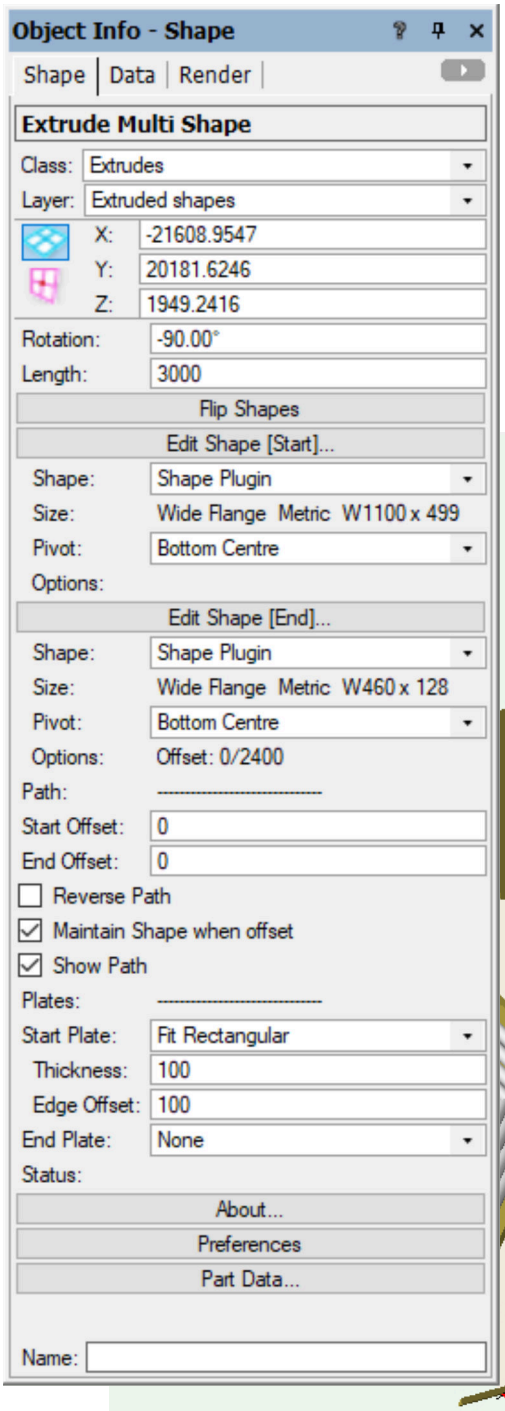


Extrude Linear plugin creates a single straight or curved 3D extrude working in planar 3D and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the path by dragging the end points of the linear plugin. Curves are created by inputting a non zero "Bulge" which is a perpendicular distance from the plugin path to the arc mid point.

Parameters will be explained later.

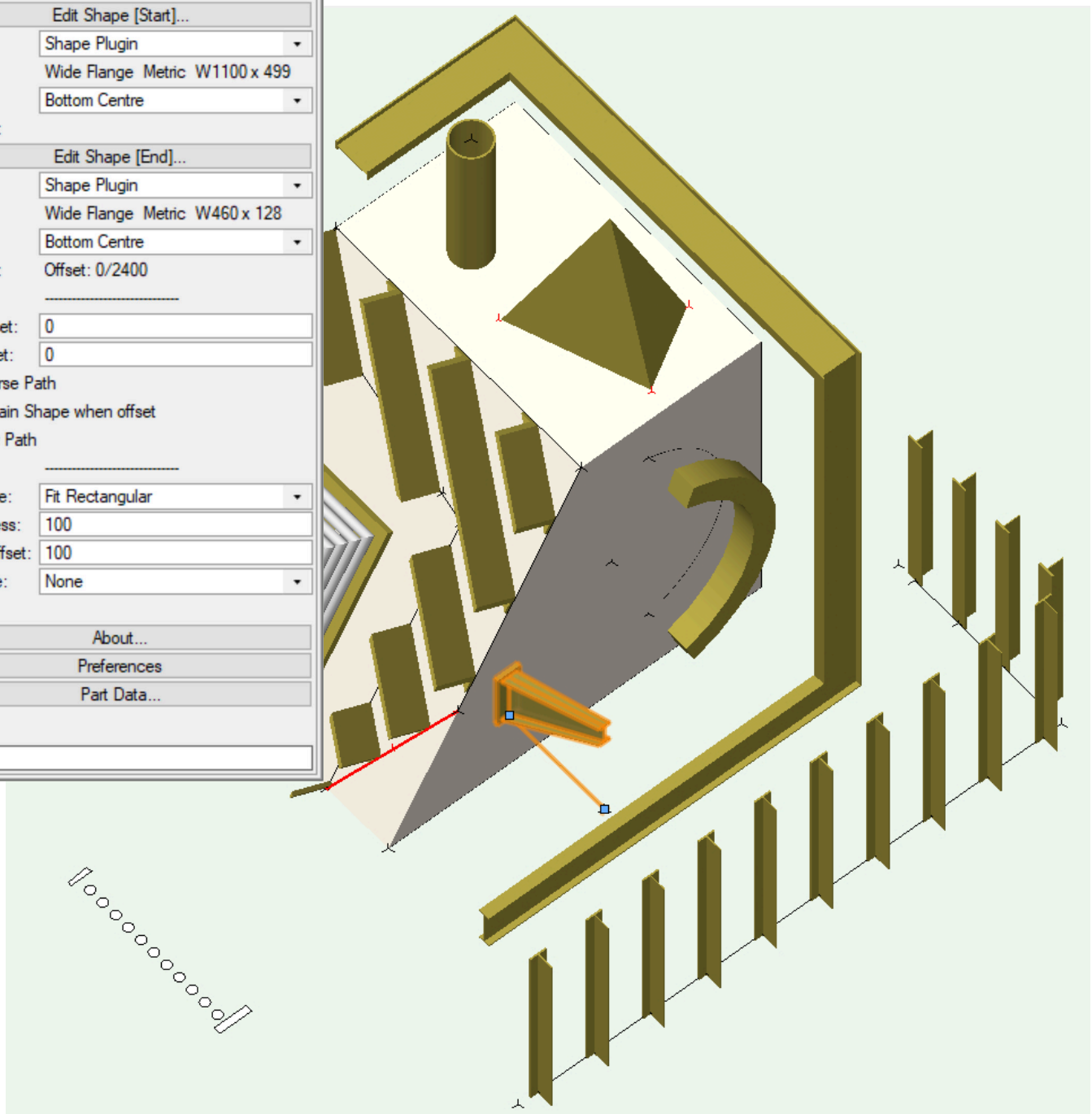




Extrude Multi Shape plugin is linear based which can have different shapes for the start and ends for the resulting extrusion as well as defining end plates.
In a 3D view for best results use an "Automatic" plane via "\" key.

Edit the path by dragging the end points of the linear plugin.

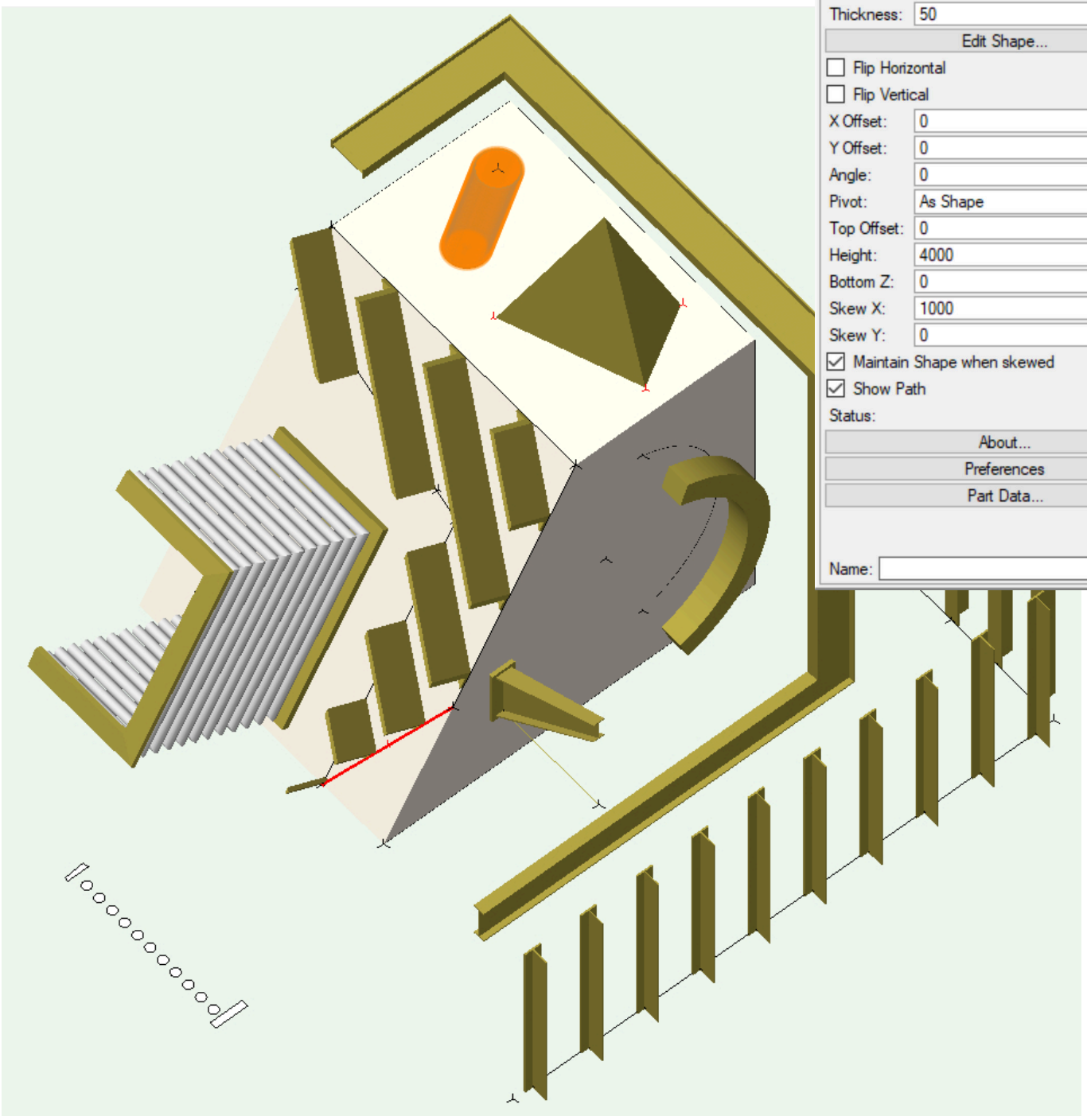
Parameters will be explained later.



Extrude Point plugin creates a 3D extrude working in planar 3D and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the shape base and extrude heights via the Object Info palette.

Parameters will be explained later.



Object Info - Shape

Shape | Data | Render

Extrude Point

Class:	Extrudes
Layer:	Extruded shapes
X:	-17851.0613
Y:	25804.0061
Z:	8881.6447
Rotation:	-90.00°
Shape:	Circle
X Diameter:	1000
Y Diameter:	1000
Thickness:	50

Edit Shape...

☐ Flip Horizontal

☐ Flip Vertical

X Offset:	0
Y Offset:	0
Angle:	0
Pivot:	As Shape
Top Offset:	0
Height:	4000
Bottom Z:	0
Skew X:	1000
Skew Y:	0

☑ Maintain Shape when skewed

☑ Show Path

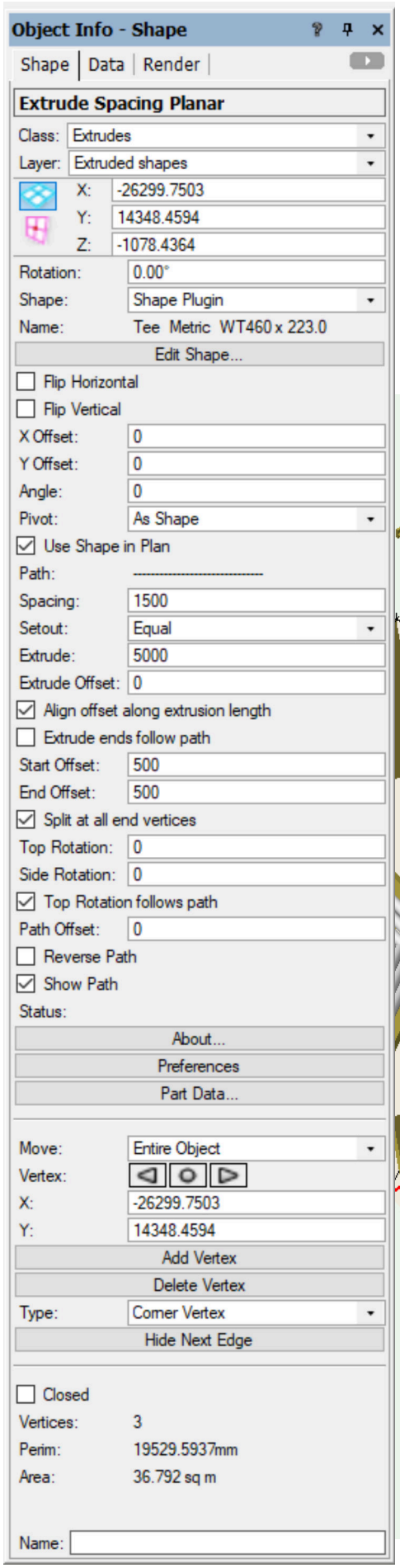
Status:

About...

Preferences

Part Data...

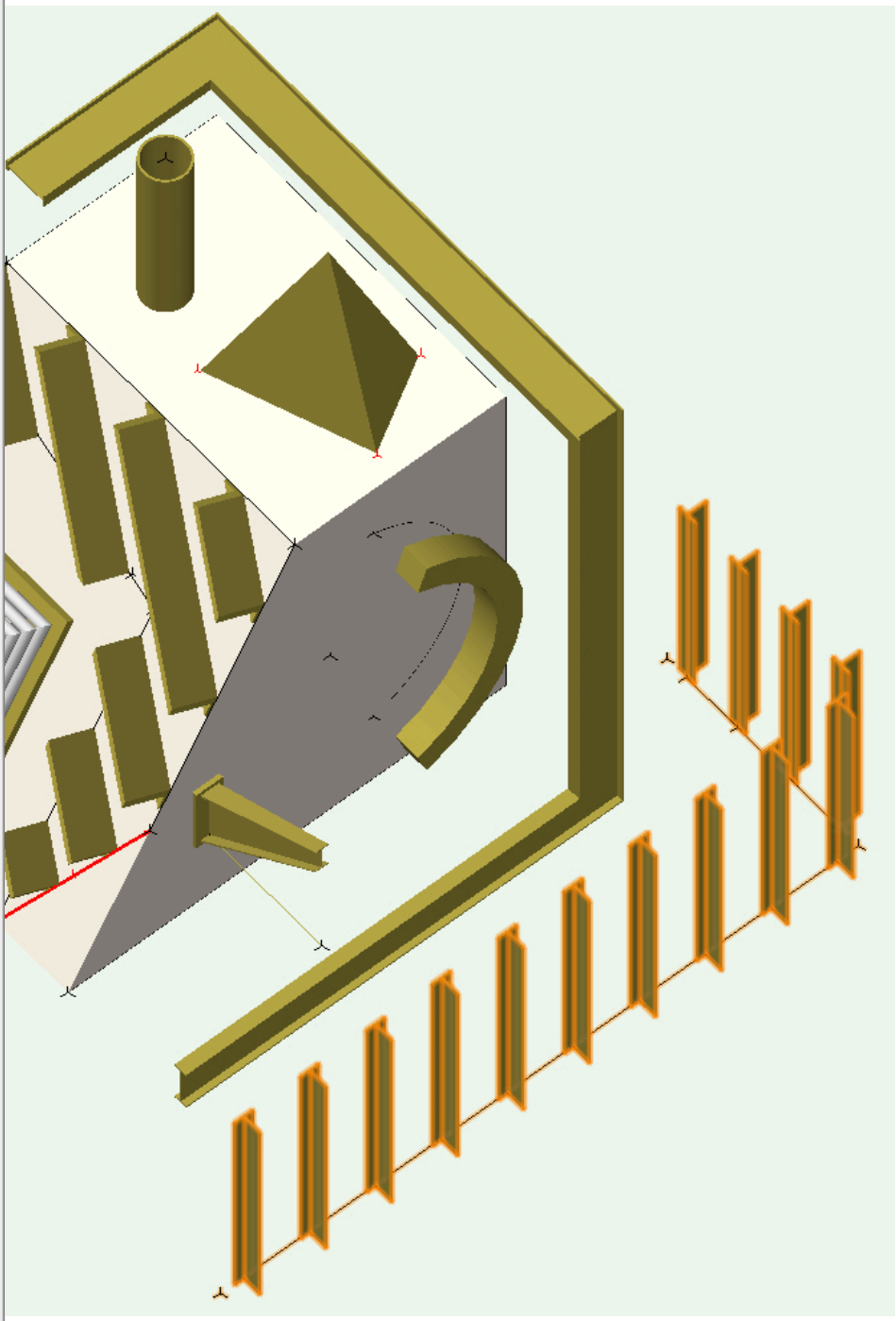
Name:



Extrude Spacing Planar plugin duplicates an extruded shape along a planar path and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the path via Reshape tool or double clicking on the path.

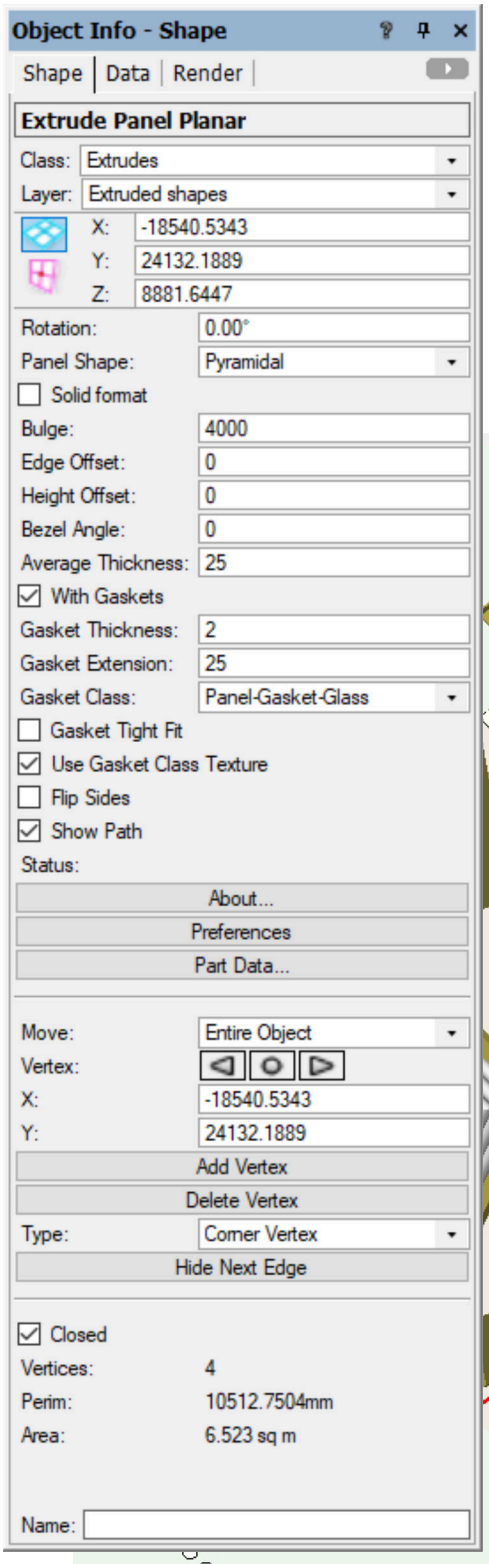
Parameters will be explained later.

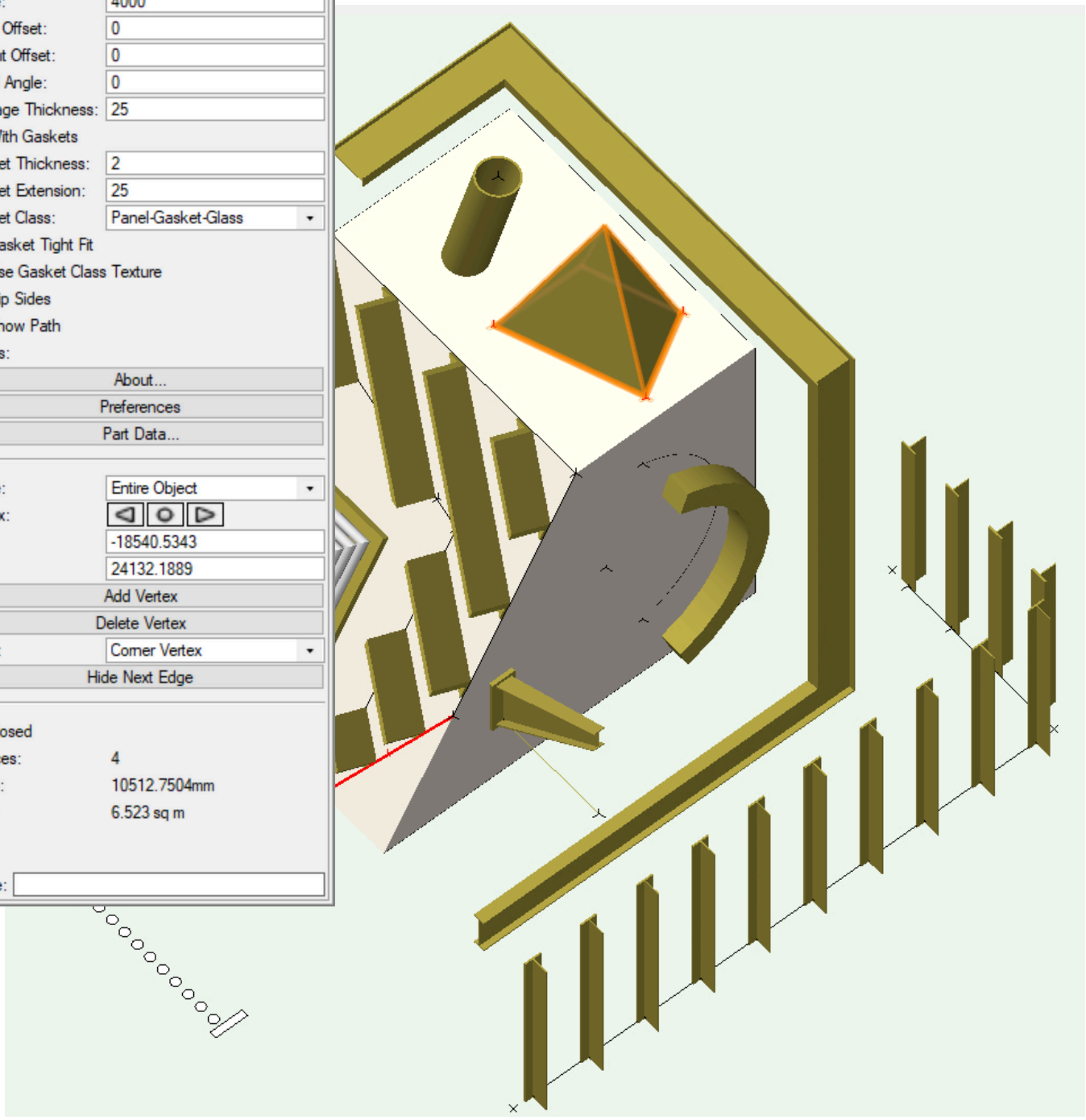


Extrude Panel Planar plugin creates extruded panel geometry using the planar path as the outer edge and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the path via Reshape tool or double clicking on the path.

Parameters will be explained later.

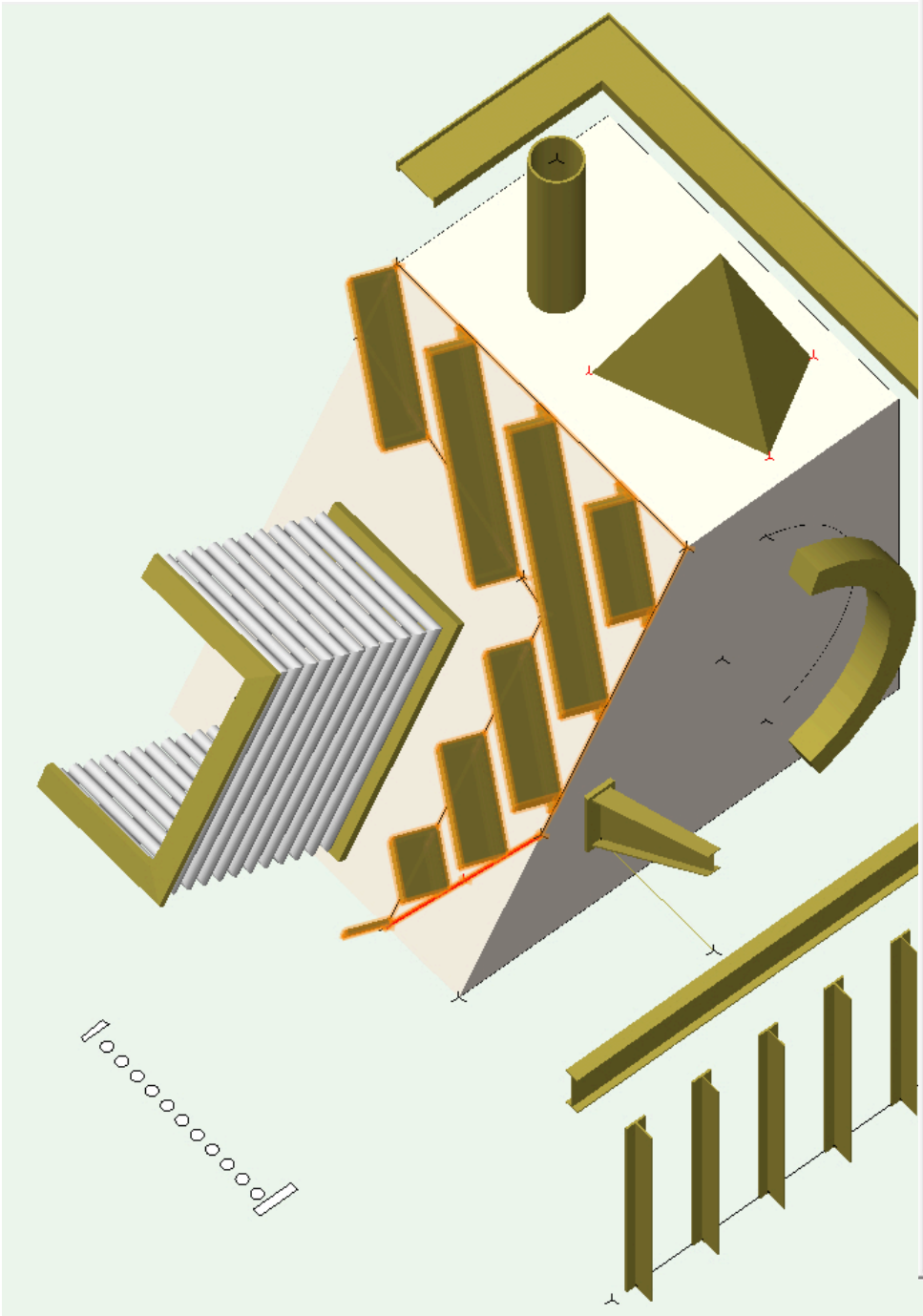


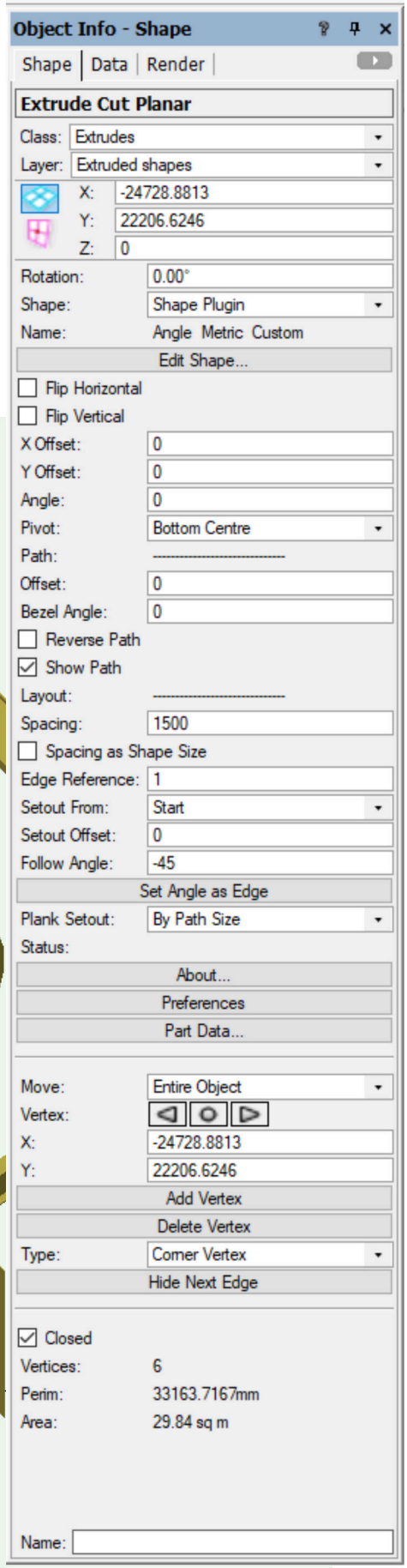


Extrude Cut Planar plugin creates multiple extrusions using the planar path as the outer edge and works best in a 3D view using an "Automatic" plane via "\" key.

Edit the path via Reshape tool or double clicking on the path.

Parameters will be explained later.



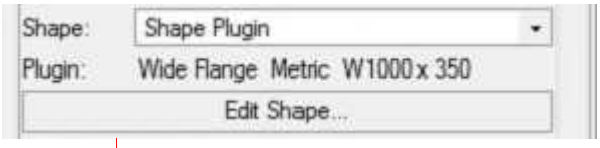


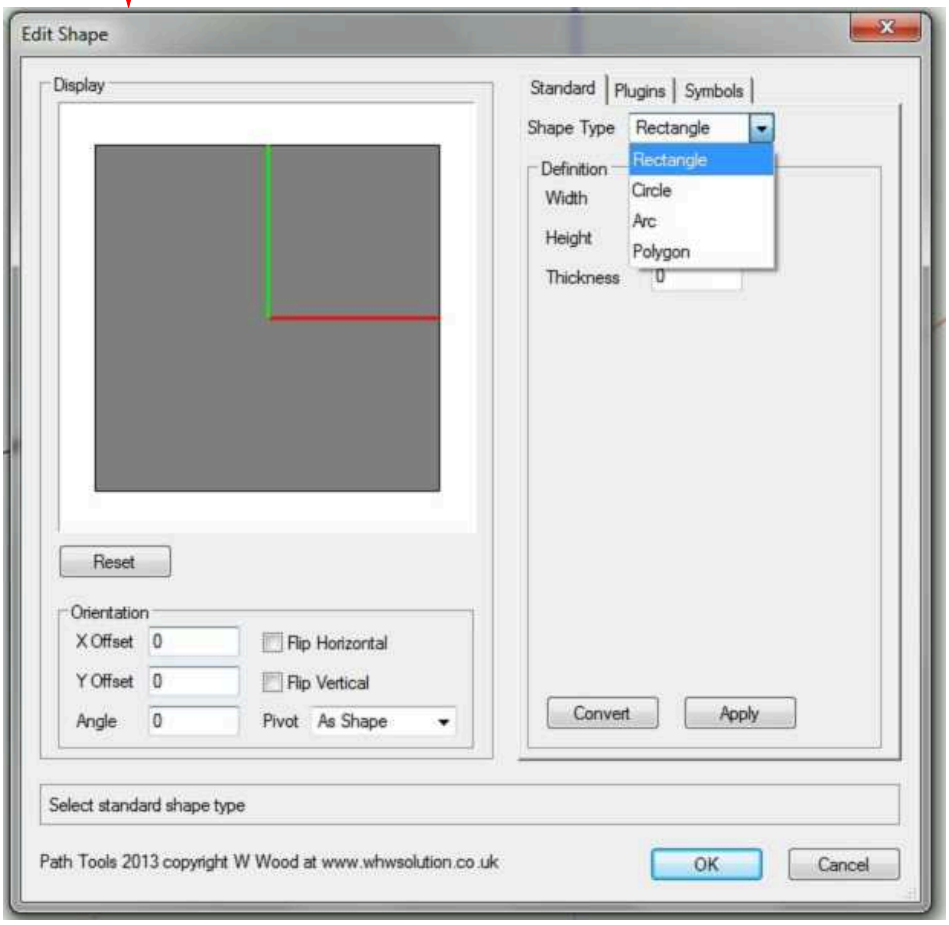
All Extrude tools have an Object Info Palette button"Edit Shape" which allows the user to change the associated shape. A shape pulldown menu can also be used to change shape.

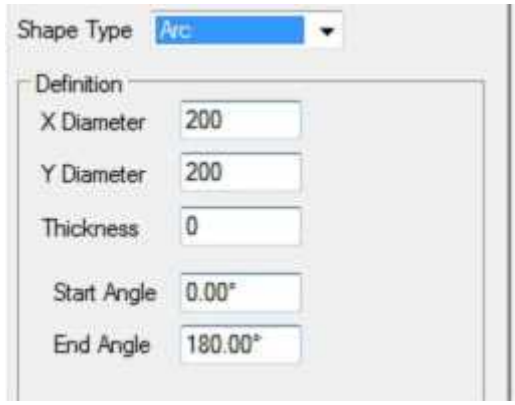
There are three types of shape:

Standard **geometric shapes**
Plugins **section shapes (as Vectorworks Detailing shapes)**
Symbols **shapes defined in a symbol**

Note:
When in Rotated Plan mode, clicking "Edit Shape" button will reset view to Top view on exit.







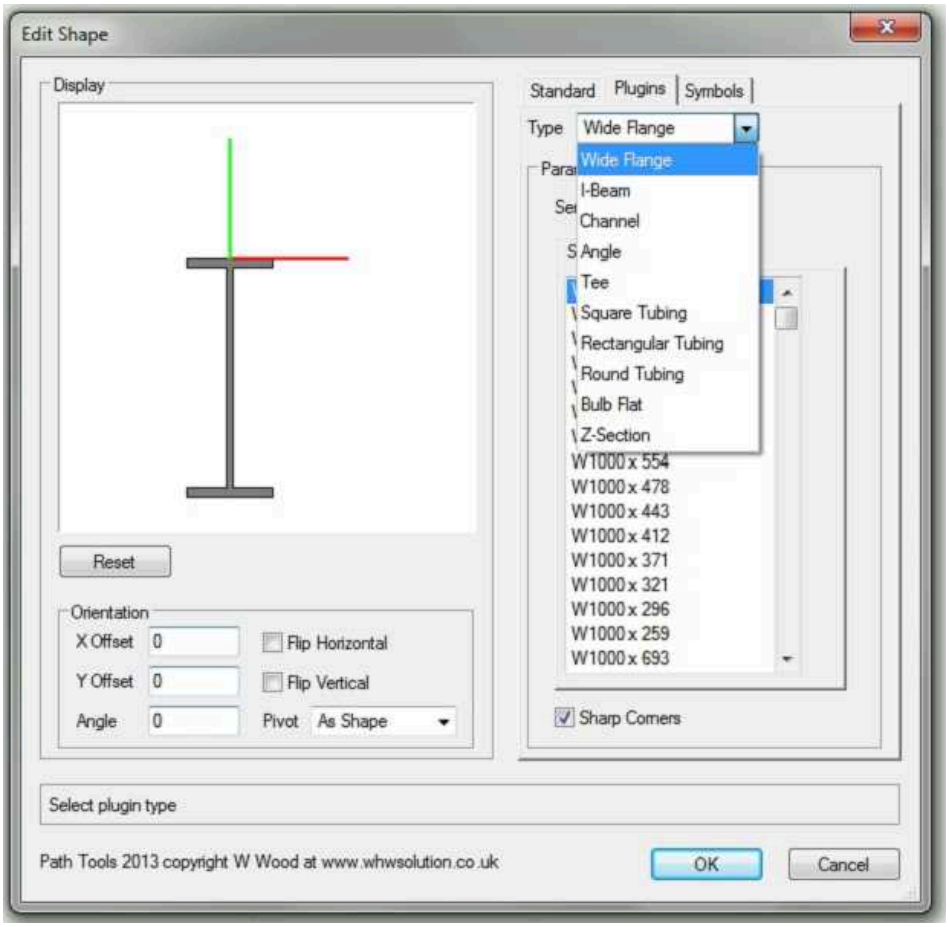
All Extrude tools have an Object Info Palette button"Edit Shape" which allows the user to change the associated shape.

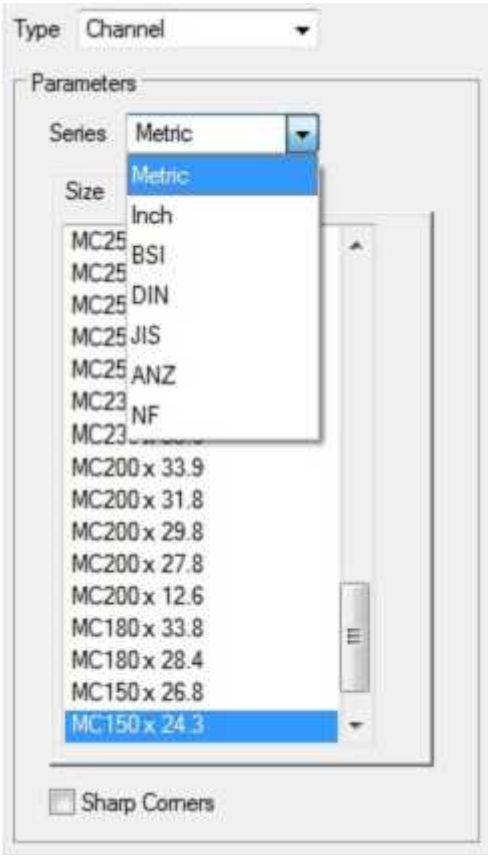
The second option is "Plugins"

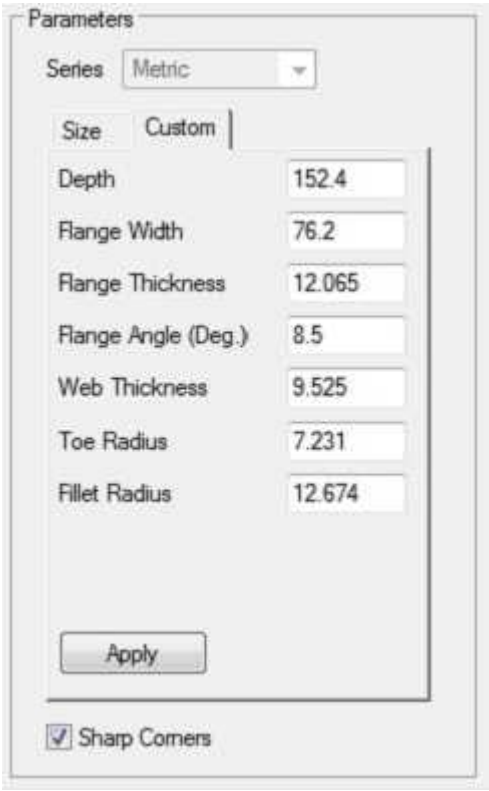
The section shapes match those in Vectorworks "Detailing" such as Angle, Channel and I-Beam including series types such as metric,BSI and DIN.

Custom section shapes can also be defined in the current units. Any section shapes that have filleted corners can have those corners made sharp to save on 3D geometry.

Note:
Some obscure "Detailing" options are not available.
Also, when in Rotated Plan mode, clicking "Edit Shape" button will reset view to Top view on exit.







All Extrude tools have an Object Info Palette button"Edit Shape" which allows the user to change the associated shape.

The third option is "Symbols"

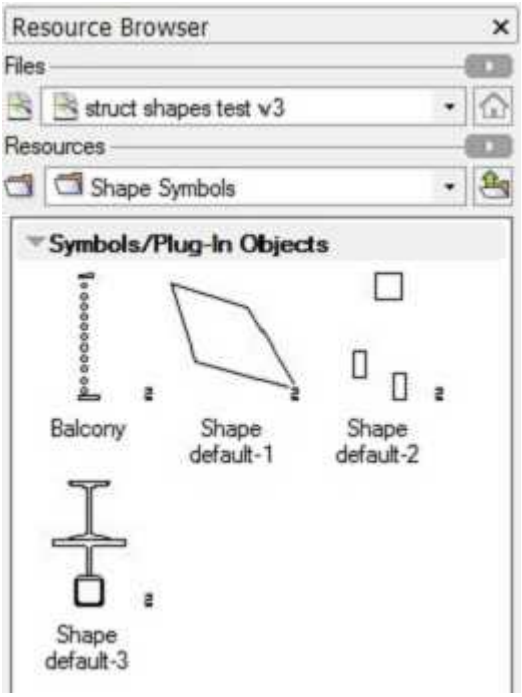
Symbols can be used to define a multiple shape setup which must be stored in a symbol folder "Shape Symbols".

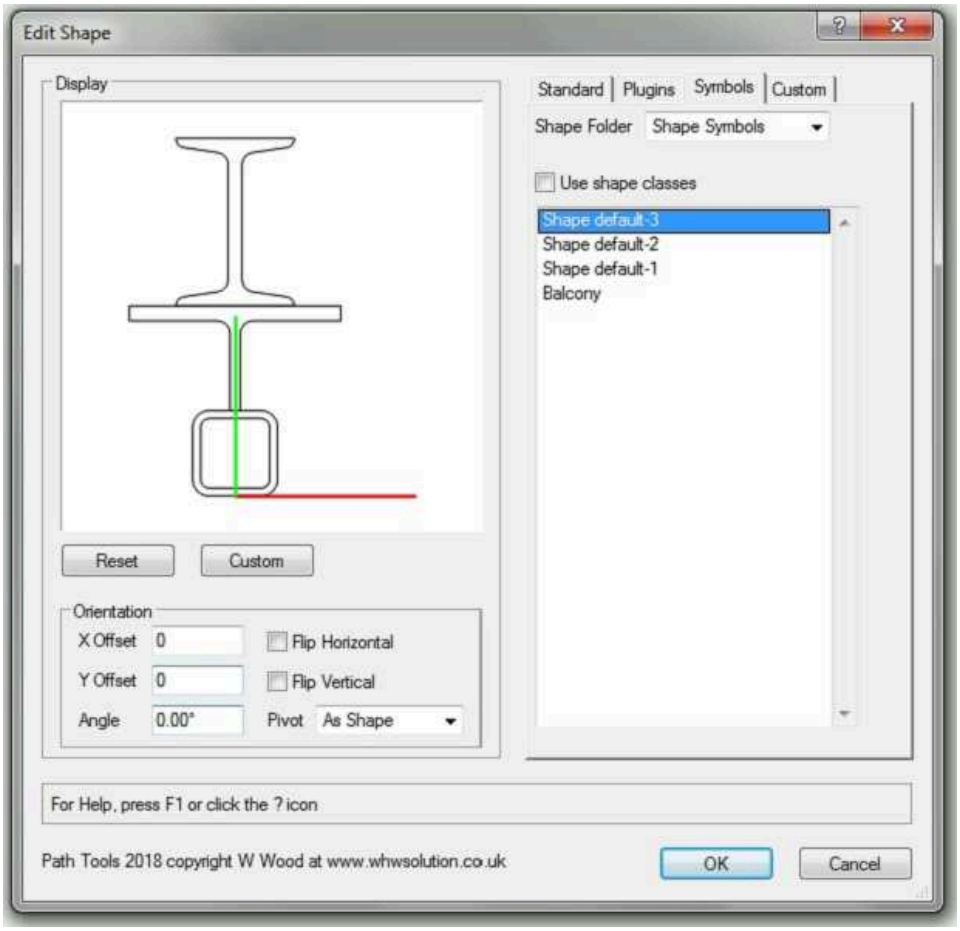
Each symbol must have at least one entity stored in the 2D part of the symbol (ie in the Screen plane). Note, Layer Plane objects are invalid.

Extrudes use the class texture "Other" definition of the drawn plugin object for display. Alternatively, a specific texture can be assigned via Object Info Palette>Render.

If "Use shape classes" is selected then the class texture of the individual shapes are used instead.

Editing the base symbol does not dynamically change any associated Extrude plugins which must be regenerated via editing a parameter for example.





To apply scaling to the selected shape symbol, click the "Custom" button

Click the "Custom" tab and edit X/Y scale factors.

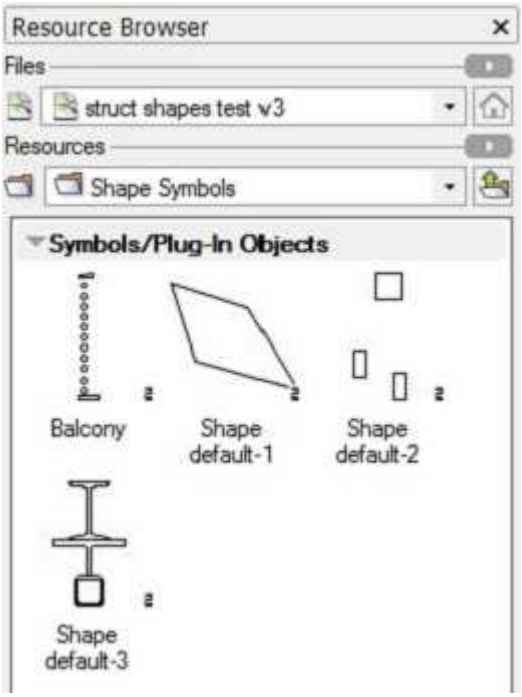
All Extrude tools have an Object Info Palette button"Edit Shape" which allows the user to change the associated shape.

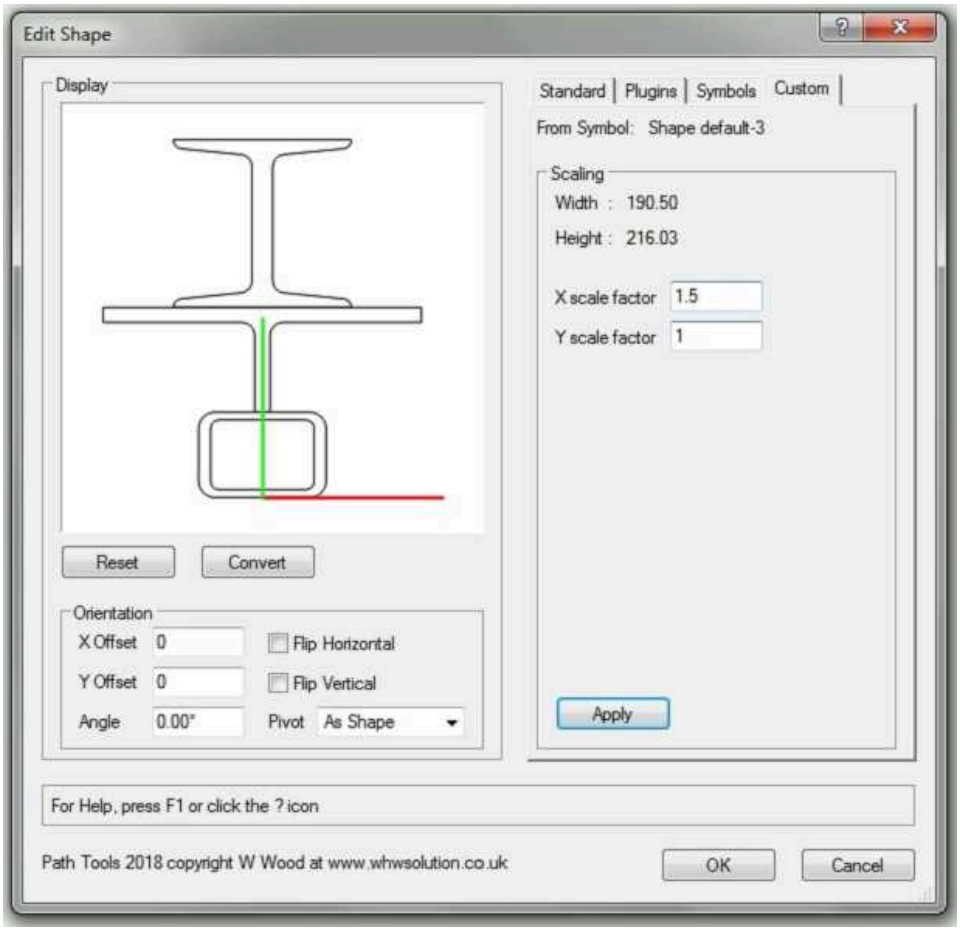
The fourth option is "Custom"

A Shape symbol can be set as the current shape symbol, see previous page. The current custom shape symbol is listed as the "From Symbol".

Scale factors can be set for both horizontal(X) and vertical(Y) directions. There is a minimum scale factor or 0.001

Once scaling has been applied, it is possible to create a new shape symbol based on the current scaled custom shape symbol implemented via the "Convert" button.





To set scaling to the selected shape symbol, click the "Apply" button

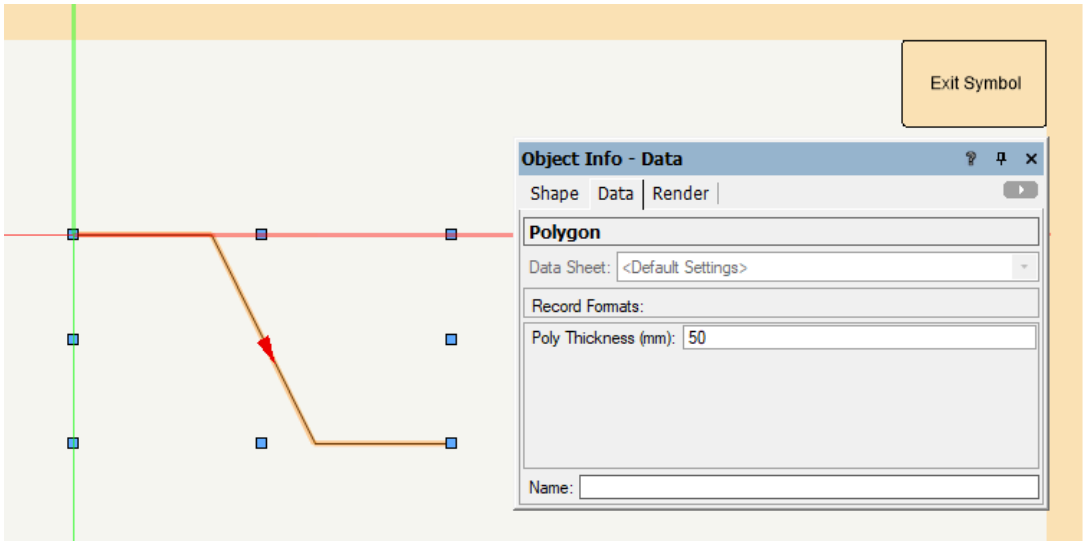
To convert the scaled shape symbol to a new symbol, click the "Convert" button

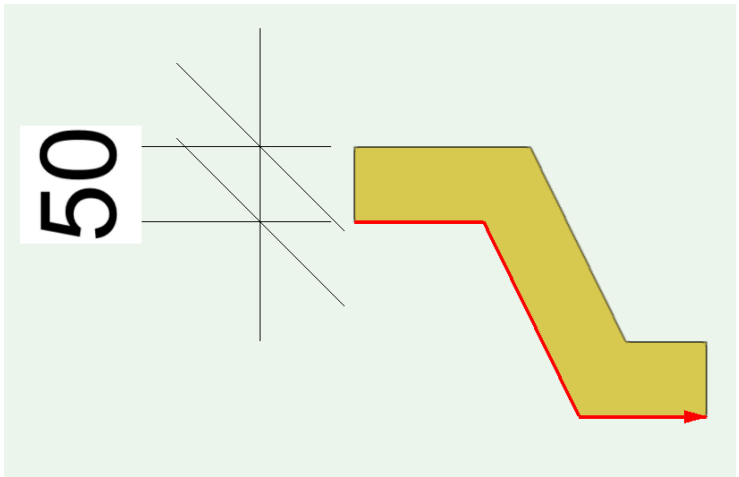
Any shape symbol that contains any open polygons or polylines can have the extrusion thickness set via a Data Record "Poly Thickness" with the value always set in mm. The record will be automatically attached to an open poly when a specific shape symbol is selected in any extrude tool. Any poly fill is also disabled ie no fill.

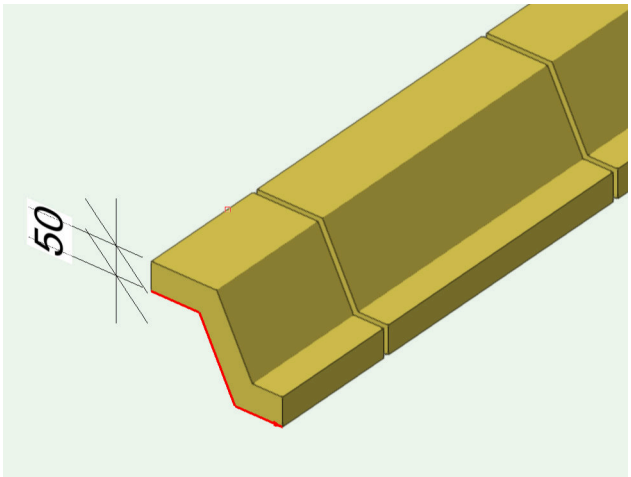
Note
Invisible edges other than the last open edge are currently ignored.

Offsets are to one side and positive to the left of the open poly direction. To flip to the other side, reverse the direction of the poly.

The minimum extrusion thickness is set at 2mm







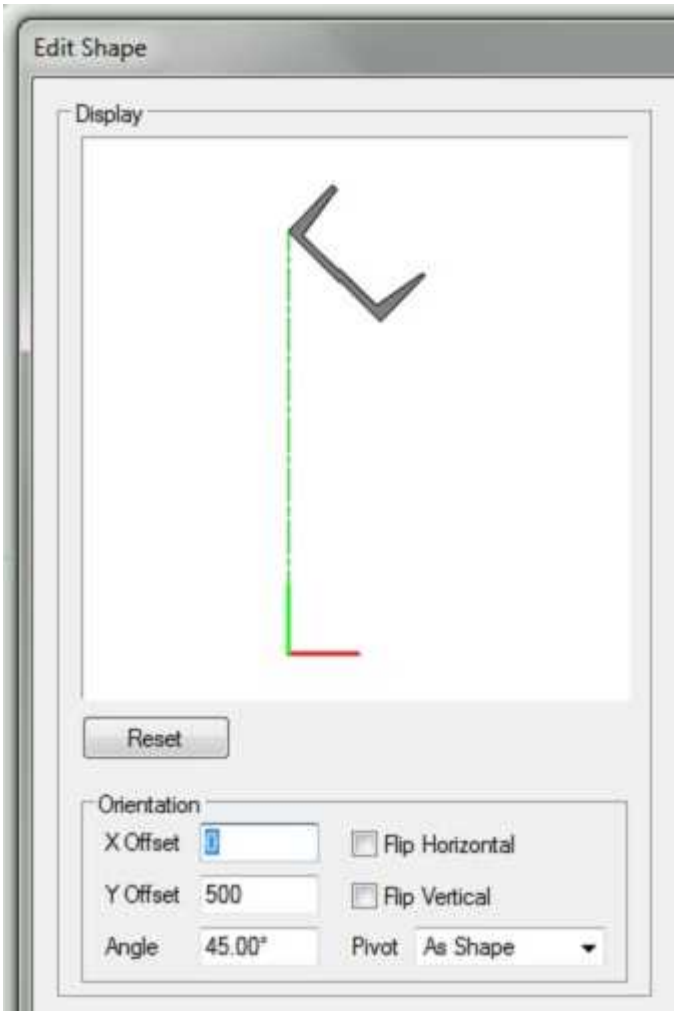
All Extrude tools have an Object Info Palette button"Edit Shape" which allows the user to change the associated shape.

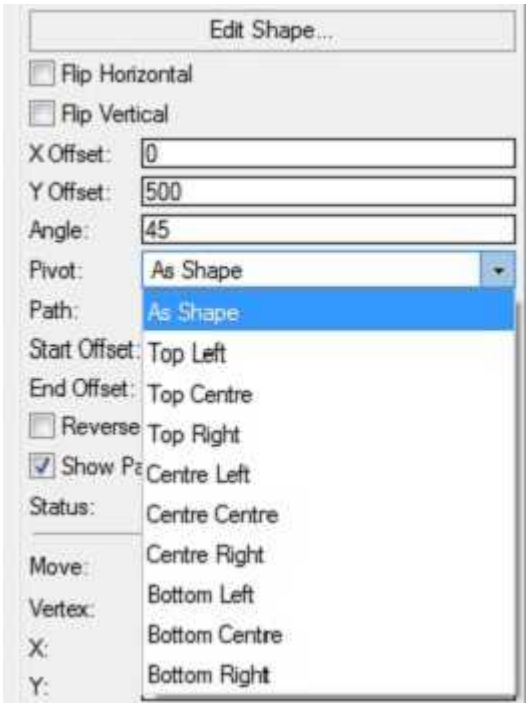
A shape definitions orientation and position can be changed in relation to the underlying path.

The pivot point of a shape is in relation to the bounding box of the shape and can be set by bottom,centre,left and right locations. In addition, an offset and rotation can be applied with X highlighted in red and Y in green.

The shape can also be flipped in horizontal and vertical axes about the shape centroid.

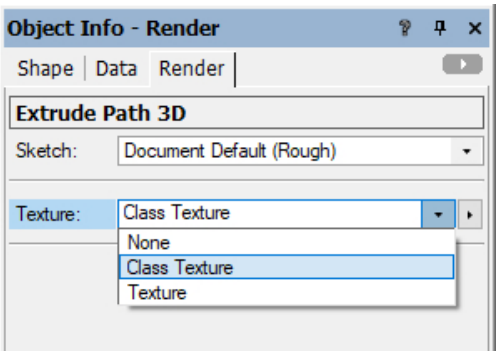
All of the orientation dialog parameters are duplicated in the object info palette to aid quick editing.

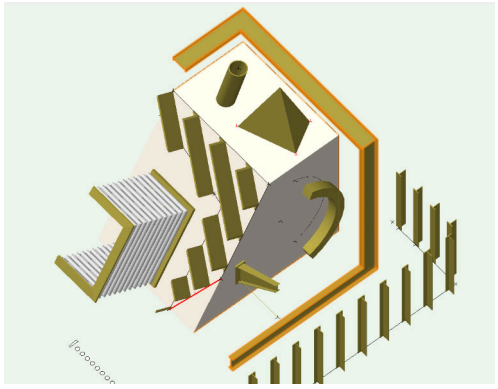


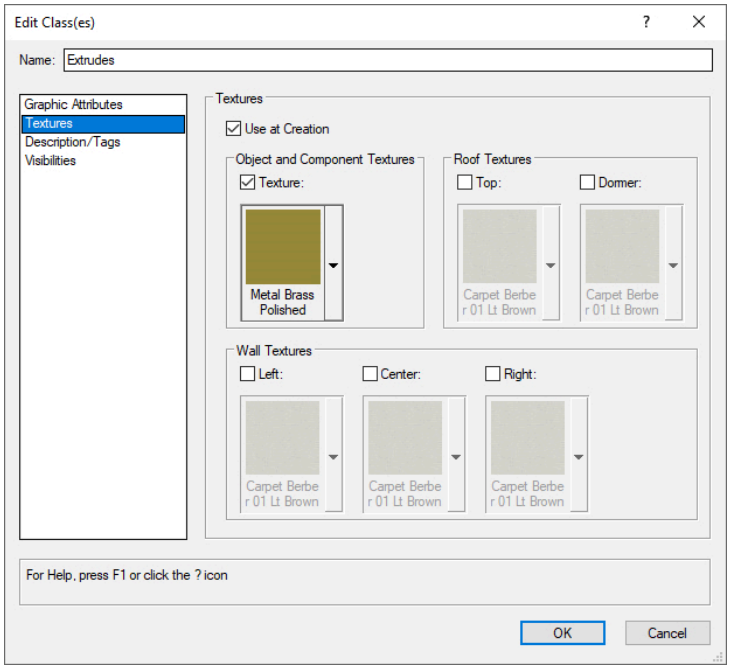


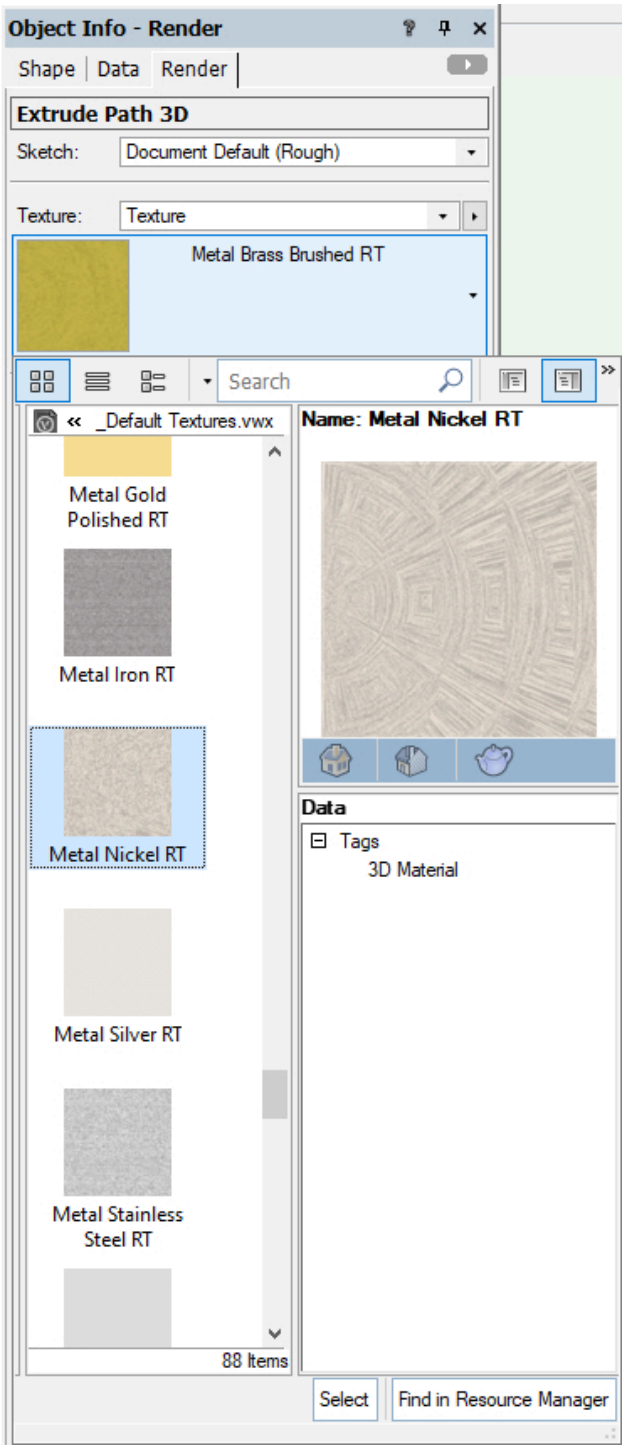
Textures for Extrude Path objects can be set via the "Render" tab in the Object Info Palette. Texture references can be specific textures from the resource list pulldown or via the texture definitions of the class associated with the object.

Symbol shapes also have the option set Textures via the classes used for the contained objects.





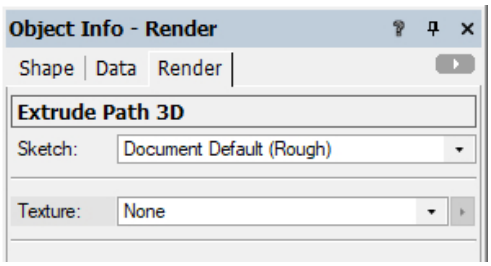


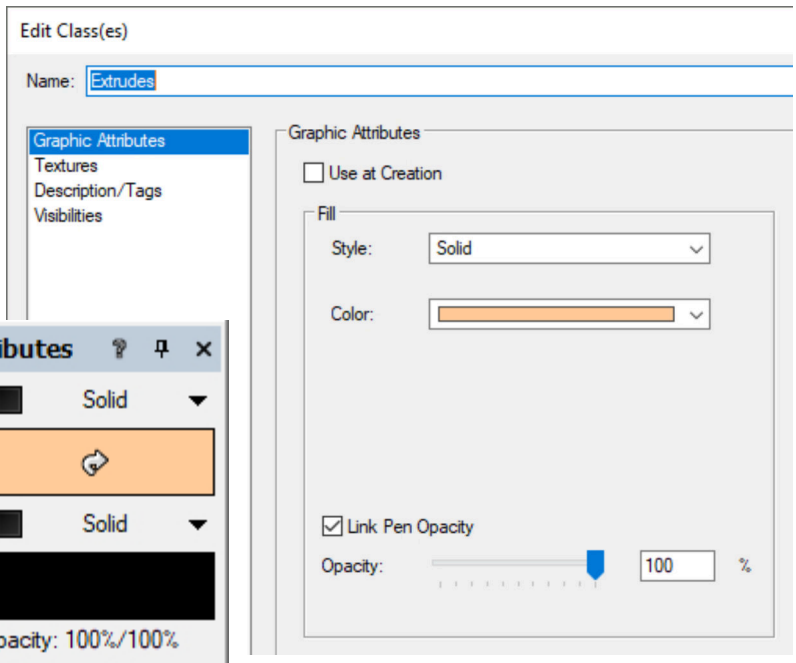


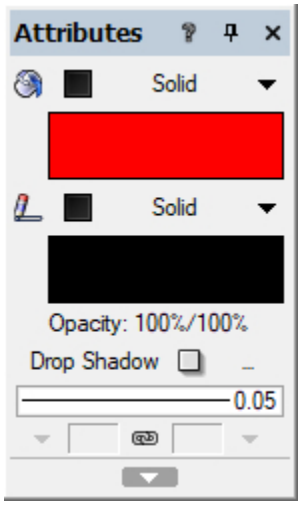
Object Fill and Pen attributes for a selected Extrude Path object can be changed via the “Attributes” palette.

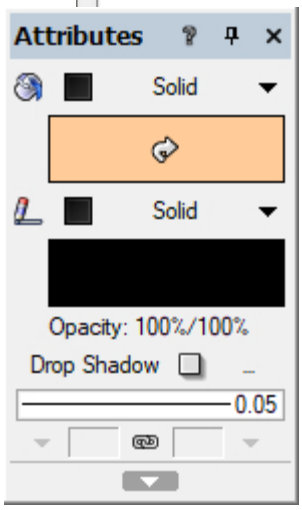
Fill must be set to "Solid" for textures to display otherwise the objects will be displayed in wireframe.

To make attributes active, set the Texture option in the “Render” tab to “None”







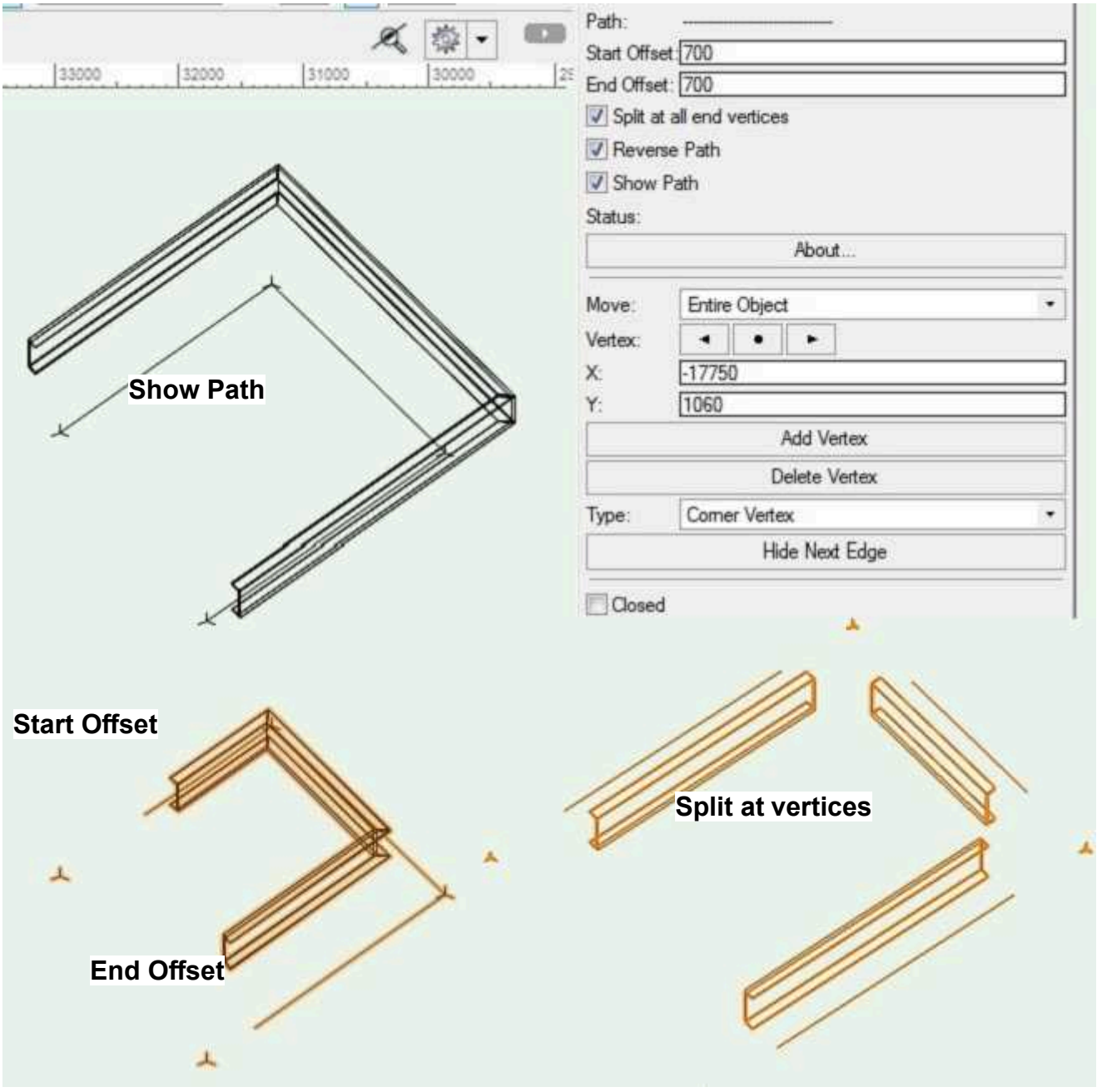


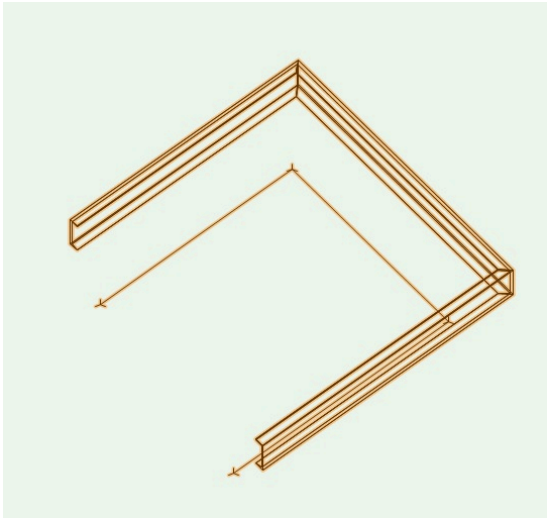
Extrude Path Planar, Extrude Linear and Extrude Path 3D have options to:

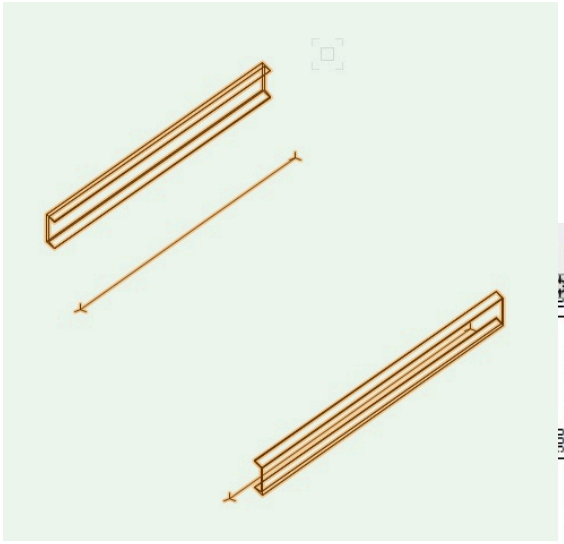
- Reverse the direction of the underlying path
- Apply offsets from the ends of an open path
- Split path into separate segments
- Show/Hide the path.

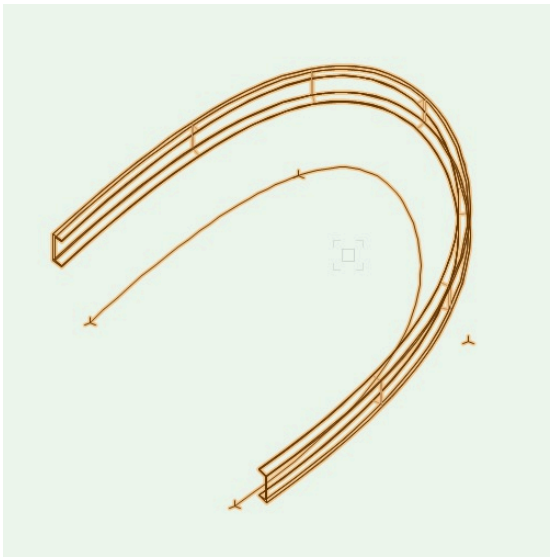
which affect how the shape is drawn. End offsets can be either positive (shortened) or negative (extended). If not "Show Path" then standard boolean operations and push pull actions can be performed on the underlying 3D geometry. "Reverse Path" reverses the shape settings and X offset.

"Status" displays an error message if the shape cannot be successfully swept along the path. Generally paths should not intersect but can cross if "Split at all end vertices" is selected.



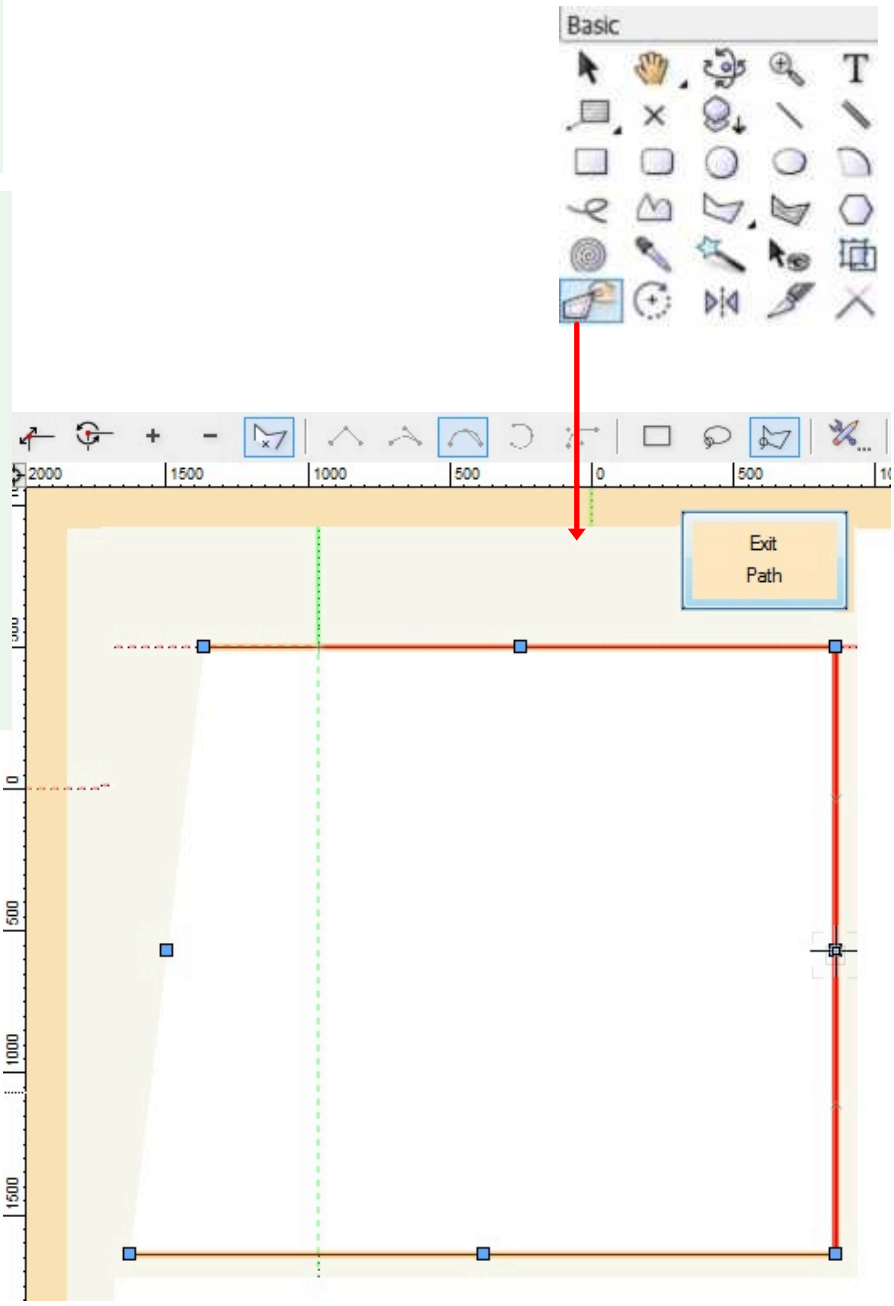






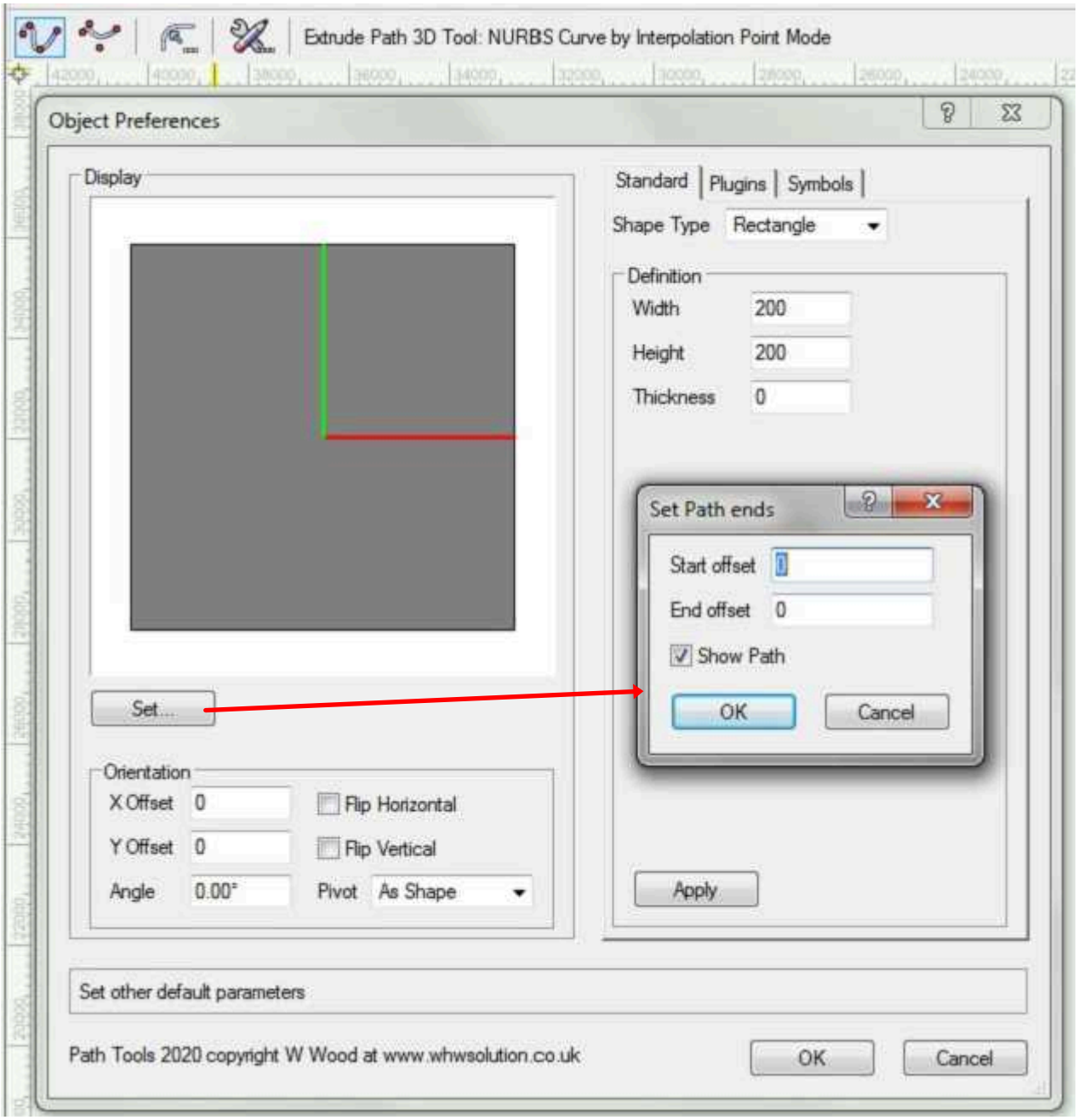
Extrude Path Planar, Extrude Path 3D, Extrude Panel Planar and Extrude Cut Planar have the option to change the path via the Reshape tool or double clicking on the geometry.

Planar honours the visibility of each segment,otherwise all standard Reshape actions can be performed on the path.

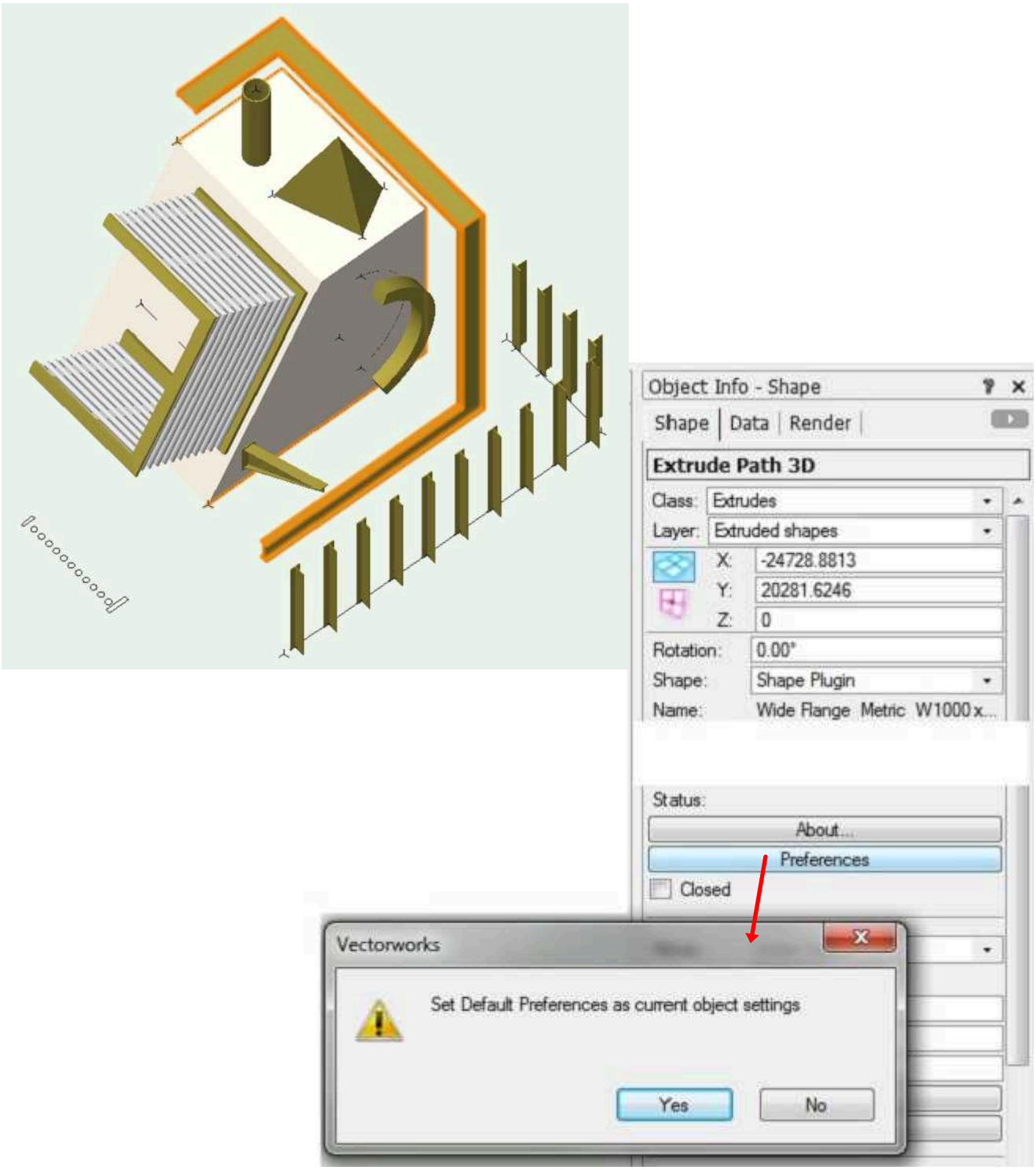


All Extrude plugins can have the default preferences set prior to drawing a new object by clicking the Preferences tool icon marked by the spanner and pencil.

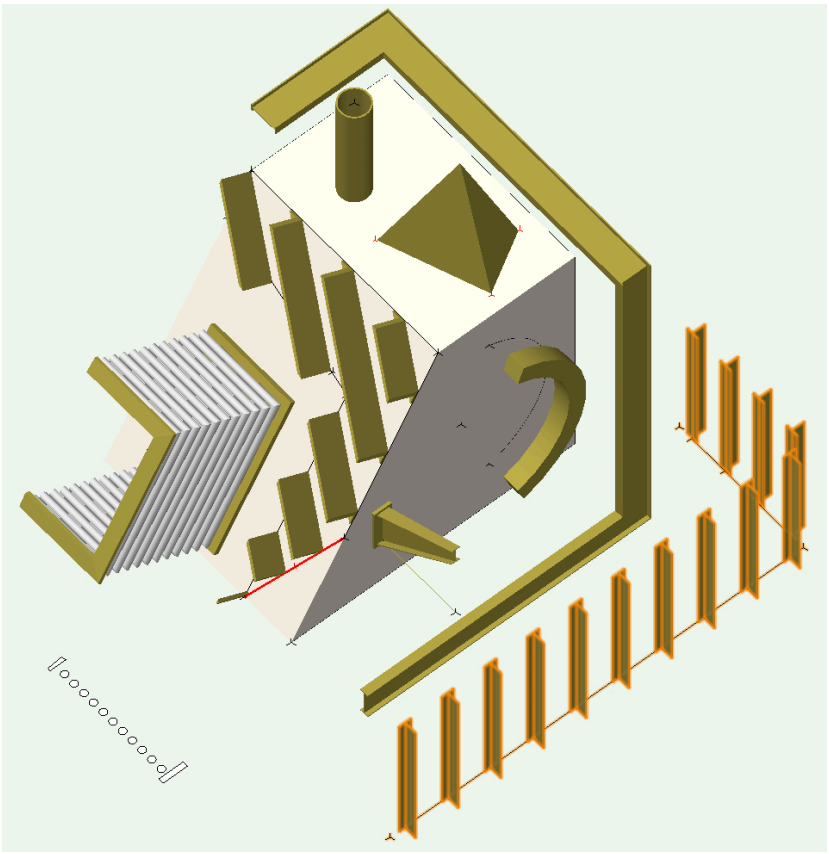
Generally this will show the Shape definition dialog which also has a Set button which displays a further dialog to specify any non shape related settings.

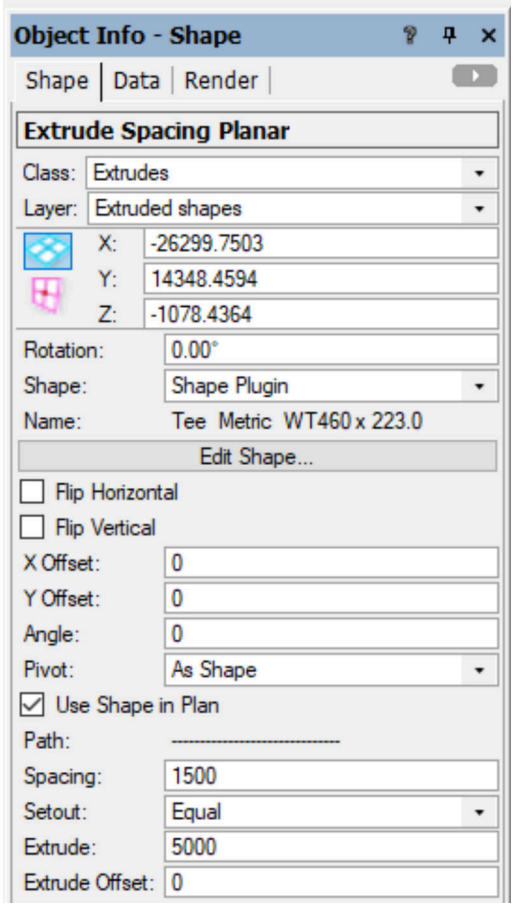


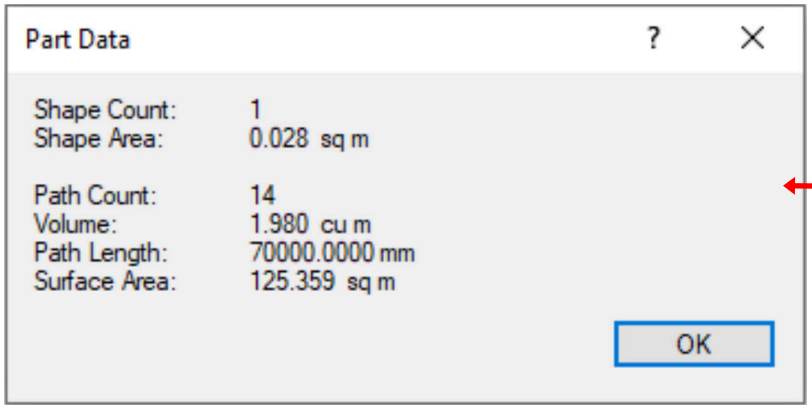
All Extrude plugins have a Preferences button in the Object Info palette which when pressed displays a dialog confirmation for storing the current plugin object's settings as the default settings for the tool preferences which will be used for any newly created objects.

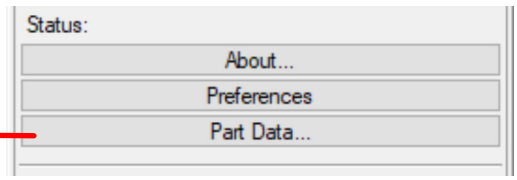


All Extrude plugins have a Part Data button in the Object Info palette which when pressed displays a dialog giving the quantities of count, length, surface area and volume, all in the current units settings.







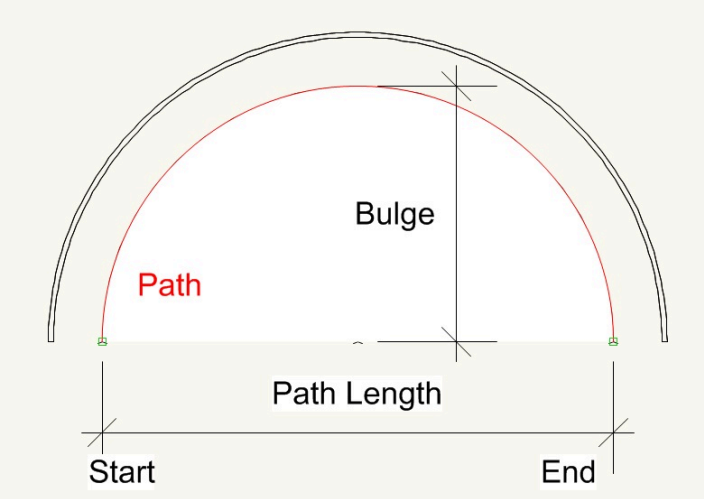


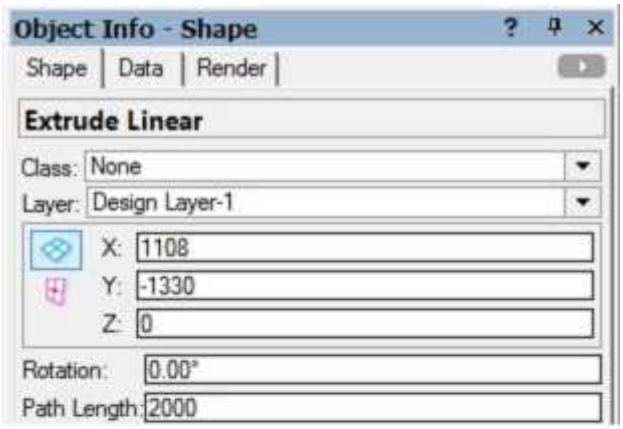
Extrude Linear has options to:

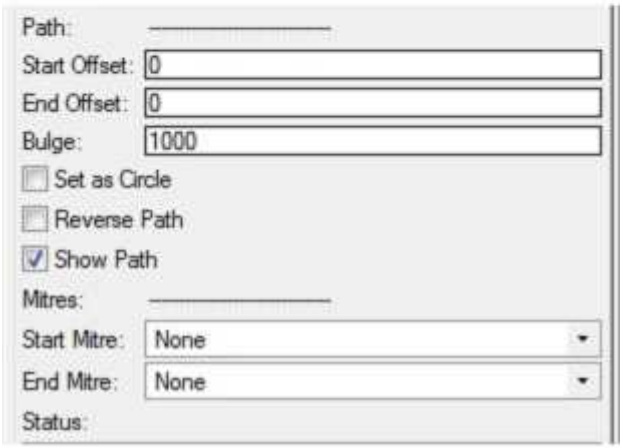
- Reverse the direction of the underlying path.
- Apply offsets from the ends of an open path.
- Draw an arc or circle path defined by a bulge between the line ends.
- Show/Hide the path.
- Draw mitres at ends from top, side or both

which affect how the shape is drawn. Positive offsets shorten the ends.
If not "Show Path" then standard boolean operations and push pull actions can be performed on the underlying 3D geometry.

"Status" displays an error message if the shape cannot be successfully swept along the path.



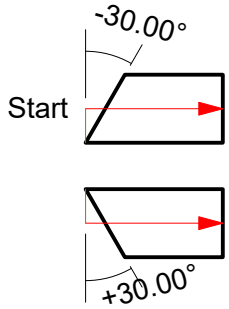




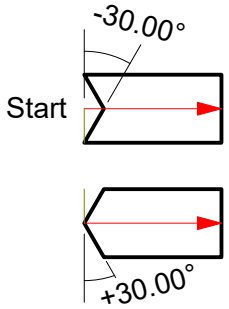
Set as circle draws a circle path with diameter defined by the path length

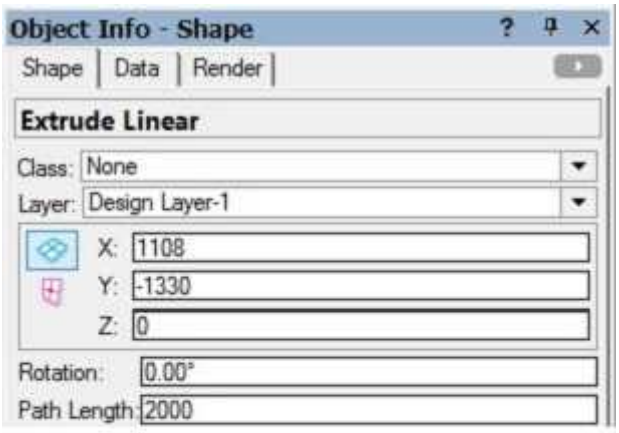
Extrude Linear has options to draw mitres at ends.

Top or Side



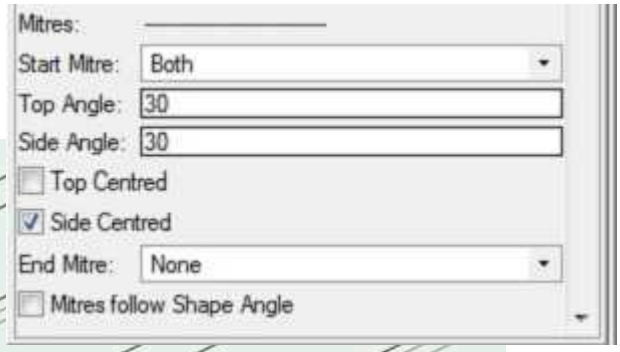
Top or Side Centred

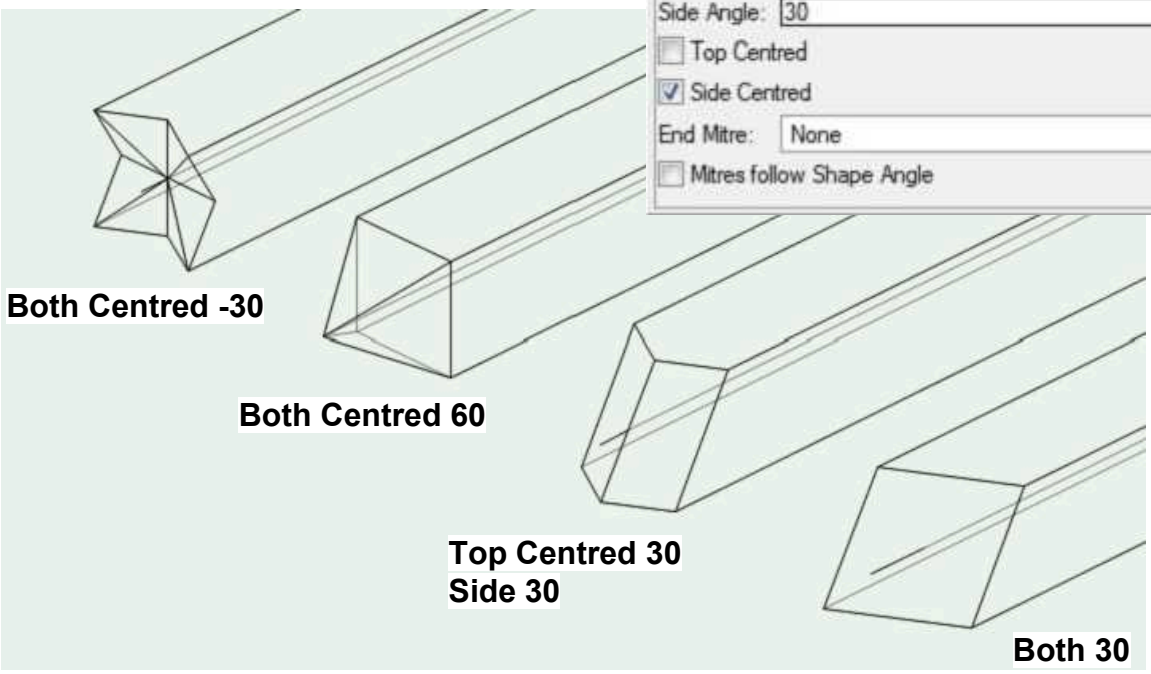




If the shape angle is not zero then the "Mitres follow Shape Angle" option will align the end mitres with the shape angle.

Mitre examples

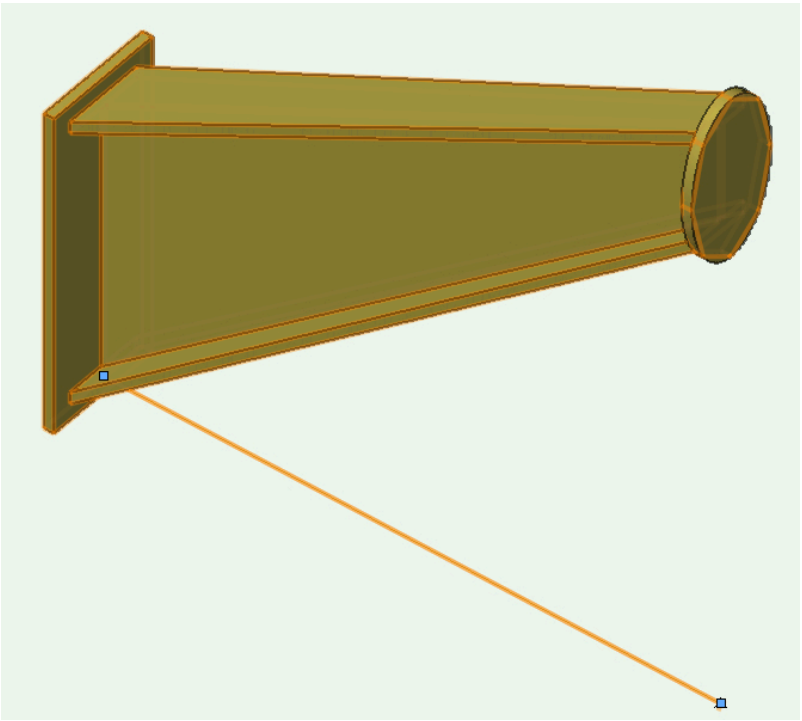


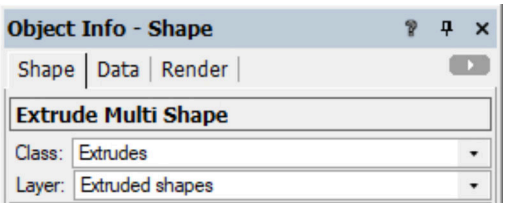


Extrude Multi Shape has options to add end plates to the extrusion.

Plates are extended by a thickness beyond the extents of the extrusion.

To add plates within the extents then set Start/End offsets as the Start/End plate thicknesses.





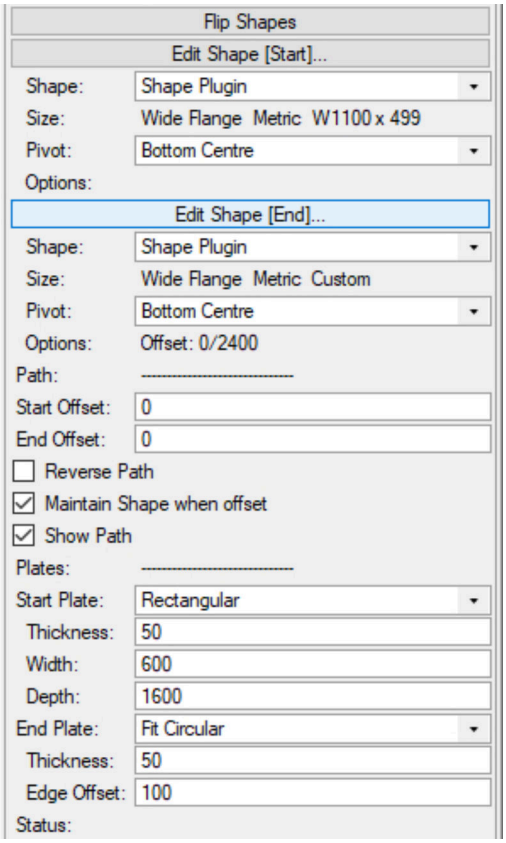
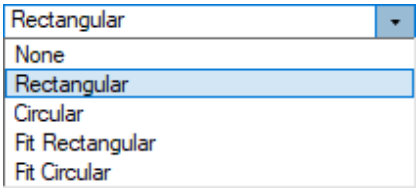


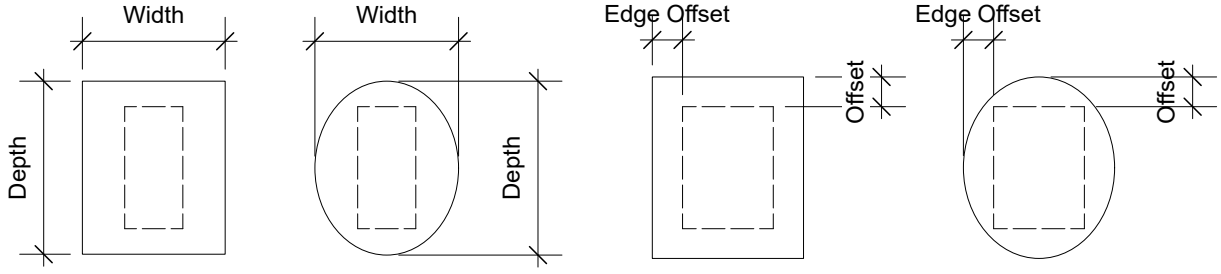
Plate options



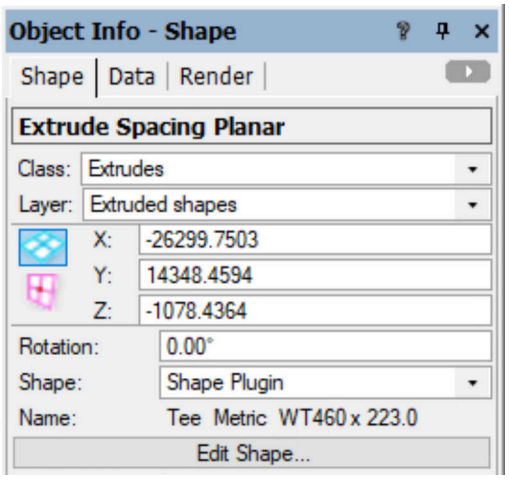
The "Maintain Shape" option takes account of the shape X/Y offsets and aligns the shapes accordingly.

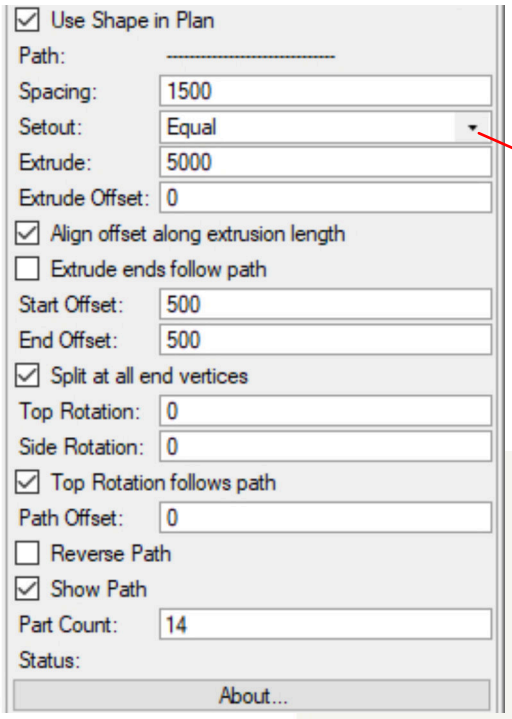
Note:
Custom shapes can be used to maintain thicknesses while changing overall sizes.

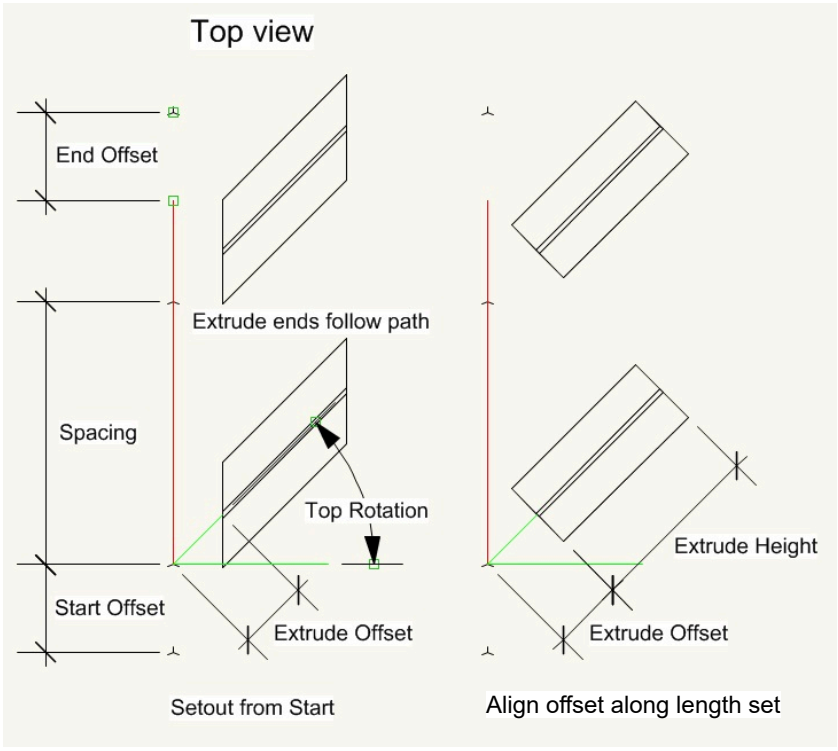
Rectangular **Circular** **Fit Rectangular** **Fit Circular**

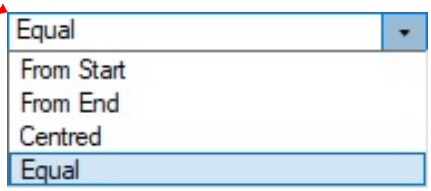


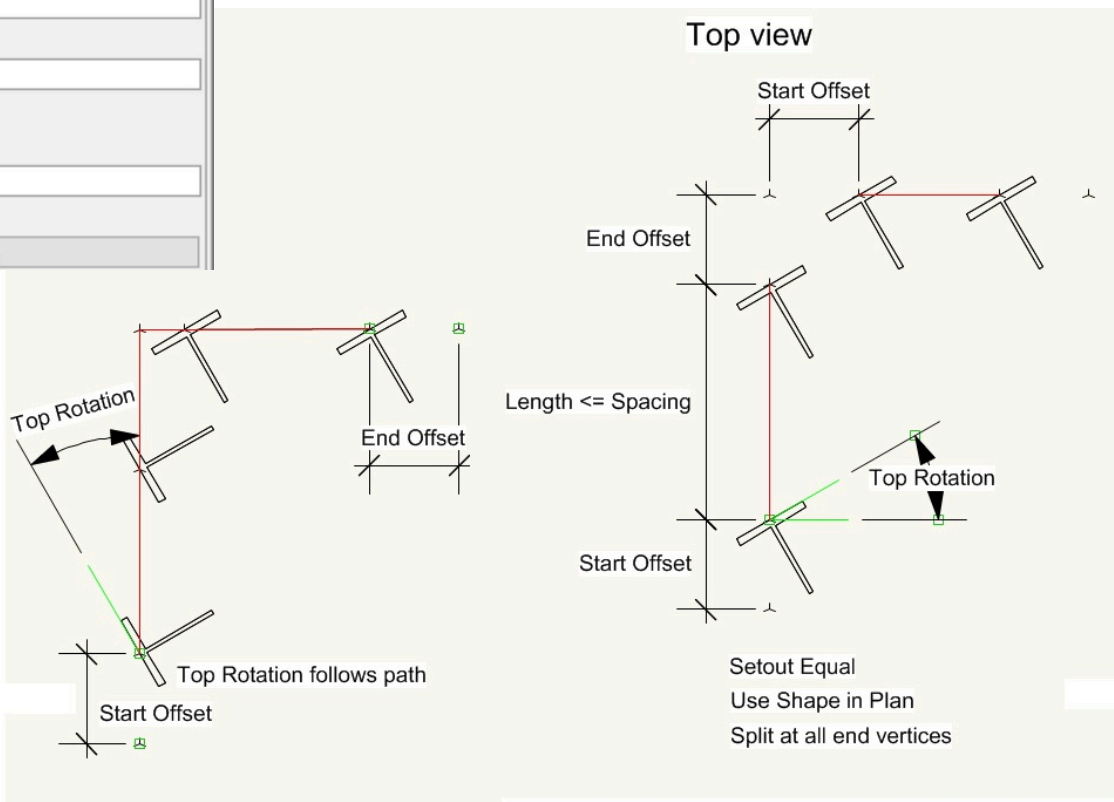
Extrude Spacing Planar has the following options:



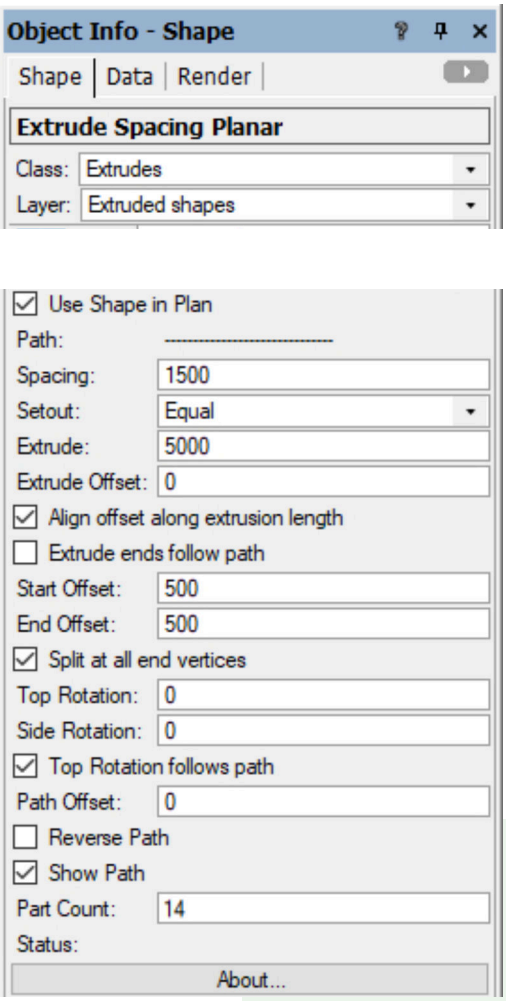


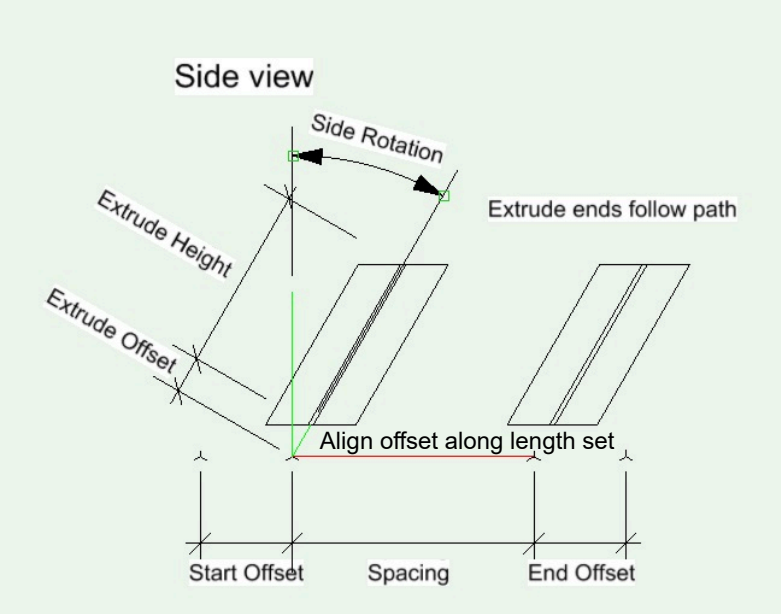




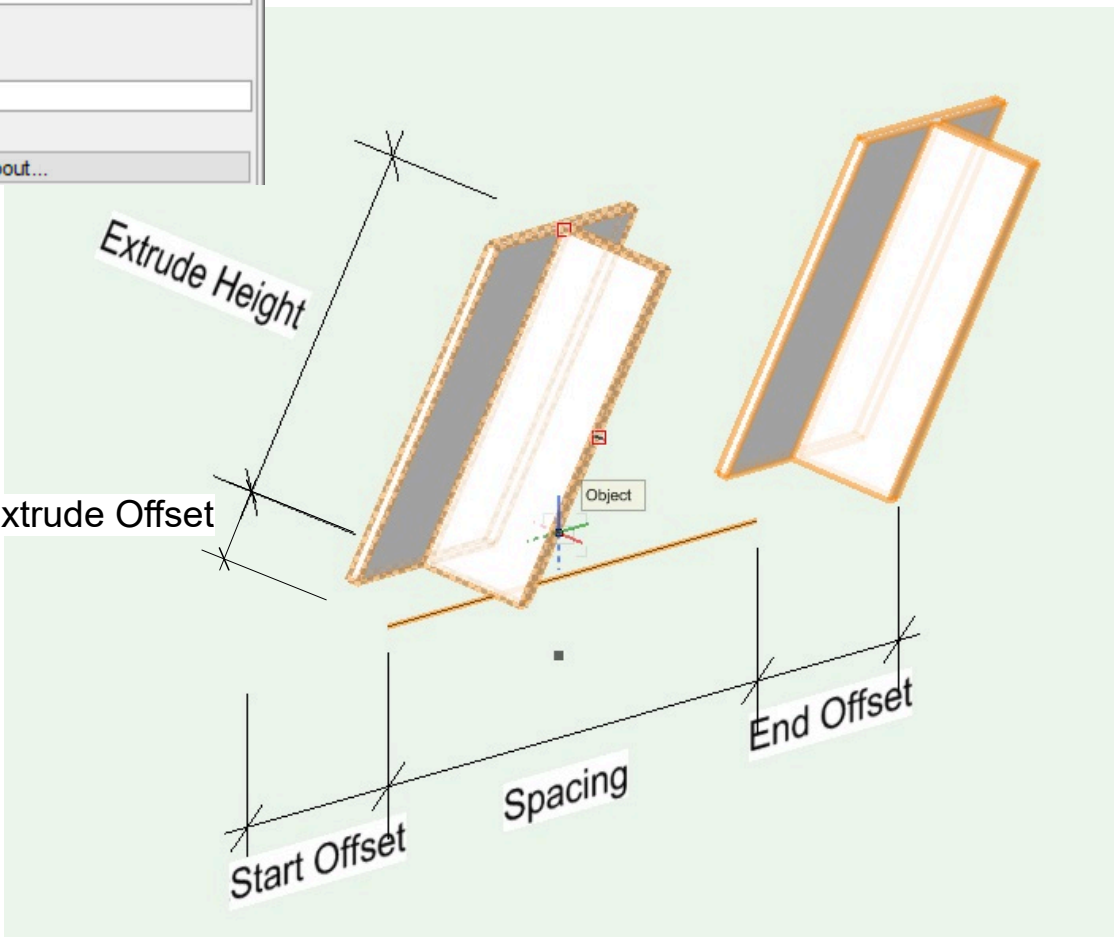


Extrude Spacing Planar has the following options:

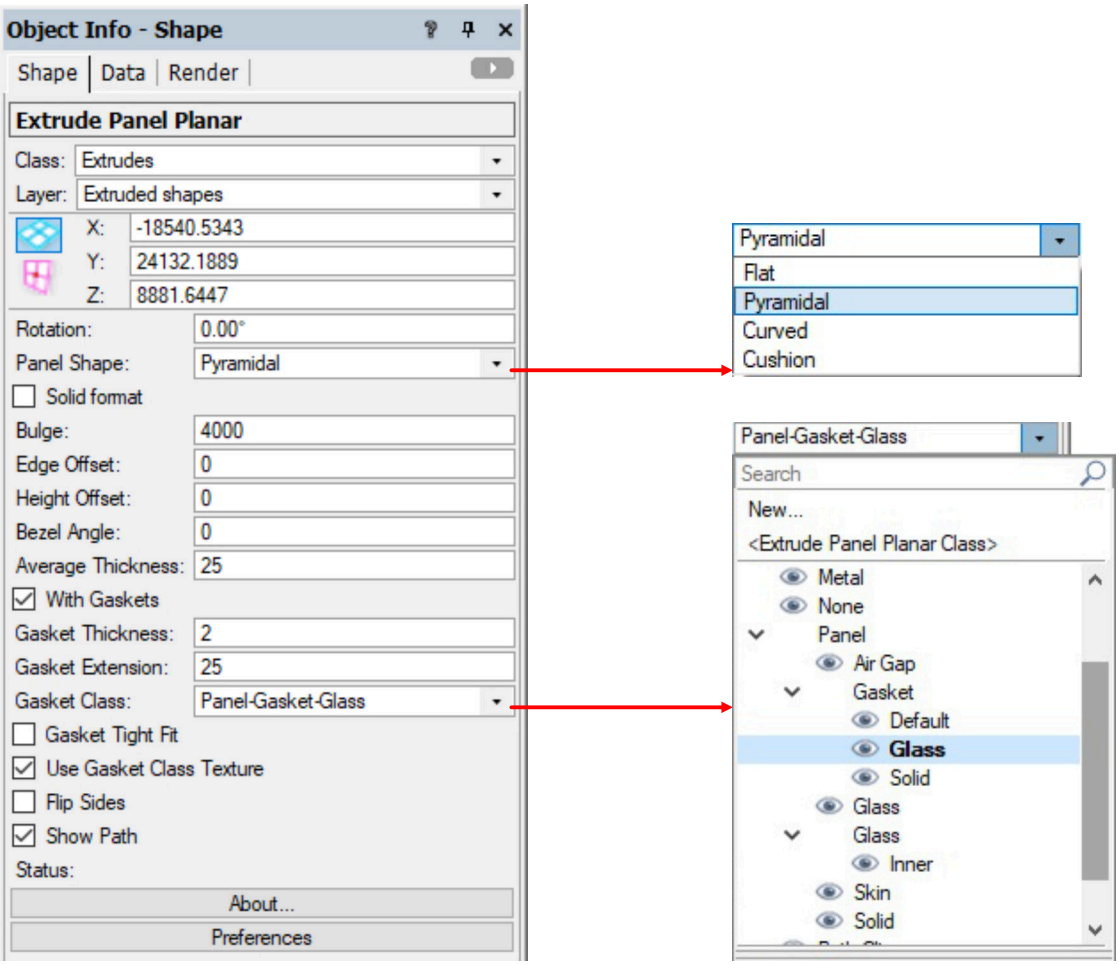




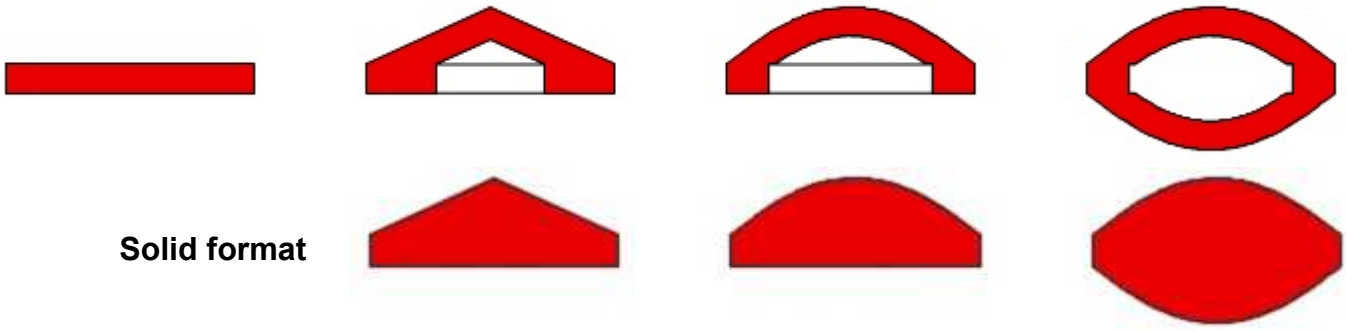
If "Align offset along extrusion length" is unset, the extrude offset will be perpendicular to the path otherwise the offset is inline with the extrusion.



Extrude Panel Planar has the following options:



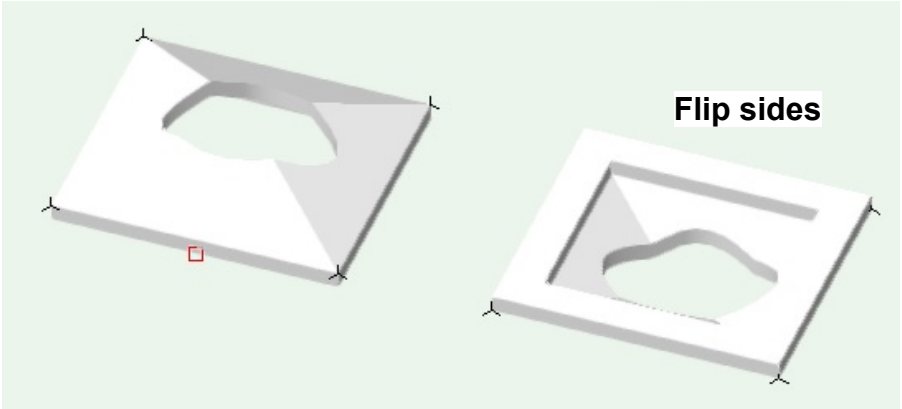
Flat **Pyramidal** **Curved** **Cushion**



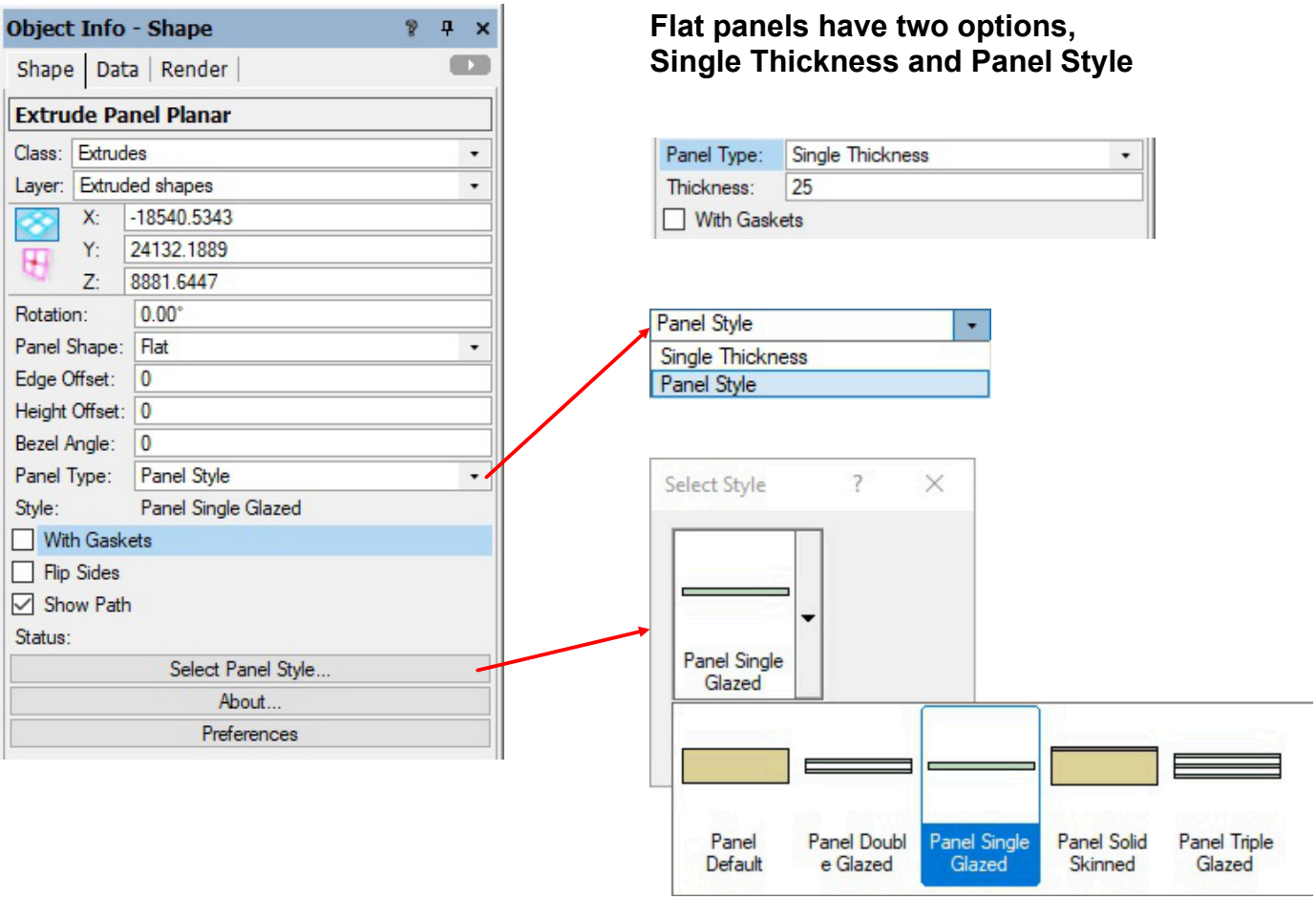
Solid format

Pyramidal with hole cut in panel path outline

Edit path via Reshape Tool

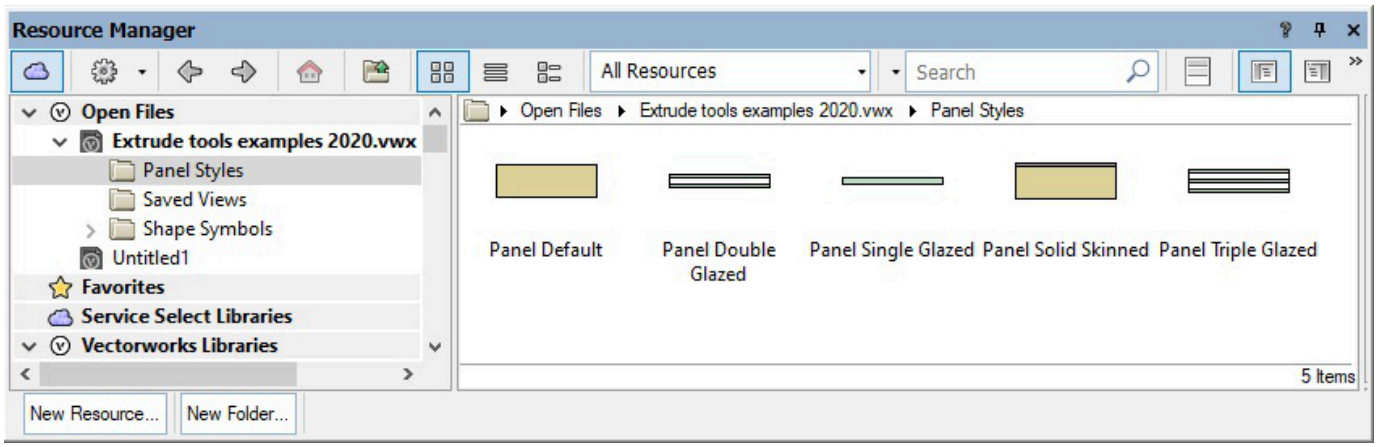


Flip sides



Flat panels have two options, Single Thickness and Panel Style

A set of default panel styles are created in a folder "Panel Styles".



Any Vectorworks Wall Style can be placed in the folder "Panel Styles" which will be displayed in the "Select Style" popup list.

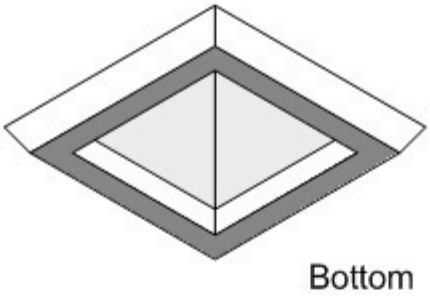
Extrude Panel Planar has the following settings:

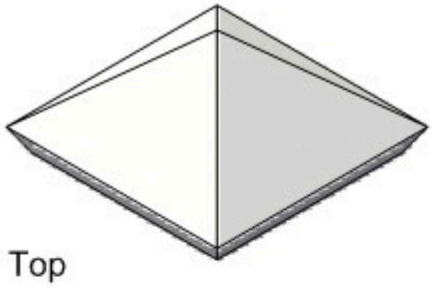
Panel Shape:	Pyramidal
Solid format	
Bulge:	4000
Edge Offset:	0
Height Offset:	0
Bezel Angle:	0
Average Thickness:	25

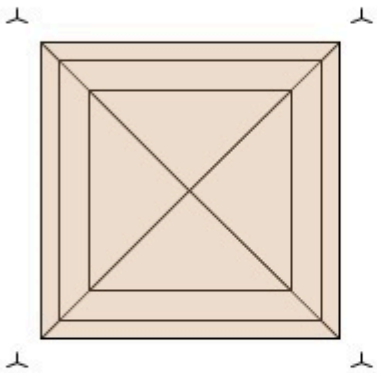
Note:
Panel display is driven by Class texture, texture or fill/pen attribute as any Extrude Path object.

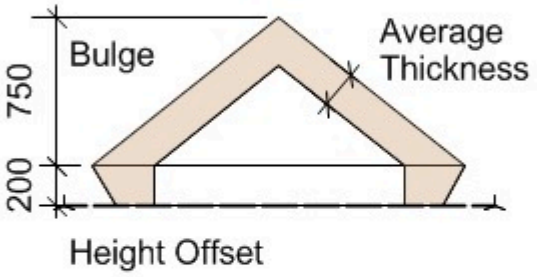
Panel Styles use component Class texture

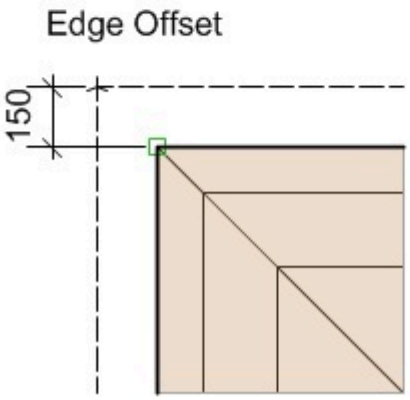
Offsets and Bezel Angle can have negative values

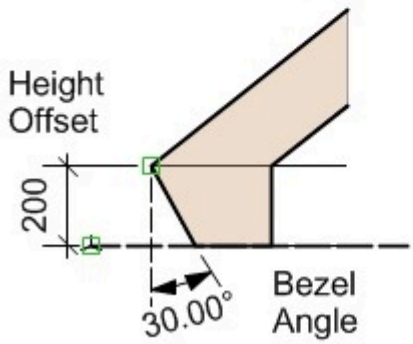




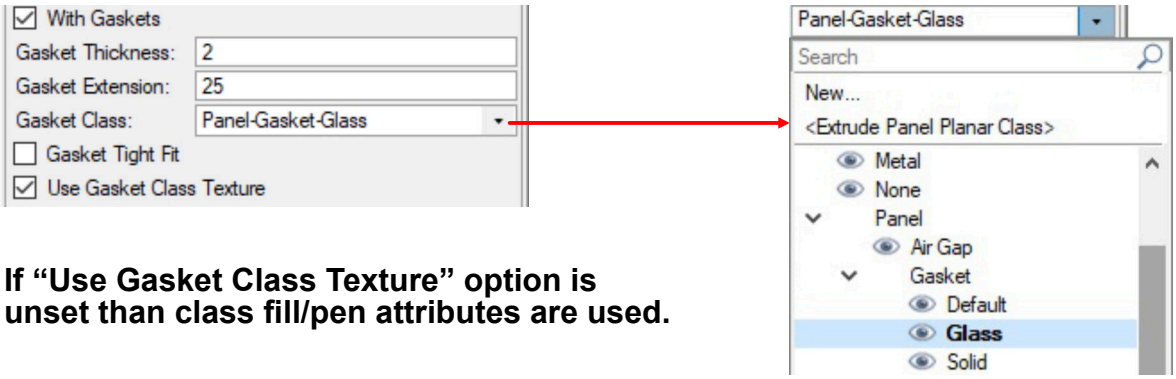




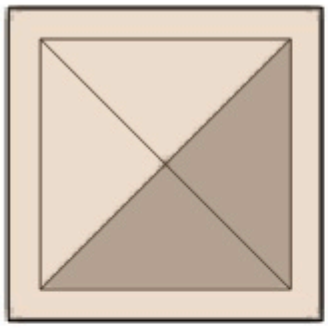


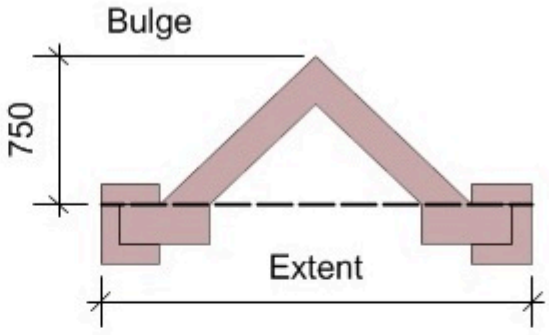


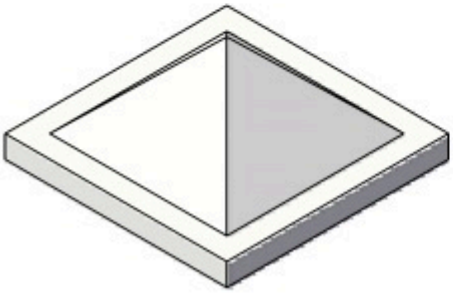
Extrude Panel Planar gaskets have the following settings:

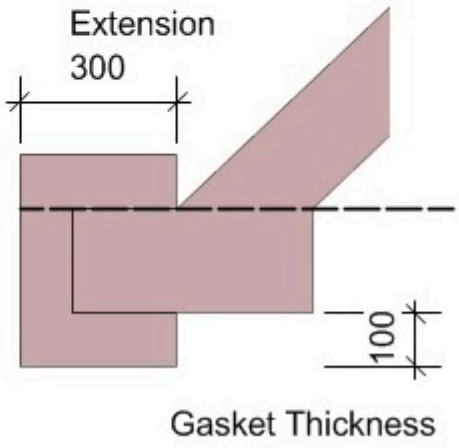


If "Use Gasket Class Texture" option is unset than class fill/pen attributes are used.





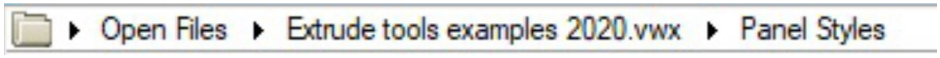




Note:
Extension shown (300mm) consists of Gasket Extension plus Thickness.

The "Gasket Tight Fit" option ignores the gasket wrap around where the gasket height matches the panel thickness.

Extrude Panel Styles are defined as a Wall Style accessed via Resource Browser

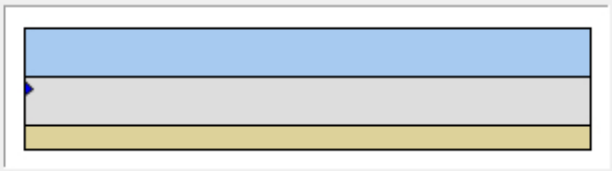


Edit Wall Style

Name: Panel Composite 1

Wall Type: Standard Wall Curtain Wall

Definition | Insertion Options | Textures | Data

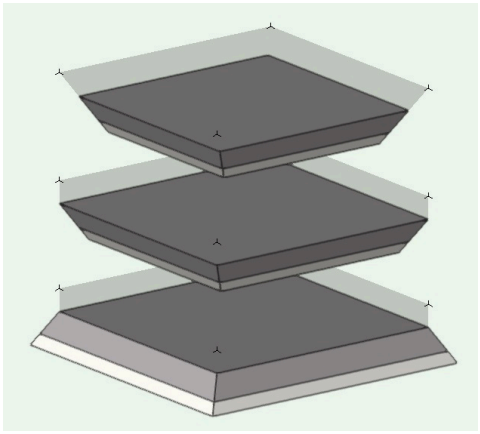


Overall Thickness: 500 (Determined by components)

Edit Wall Attributes...

Components: Panel Composite 1

#	Name	Core	Function	Class	Thickness
1	Glass deck		Outer Finish	Panel-Glass	200
2	Panel Core		Load-Bearing	Panel-Solid	200
3	Ceiling		Inner Finish	Panel-Skin	100



Components: Panel Composite 2

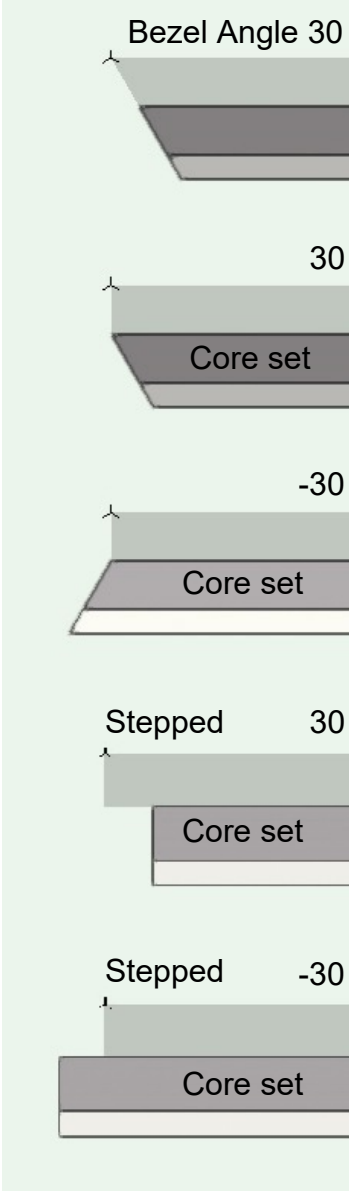
#	Name	Core	Function	Class	Thickness
1	Glass deck		Outer Finish	Panel-Glass	200
2	Panel Core	✓	Load-Bearing	Panel-Solid	200
3	Ceiling		Inner Finish	Panel-Skin	100

The setting of a Core component defines how bezel angles are applied and can be stepped

Panel Type: Panel Style

Style: Panel Composite 2

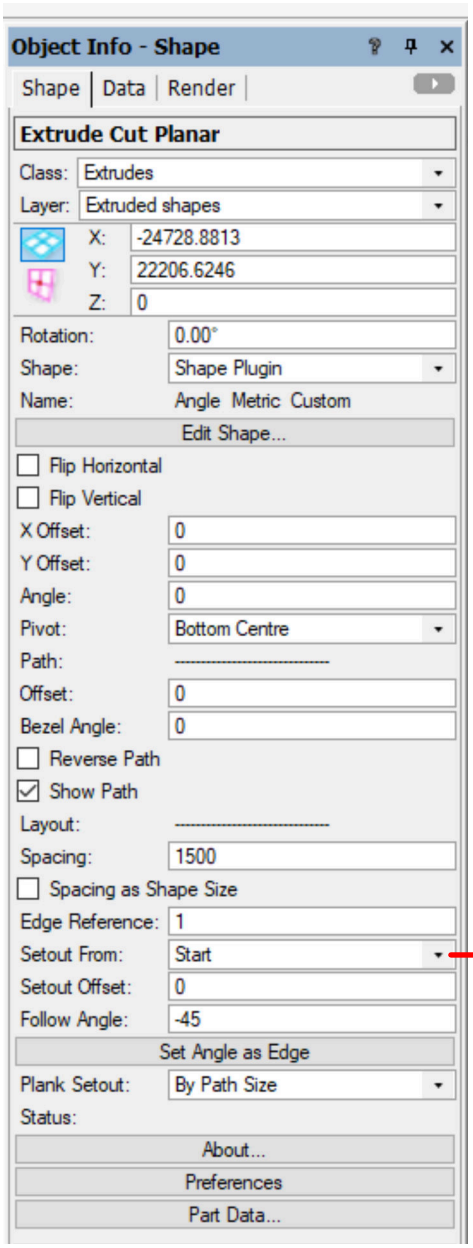
☑ Stepped Style

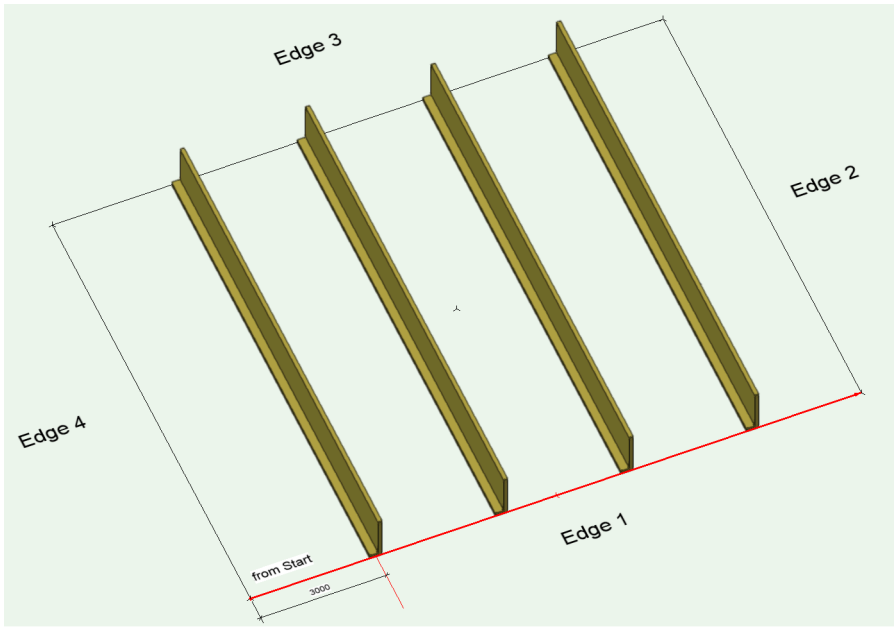


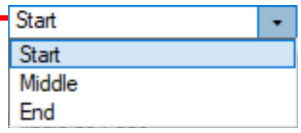
Changes to a Panel Style are not automatically applied to a Panel.

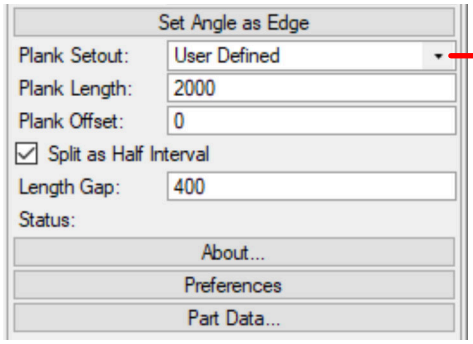
To update Panels, use menu command

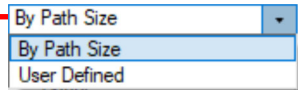
Tools>Utilities>Reset All Plug-Ins

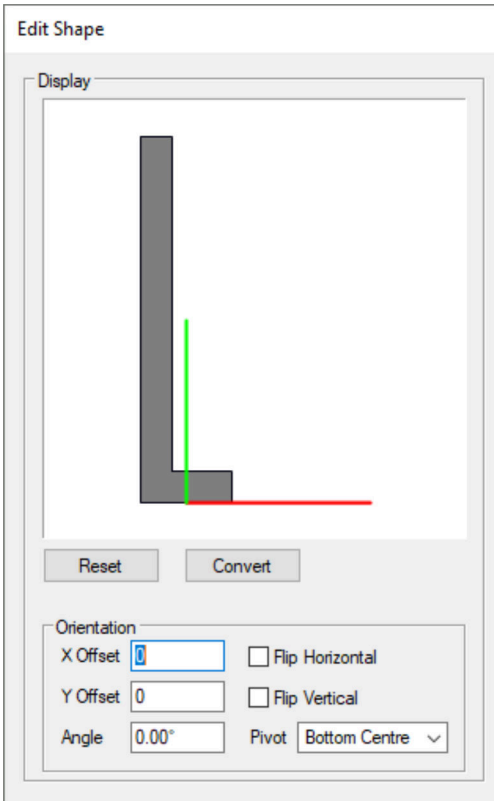

Object Info - Shape
Shape
Data
Render
Extrude Cut Planar
Class: Extrudes
Layer: Extruded shapes
X: -24728.8813
Y: 22206.6246
Z: 0
Rotation: 0.00°
Shape: Shape Plugin
Name: Angle Metric Custom
Edit Shape...
Flip Horizontal
Flip Vertical
X Offset: 0
Y Offset: 0
Angle: 0
Pivot: Bottom Centre
Path:
Offset: 0
Bezel Angle: 0
Reverse Path
Show Path
Layout:
Spacing: 1500
Spacing as Shape Size
Edge Reference: 1
Setout From: Start
Setout Offset: 0
Follow Angle: -45
Set Angle as Edge
Plank Setout: By Path Size
Status:
About...
Preferences
Part Data...


Edge 3
Edge 2
Edge 4
Edge 1
from Start
3000

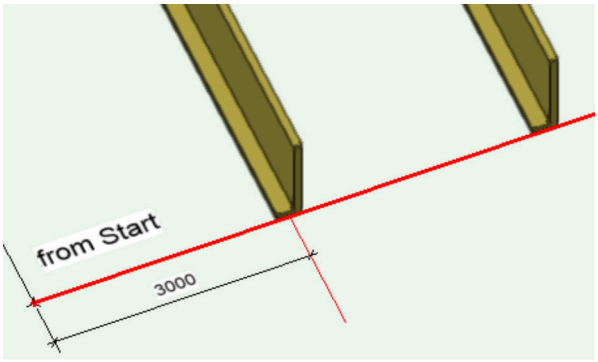

Start
Start
Middle
End


Set Angle as Edge
Plank Setout: User Defined
Plank Length: 2000
Plank Offset: 0
Split as Half Interval
Length Gap: 400
Status:
About...
Preferences
Part Data...

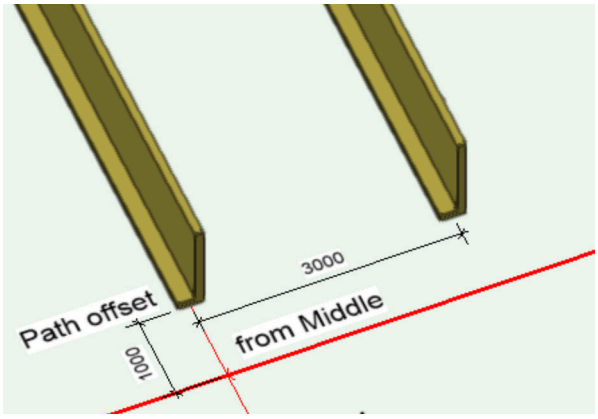

By Path Size
By Path Size
User Defined


Edit Shape
Display
Reset
Convert
Orientation
X Offset 0
Y Offset 0
Angle 0.00°
Flip Horizontal
Flip Vertical
Pivot Bottom Centre

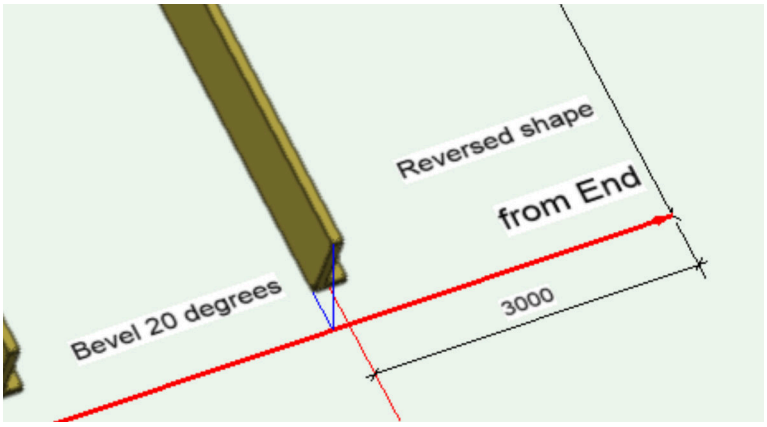
Setout from Start

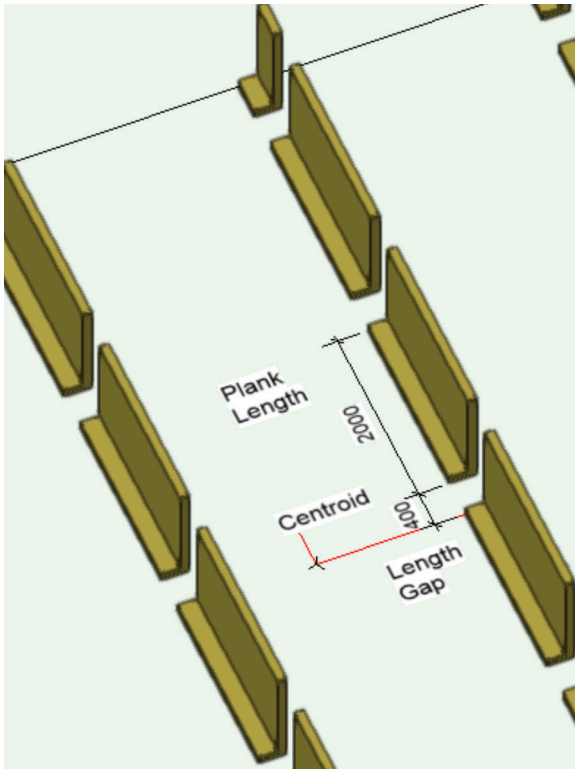


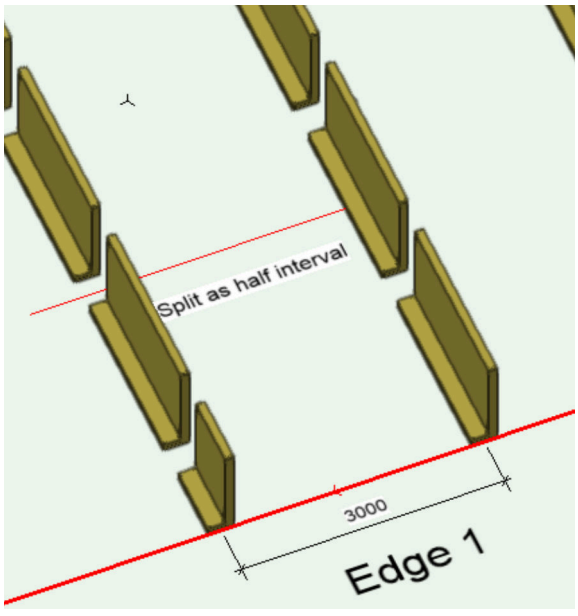
Setout from Middle



Setout from End



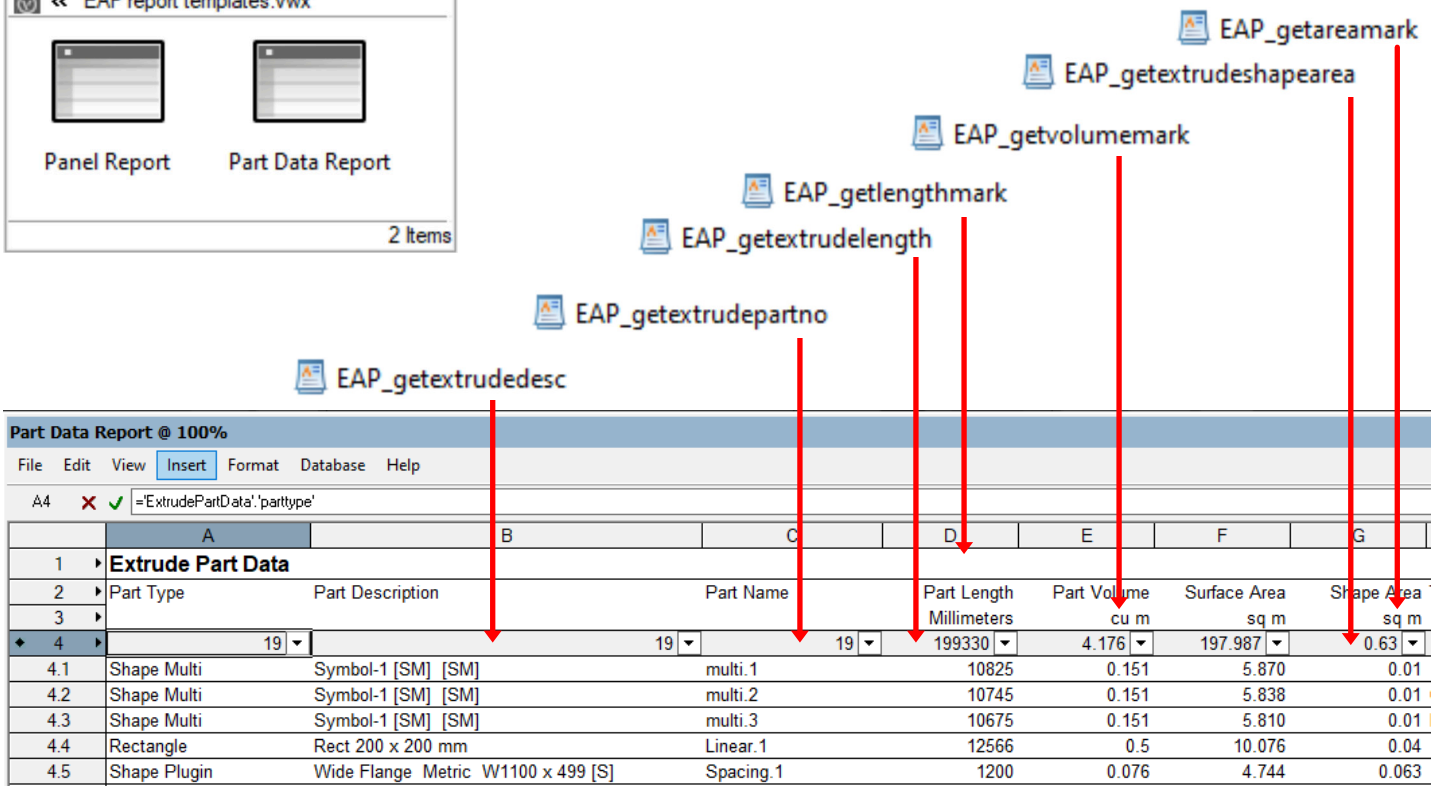




Bezel angle slices the extrusions defined by defined angle

A template file is included in the release which contains two worksheets for reporting on extrude path objects.

A database formula is setup to report on the objects and in some instances the fields use worksheet python scripts referenced by "=RUNSCRIPT" to extract the relevant data.



	A	B	C	D	E	F	G
1	**Extrude Part Data**						
2	Part Type	Part Description	Part Name	Part Length Millimeters	Part Volume cu m	Surface Area sq m	Shape Area sq m
3							
4	19	19	19	199330	4.176	197.987	0.63
4.1	Shape Multi	Symbol-1 [SM] [SM]	multi.1	10825	0.151	5.870	0.01
4.2	Shape Multi	Symbol-1 [SM] [SM]	multi.2	10745	0.151	5.838	0.01
4.3	Shape Multi	Symbol-1 [SM] [SM]	multi.3	10675	0.151	5.810	0.01
4.4	Rectangle	Rect 200 x 200 mm	Linear.1	12566	0.5	10.076	0.04
4.5	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744	0.063

The worksheet scripts are stored in the Extrude tools plugins folder with an example shown below.

EAP_getextrudelength - Notepad

File Edit Format View Help

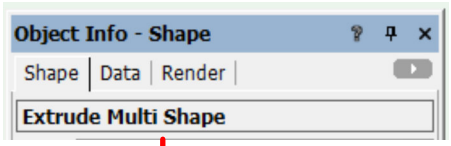
```
import vs
import math

# Created 240416
# Length of extrude about the centroid of a shape from extrude based plugins ie Extrude Path Planar
# Conversion in relation to current length unit and plugin stored length unit

objH = vs.WSScript_GetObject()
try:
        upi = float(vs.GetRField(objH,'ExtrudePartData','upi'))

        prefupi = vs.GetPrefReal(152)
        tempstr = vs.GetRField(objH,'ExtrudePartData','partlength')
        numval = float(tempstr) * prefupi / upi
except:
        numval = 0
vs.WSScript_SetResReal(numval)
```

The Extrude Part Data worksheet has the following format.



Part Data Report @ 150%

File Edit View Insert Format Database Help

	A	B	C	D	E	F
1	**Extrude Part Data**					
2	Part Type	Part Description	Part Name	Part Length Millimeters	Part Volume cu m	Surface Area sq m
3						
4.1	Shape Multi	Symbol-1 [SM] [SM]	multi.1	10825	0.151	5.870

Part name taken from object's name

Edit Shape [Start]... Edit Shape [End]...

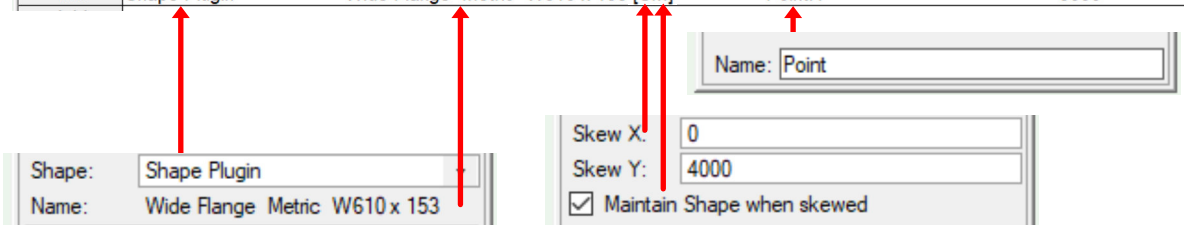
4.4	Rectangle	Rect 200 x 200 mm	Linear.1	12566	0.5	10.076

Shape size shown in current units

Extrude Spacing

4.5	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744
4.6	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744
4.7	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744
4.8	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744
4.9	Shape Plugin	Wide Flange Metric W1100 x 499 [S]	Spacing.1	1200	0.076	4.744

4.10	Shape Plugin	Wide Flange Metric W610 x 153 [SM]	Point.1	5000	0.058	8.209



Multi shape symbol

4.12	Shape Symbol	Symbol-1	main.1	31779	0.636	19.067
4.13	Shape Symbol	Symbol-1	main.2	31779	0.636	19.067
4.14	Shape Symbol	Symbol-1	main.3	31864	0.637	19.118

Part number incremented for each extruded shape

H	I
Texture	Class
	None
Cloth Blue Silk Shantung RT	Class Name-1
Brick Modular Running Bond <Surf Hatch> RT	Class Name-2
	None

The Extrude Panel Data worksheet has the following format.

Panel Report @ 150%

File Edit View Insert Format Database Help

Q10

	A	B	C	D
1	**Panel**			
2	Definition	Style	Name	Class
3				
4.1	Flat Single Thickness		cube	Panel-Solid
4.2	Flat Panel Style	Ext Bearing-CMU 190mm-EIFS	Composite-2	None
4.3	Flat Panel Style	Ext Bearing-CMU 190mm-EIFS	Composite	None
4.4	Flat Single Thickness		Pyramid-2	Panel-Solid

Panel Type: Panel Style

Style: Ext Bearing-CMU 190mm-EIFS

Name: Composite-2

6	**Panel Style Components**		(not including Air Gap components)	
7	Function	Style	Name	Class
8				
9.1	Outer Finish	EIFS	Composite-2.1	Component-Ext Finish-EIFS
9.2	Load Bearing	Concrete Masonry Units	Composite-2.2	Component-Struct-CMU
9.3	Inner Finish	Interior Plaster	Composite-2.3	Component-Finish-Gypsum Board
9.4	Outer Finish	EIFS	Composite.1	Component-Ext Finish-EIFS
9.5	Load Bearing	Concrete Masonry Units	Composite.2	Component-Struct-CMU
9.6	Inner Finish	Interior Plaster	Composite.3	Component-Finish-Gypsum Board

Edit Wall Style

Name: Ext Bearing-CMU 190mm-EIFS

Shape size shown in current units

Components:

#	Name	Core	Function	Class
1	EIFS		Outer Finish	Component-Ext Finish-EIFS
2	Concrete Masonry Units	✓	Load-Bearing	Component-Struct-CMU
3	Interior Plaster		Inner Finish	Component-Finish-Gypsum Board

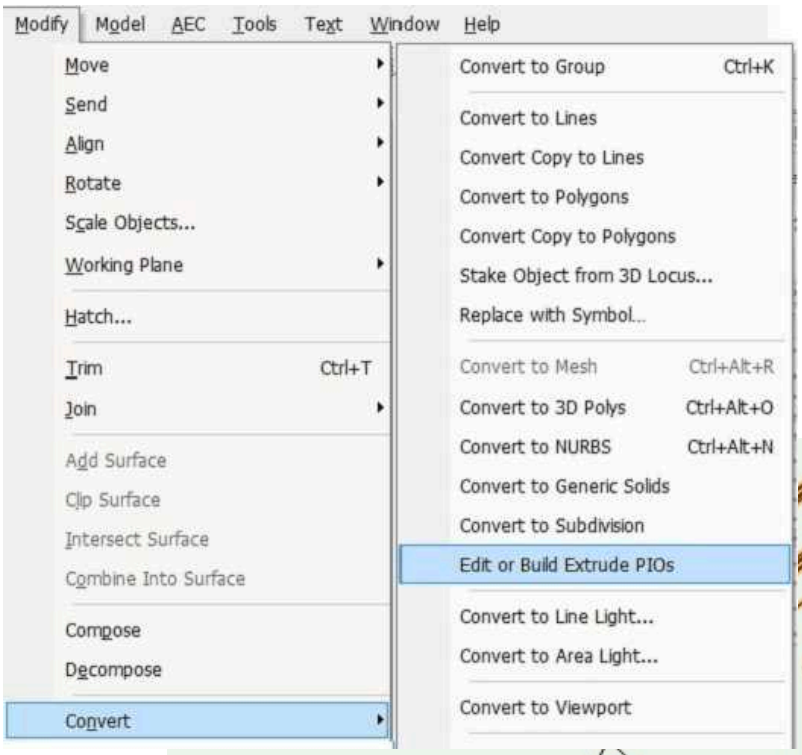
Other Panel Definitions

Pyramidal

- Flat
- Pyramidal
- Curved
- Cushion

E	F	G	H	I
Volume cu m	Area sq m	Surface Area sq m	Perimeter Millimeters	Thickness Millimeters
1	1	6	4000	1000
3.711	14.409	84.123	19349.283	280
3.492	14.409	80.92	19349.283	280
0.611	6.105	13.463	12532.677	100

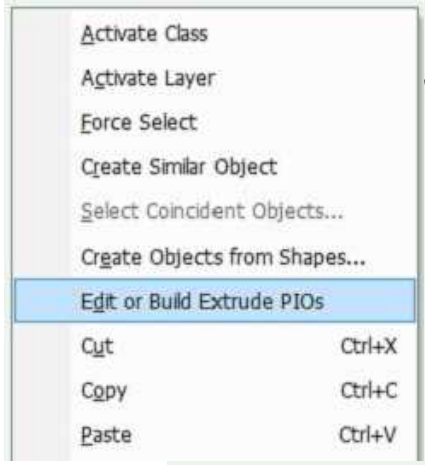
J	K	L	M	N	O	P	Q
Gasket						**Holes**	
Class	Volume cu m	Shape Area sq mm	Surface Area sq m	Perimeter Millimeters	Thickness Millimeters	Perimeter Millimeters	Area sq m
	0	0	0	0	0	0	0
Panel-Gasket-Default	0.013	689.427	12.917	19373.651	2	0	0
Panel-Gasket-Default	0.016	862.714	15.8	19373.651	2	0	0
Panel-Gasket-Default	0.003	200	2.559	12558.268	2	0	0



Edit or Build Extrude PIO's menu command allows conversion of planar 2D/3D shapes or bulk editing of existing Extrude path plugins.

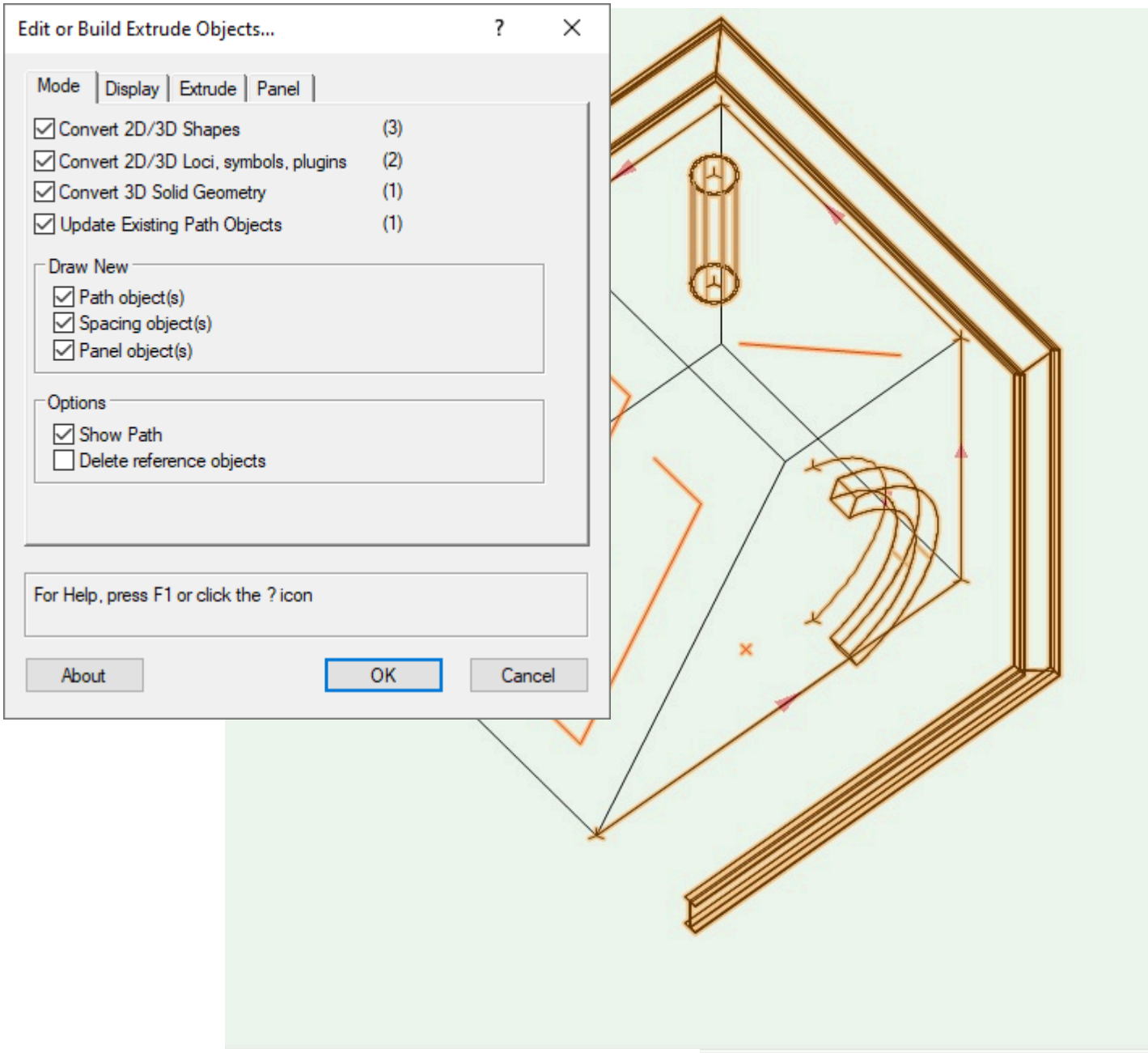
Valid shapes include line, rectangle, circle, oval, arc, 2D polygon, polyline, nurbs curve and 3D polygon.

2D/3D loci are also allowed.



A right click menu is available to invoke editing.

All invalid objects are deselected with a warning message "Invalid objects deselected"



Conversion to Extrude Path plugin objects is allowed for:
- **All 2D shapes to Extrude Planar, Linear, Spacing or Panel pio's**
- **2D/3D loci to Extrude Point pio's**
- **3D polygons/solid objects to Extrude Planar pio's**
- **3D nurbs curves to Extrude path 3D pio's**

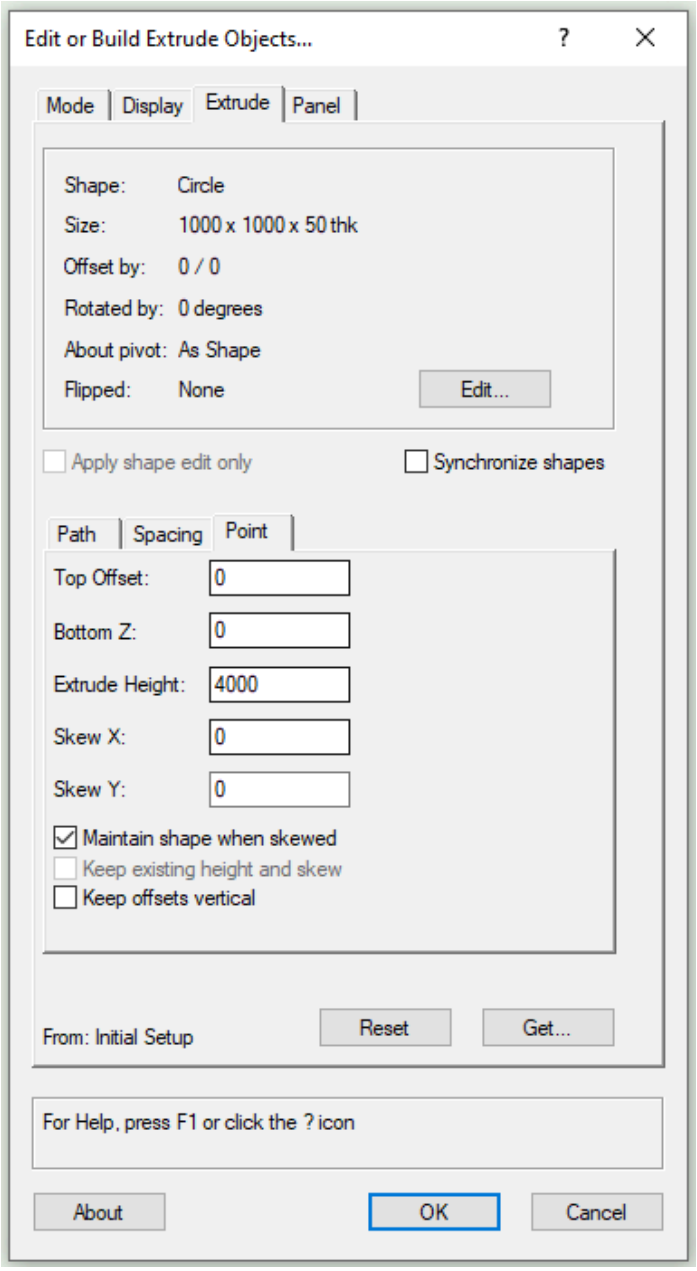
The number of valid selected objects is shown in brackets.

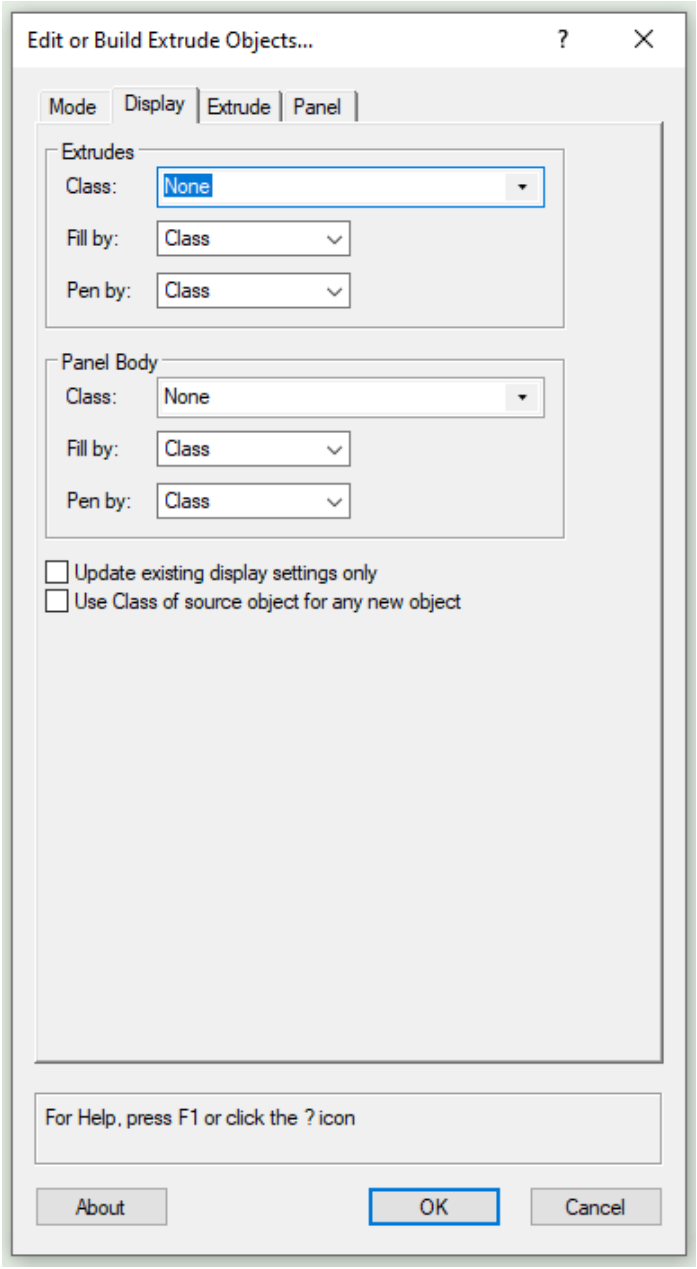
All existing Extrude path plugin objects can also be updated.

For conversion to new objects, options are available for Extrude Path Planar, Spacing and Panel pio creation.

Other options allow deletion of selected reference objects and use active document class when new Extrude Path plugins are created as well as setting the path display.

The Edit button displays the standard shape editing dialog - see "Edit Shape" details earlier.





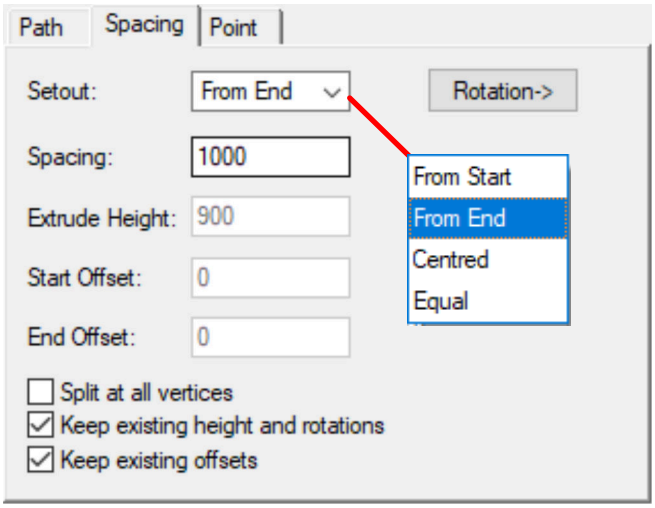
"Apply shape edit only" ignores any changes to the path,spacing or point parameters for existing selected extrude type plugins

"Synchronize shapes" uses a common shape edit over all extrude type plugins

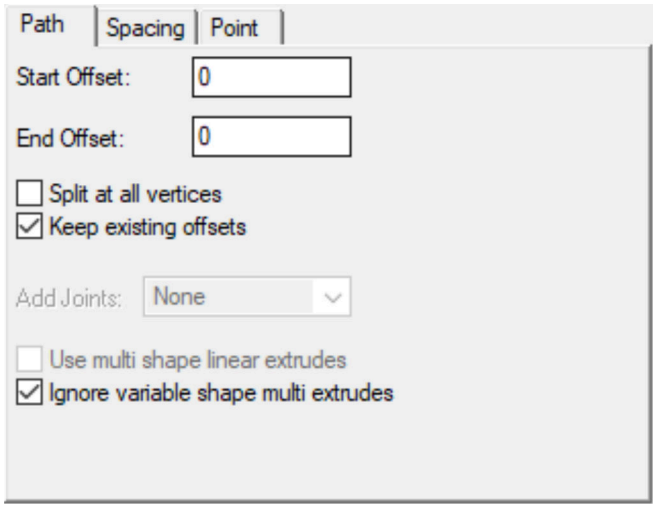
"Update existing display settings only" applies new display settings only

"Use Class of source object for any new object" uses class settings of any source object for newly created extrude type plugins

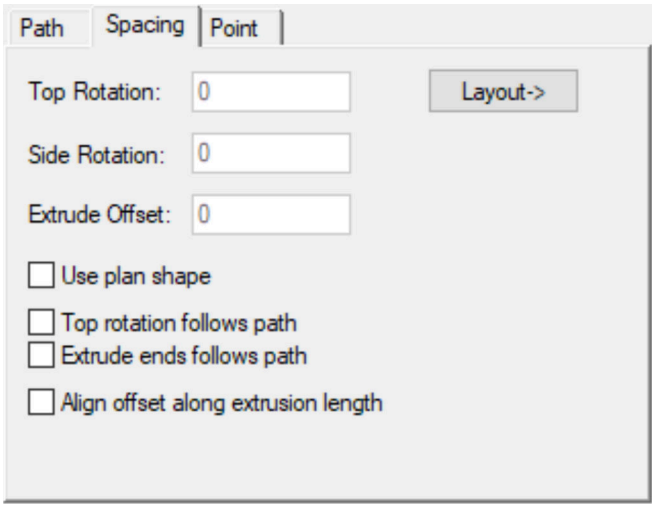
Spacing Layout



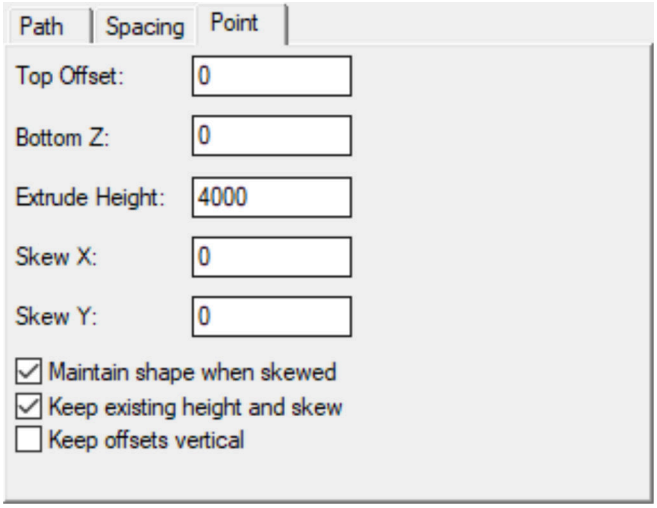
Path



Spacing Rotation

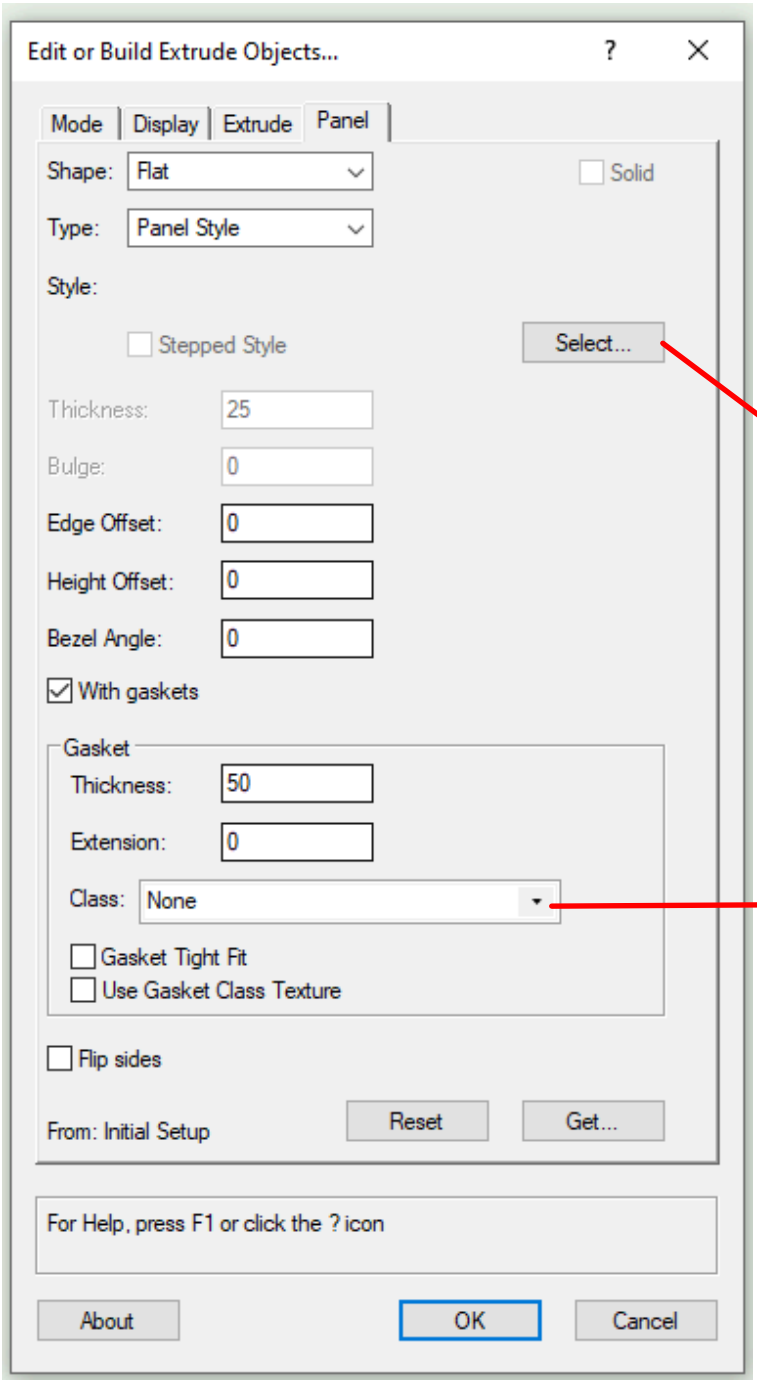


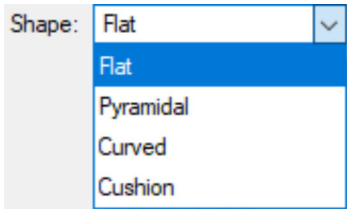
Point

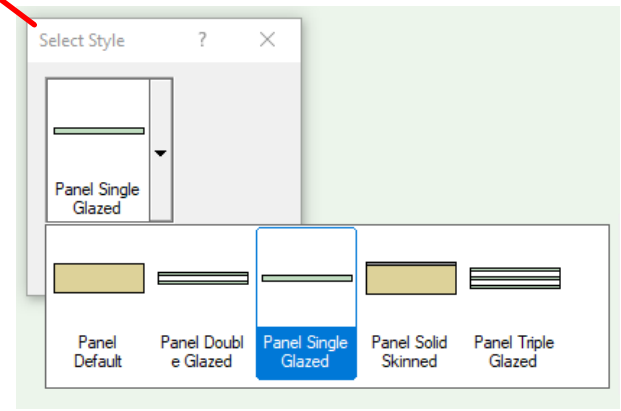


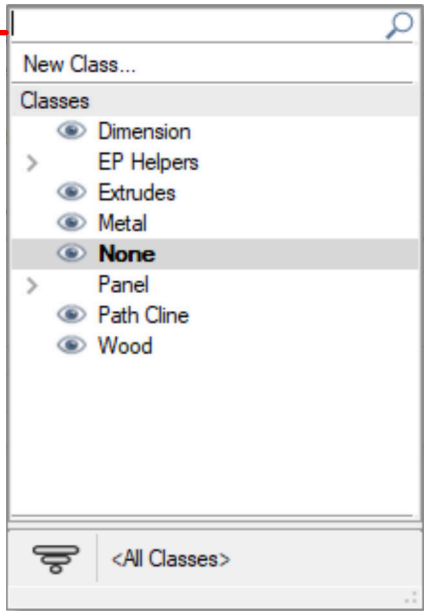
Dialog controls relate to respective Extrude path plugins

Keep existing options are only active when Extrude path plugins are selected.



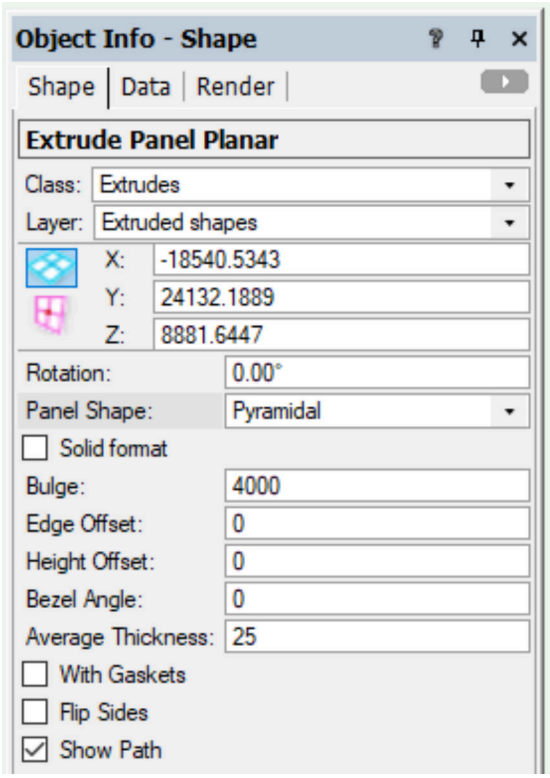


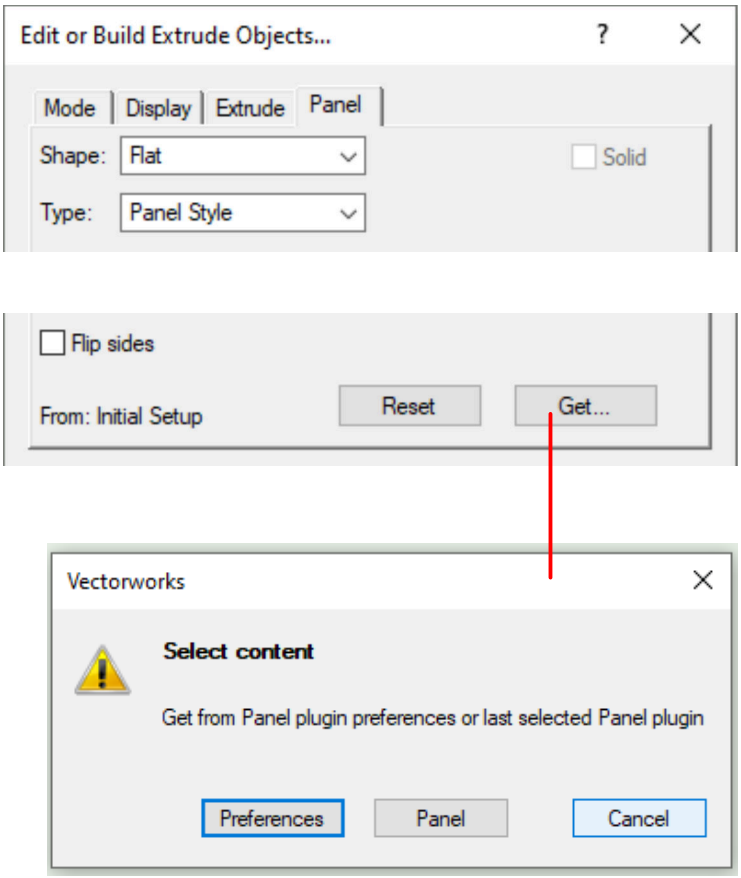




Dialog controls relate to Extrude Panel Planar plugin. Options are greyed when not applicable to current Shape, Type, Style or With gaskets

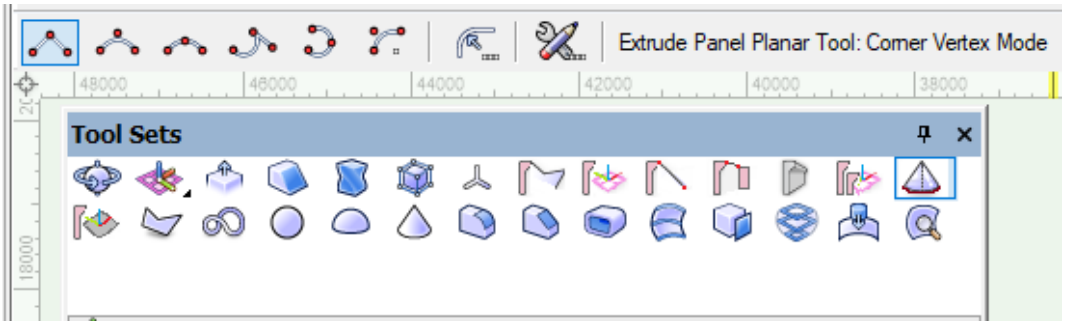
See earlier for description of Extrude Panel Planar plugin options



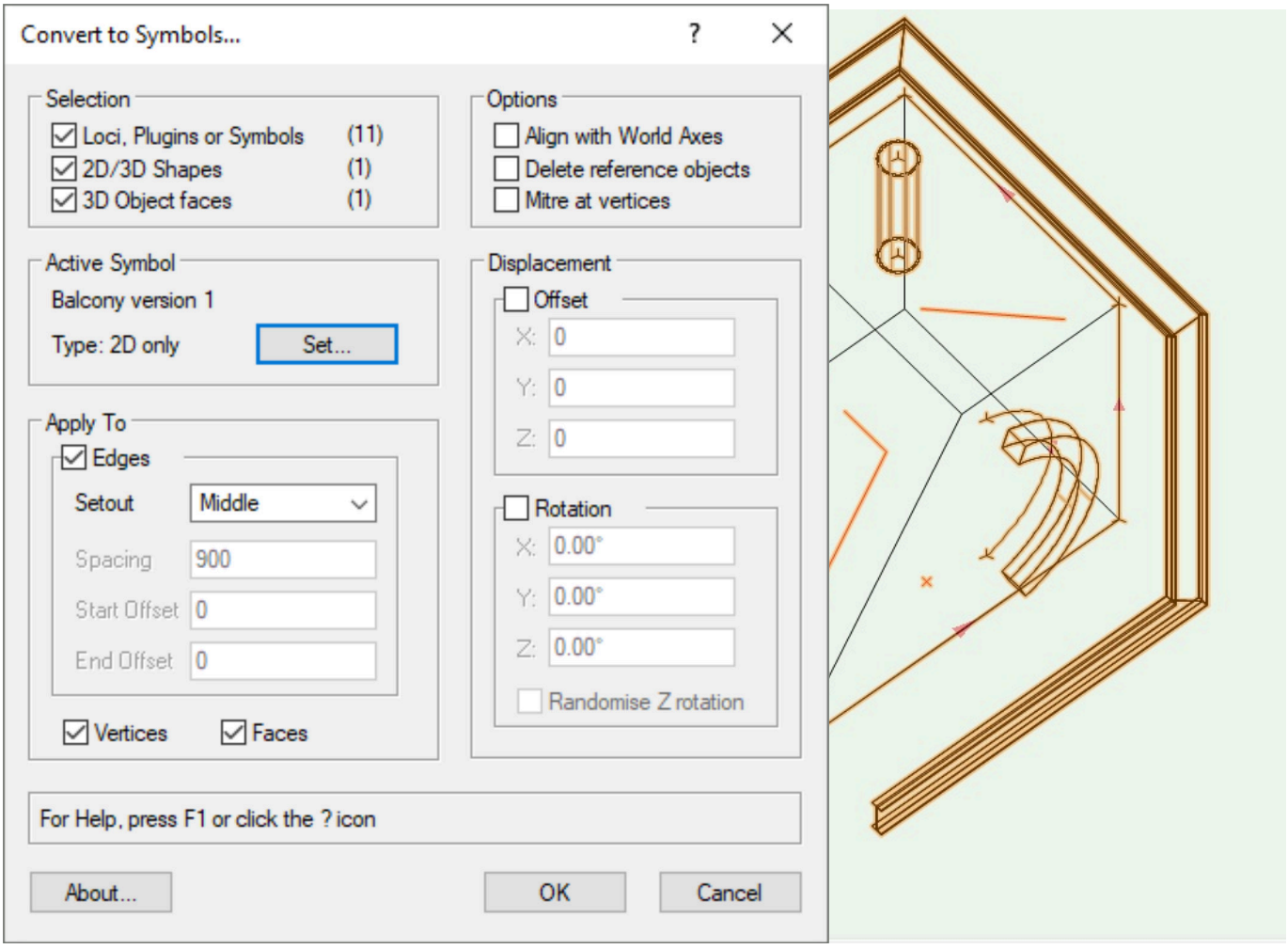


Last selected Panel plugin

Panel plugin current preferences

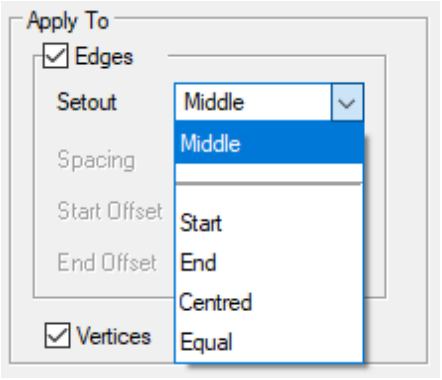


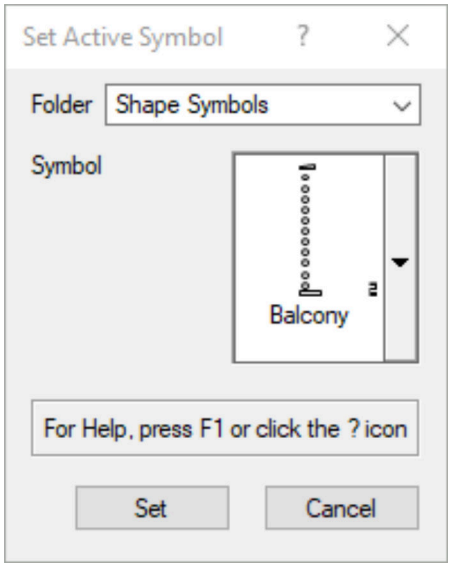
Settings in the Edit or Build Extrude PIO's dialog can be set from either the last selected plugin type or the current default preferences for an extrude type plugin.



Conversion to Symbols is allowed for:
- **All 2D shapes, 2D/3D loci and symbols**
- **3D face(s), nurbs curves/surfaces or solid objects**

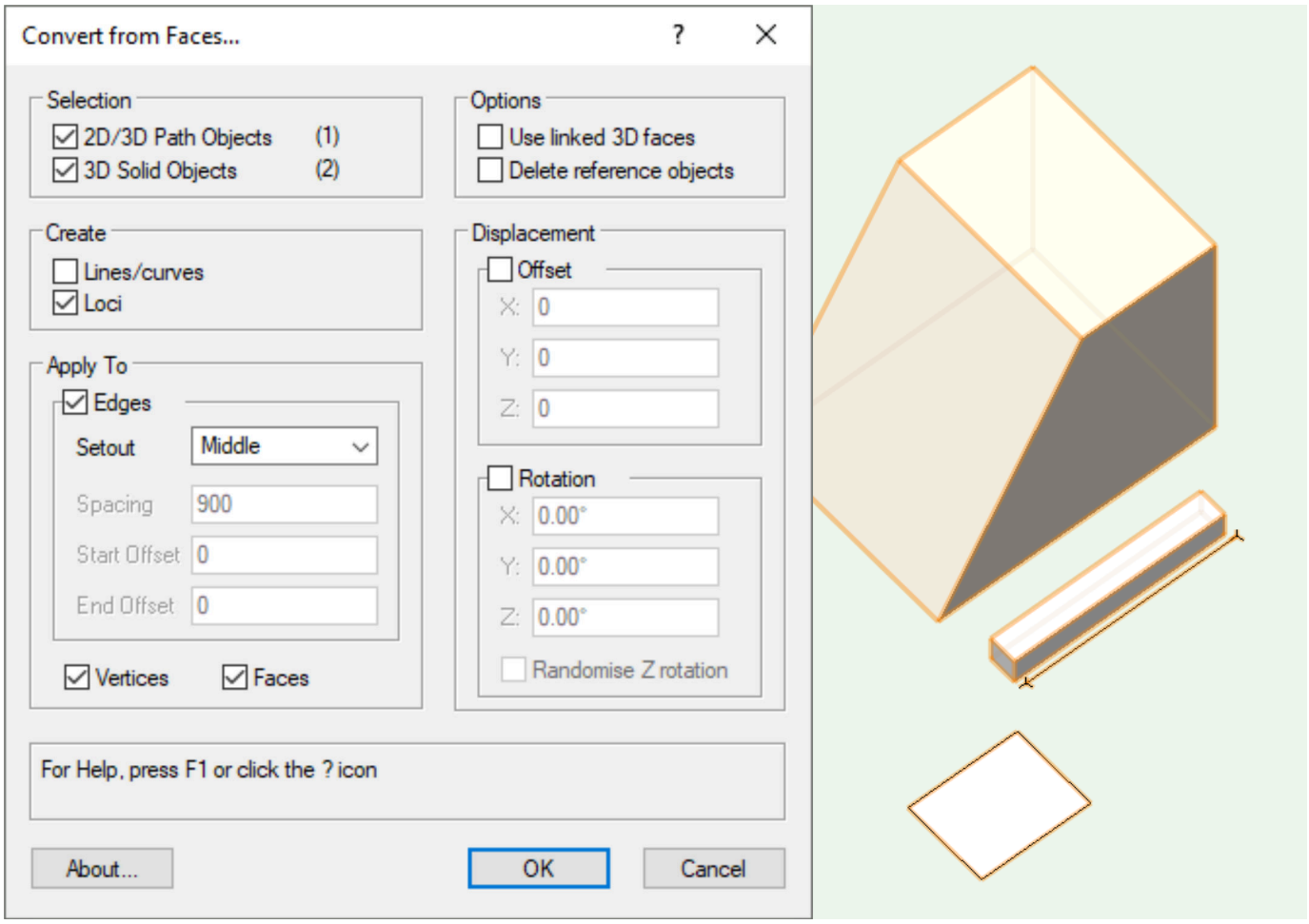
The number of valid selected objects is shown in brackets.
Symbol(s) must already exist in the current file.





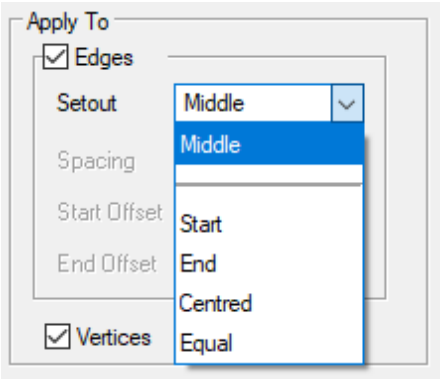
Symbol placement can be setout along edges, at 2D/3D vertices or at the centre of faces and be displaced by an offset or additionally rotated.

Edge setout can be from path start, end, from centre or equally spaced. Mitre at vertices will take account of the angle of the incoming and outgoing edges connected to a vertex.



Conversion from Faces is allowed for:
- **All 2D shapes**
- **3D face(s), nurbs curves/surfaces or solid objects**

The number of valid selected objects is shown in brackets.

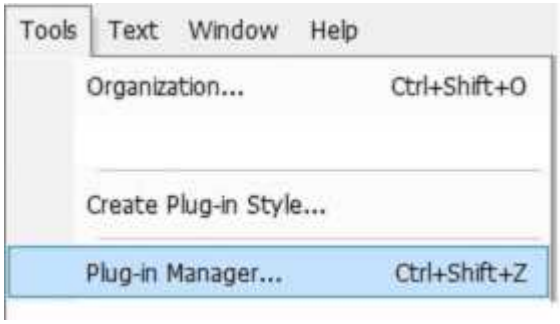


Create lines/curves option converts valid object edges to individual lines/curves and can take account of linked/grouped 3D faces.

Create loci option converts valid objects to individual 2D loci and can take account of linked/grouped 3D faces.

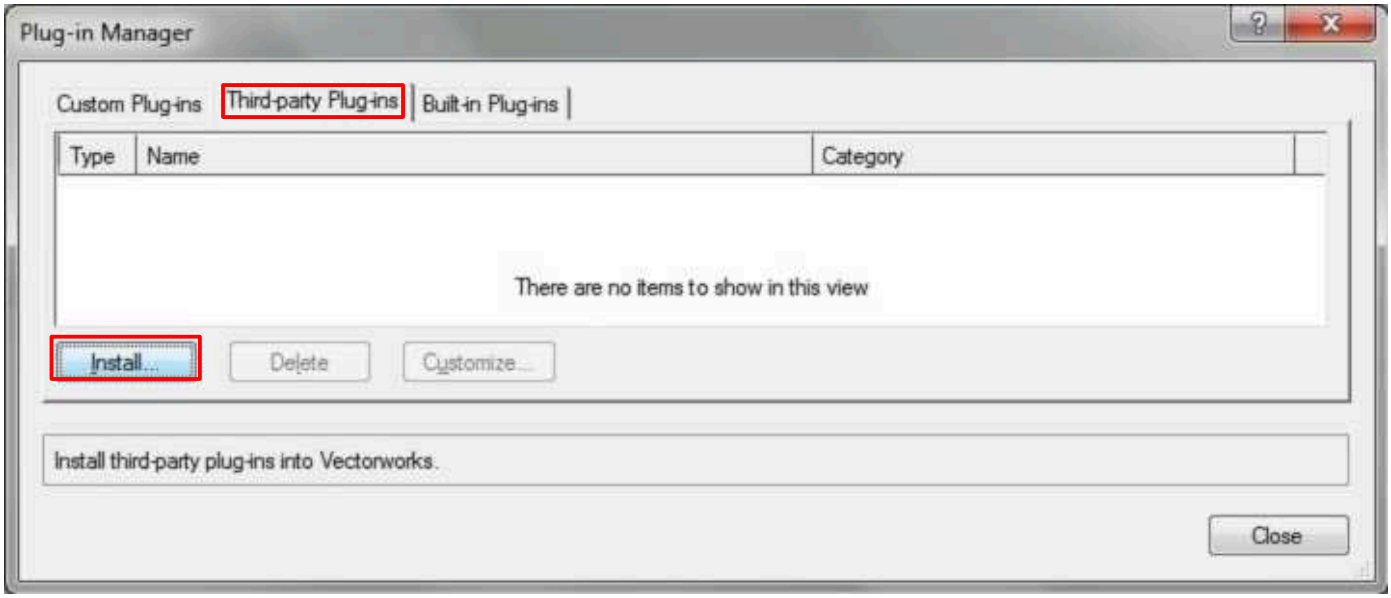
Loci placement can be setout along edges, at 2D/3D vertices or at the centre of faces and be displaced by an offset or additionally rotated.

Edge setout can be from path start, end, from centre or equally spaced.

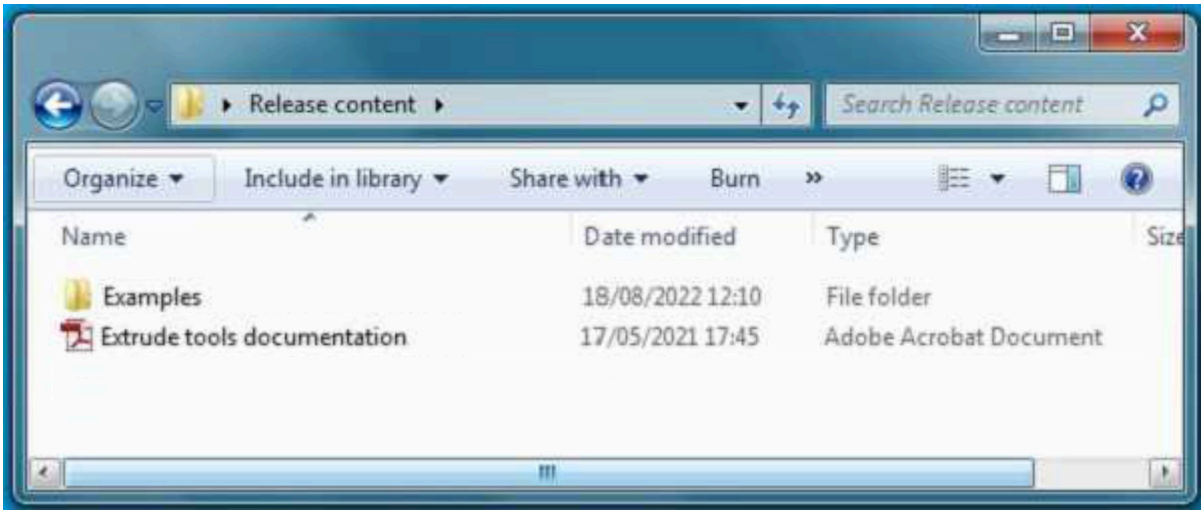


To install Extrude Path plugins, select menu command "Plugin Manager..." from banner menu option "Tools".

Activate "Third Party Plug-Ins" tab, click "Install" button and select downloaded zip file "Extrude Tools install <release>" and open.

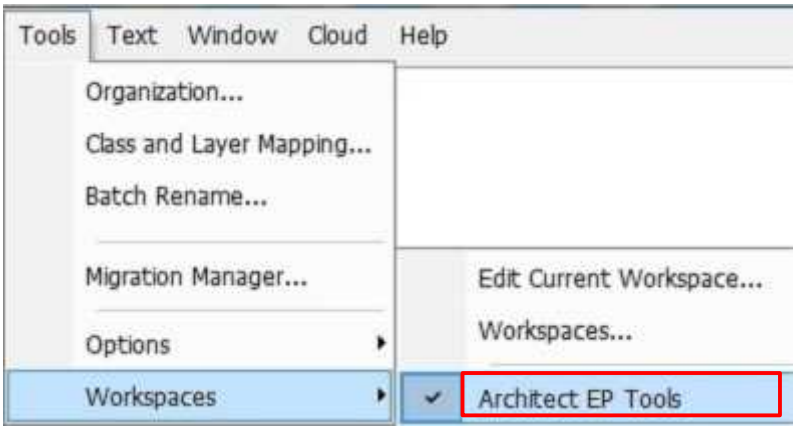


Unzip "Extrude tools content <release>" to a preferred location to access documentation and examples on how to use tools including marionette examples.

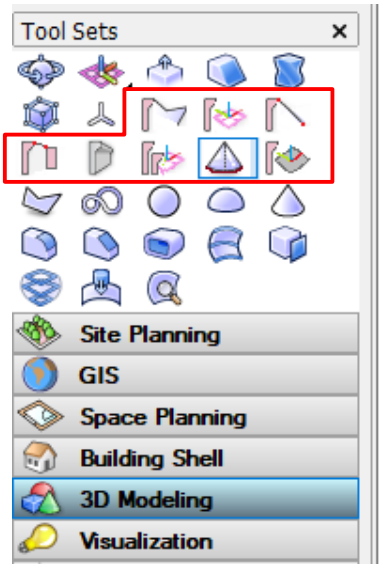


Open "Extrude tools documentation" PDF file and browse content for a description how tools work.

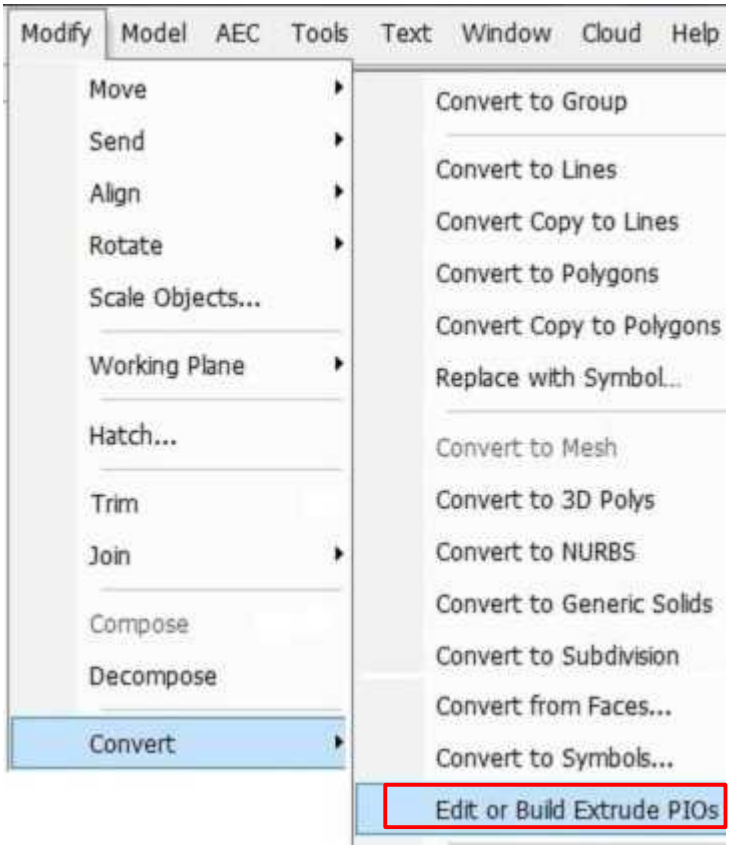
Select the Extrude Path Tools workspace to setup environment. See later to edit user defined workspace.



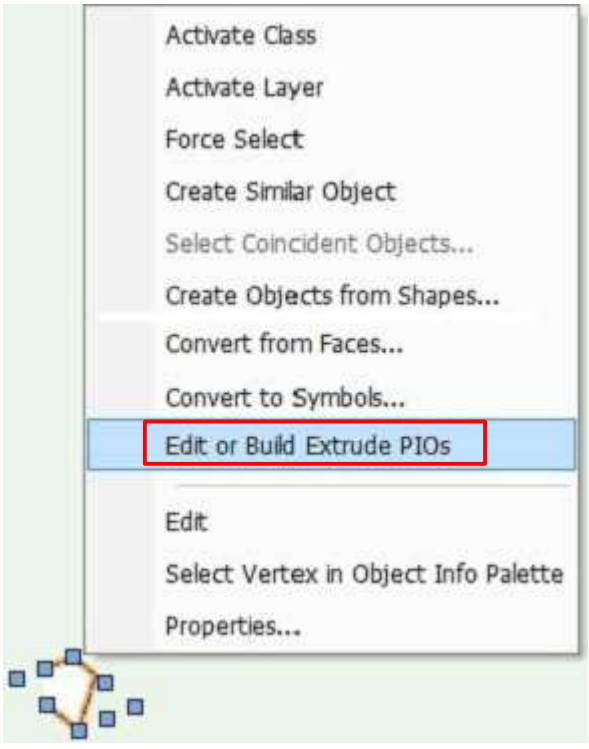
3D Modelling tool palette



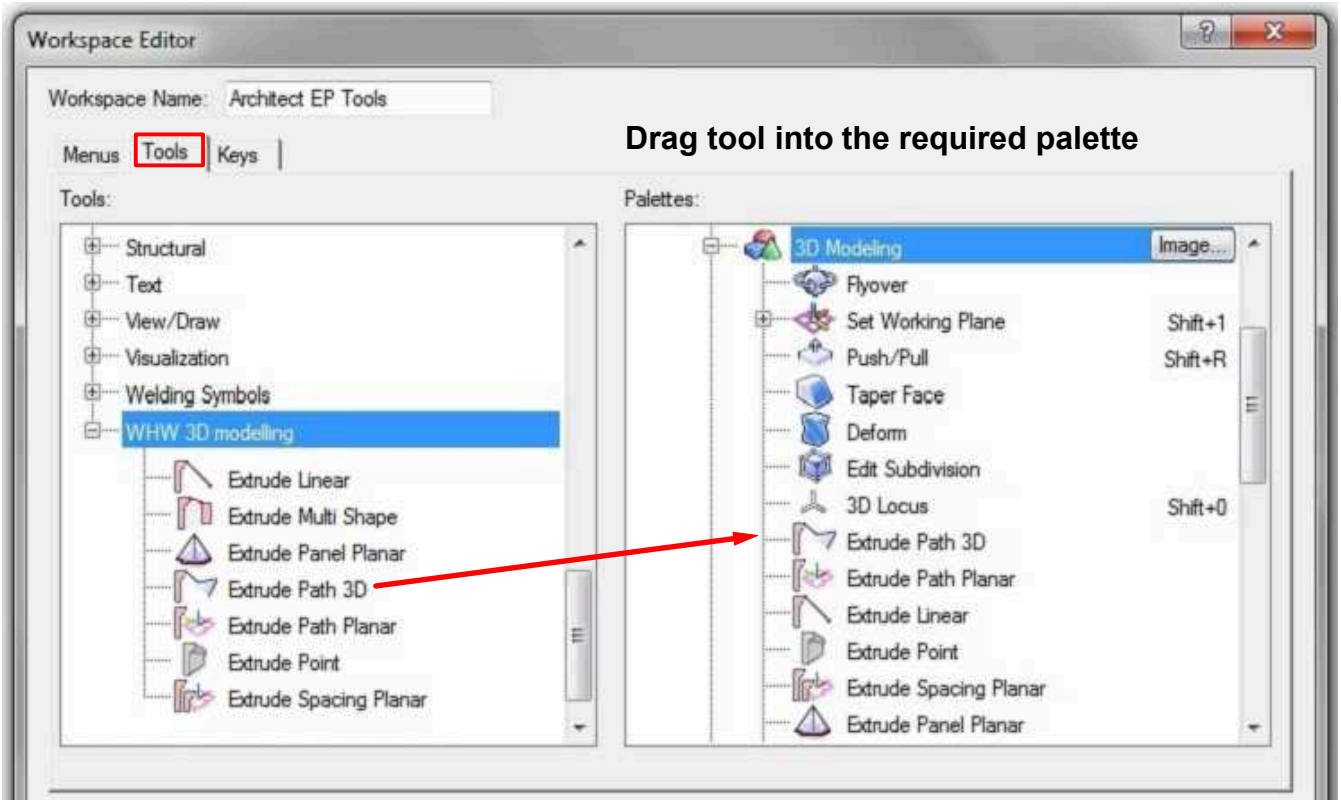
Convert menu command

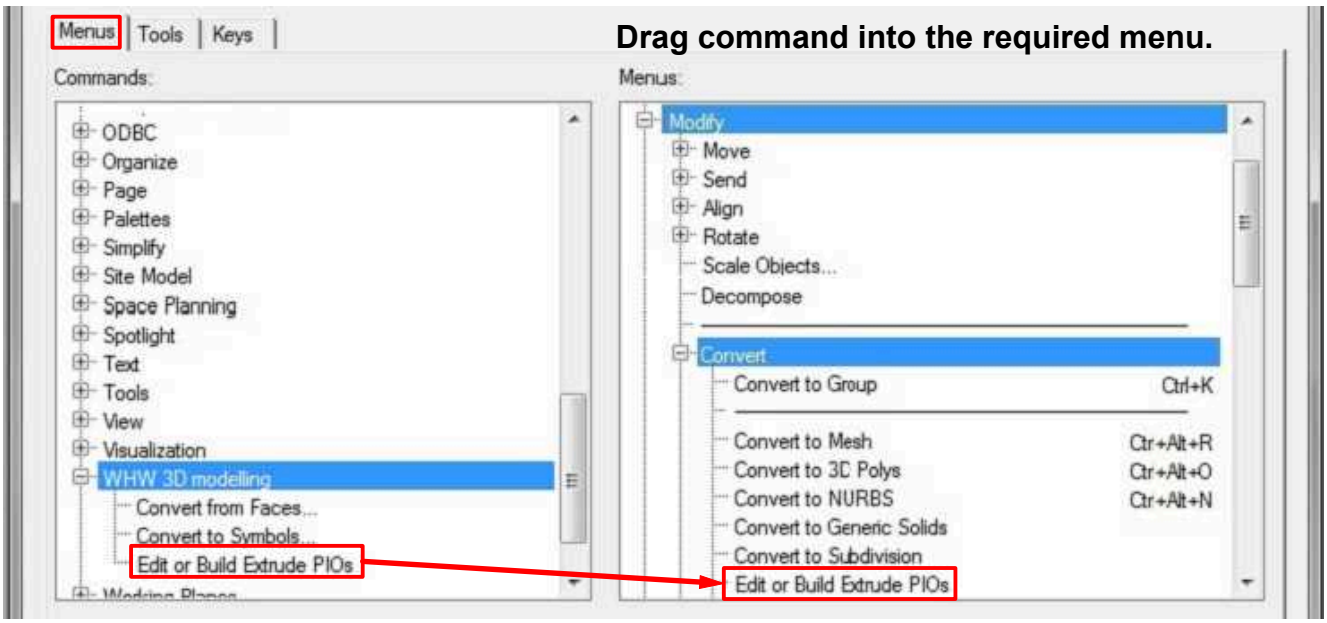


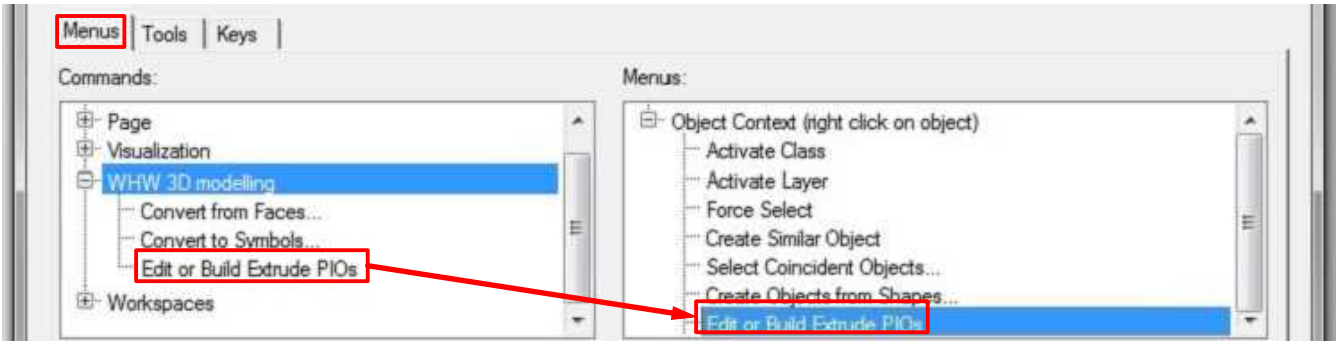
Object Context menu command



To add Extrude Path Tools to an existing workspace, select the required workspace and "Edit Workspace"







By default the Extrude tools run in demonstration mode with an expiry date.

To license the tools, email the following:

Vectoworks serial code
Name
Organisation

for example

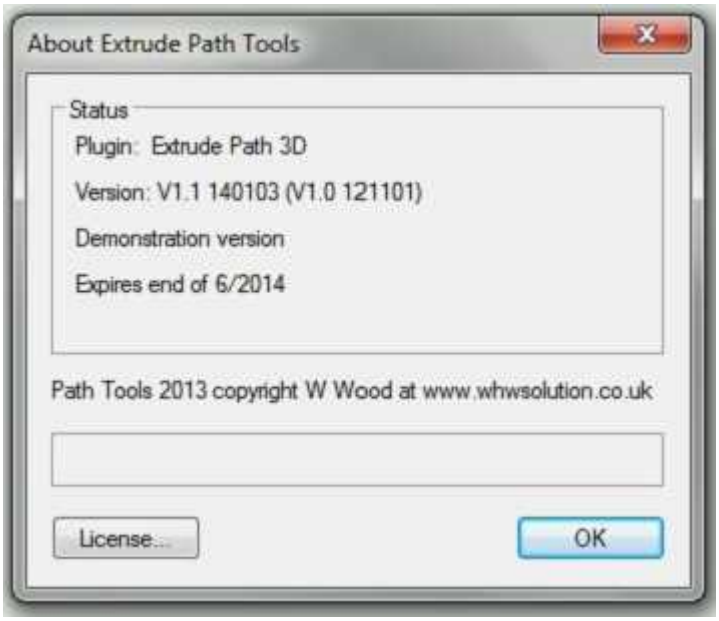
Y5GUD5
Bill Wood
W H Wood Solution

Only last 6 characters of your Vectorworks serial code is needed - see Help>About Vectorworks dialog.

Contact details as below.

On payment for the tools, a text file will be returned which can be selected when the "License..." button is clicked.

This will activate the tools as shown right.



Demonstration version

Licensed version

The release zip file "Extrude Tools install" creates the following:

Folder: Plug-Ins/Extrude tools

Files:
Edit or Build Extrude PlOs....vsm
Convert to Symbols....vsm
Convert from Faces....vsm in folder convertfaces
Extrude Linear.vso
Extrude Multi Shape.vso
Extrude Point.vso
Extrude Panel Planar.vso
Extrude Path 3D.vso
Extrude Path Planar.vso
Extrude Spacing Planar.vso
Extrude Cut Planar.vso
Set 3D Polys Planar.…vsm

Folder: Workspaces

File:
Architect EP Tools.vww

Note:
Library files can be opened directly from
the Resource Manager (Right click menu)

On Windows systems the Vectorworks User path is:
C:\Users\<user>\AppData\Roaming\Nemetschek\VectorWorks\2020

On Macintosh systems, the Vectorworks User path is:
Library/Application Support/Vectorworks/2020/

The release zip file "Extrude Tools content" once unzipped to a user defined folder creates the following:

Files:
Extrude tools documentation.pdf

Folder: Examples

Files:
Extrude tools examples 2020.vwx
EAP report templates.vwx

Note: VWX files may need to be converted to the current Vectorworks version.