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# Sorcerer

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**Advanced Software for Roof Modeling and Estimating**

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## **Tutorial - Creating and Estimating a Tapered Panel**

Suitable for Sorcerer and Roof Wizard

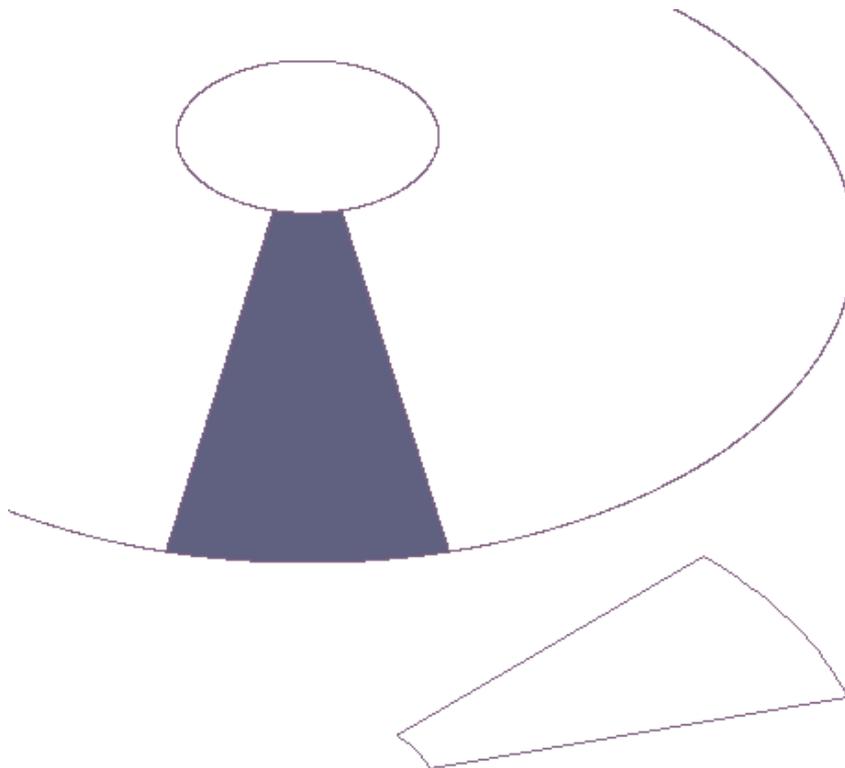
Document Issue 2.0.0 - March 26, 2010

## How to Create Tapered Panels – Method 1

### Introduction

This tutorial will describe the process of creating a working drawing for a tapered panel for a conical or conical section of roof using basic CAD principles. Before you begin, you must have been practicing with the use of some of the regular CAD functions to do this exercise. Also make sure you read the prompts in the prompt area, it is telling you what to do for each command.

The purpose of this tutorial is to produce a work shop drawing of a tapered panel from the basic actual geometry of the roof shape. The similar process can be used to create domed roofs as well.

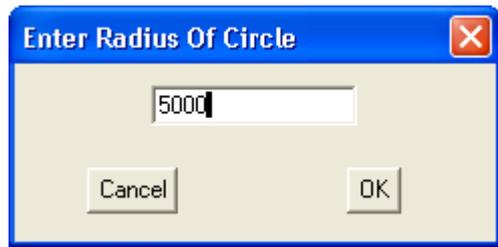


### Create the Roof Geometry

Draw an arc at the height of the upper inside edge of the structure using **CAD > Circle > Insert > Radius=**

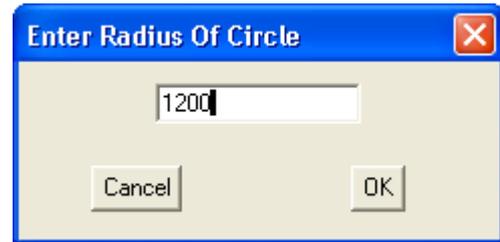


Input the desired radius of the first arc (circle), and select OK.



You will be prompted for the centre point of the arc (circle), for this exercise input 0,0,0. (We are working in all three axis now – X,Y,Z)

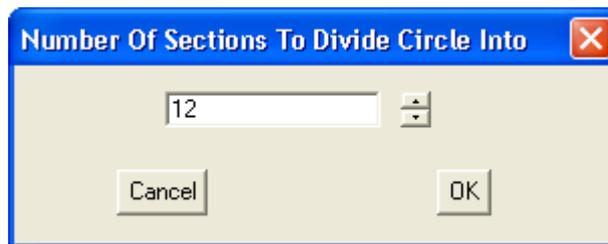
Then draw the second arc (or circle), and select OK.



You will be prompted for the centre point of the arc (circle), for this exercise input 0,0,1200.

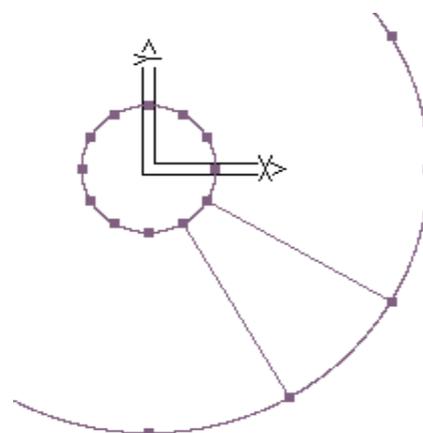


Once both circles have been drawn, divide them into a number of segments that will result in the best shaped panel, I used 12.



### Add Panel Segment

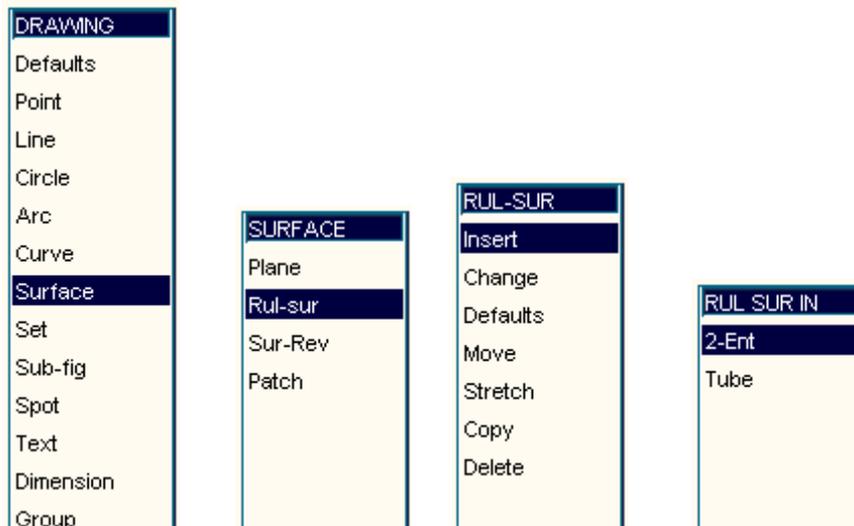
Then using the **CAD > Line > Insert > Free** command, draw in a line between two of the corresponding points on each circle by 'snapping' (middle mouse button) the start and end of the line to the division points of each circle.



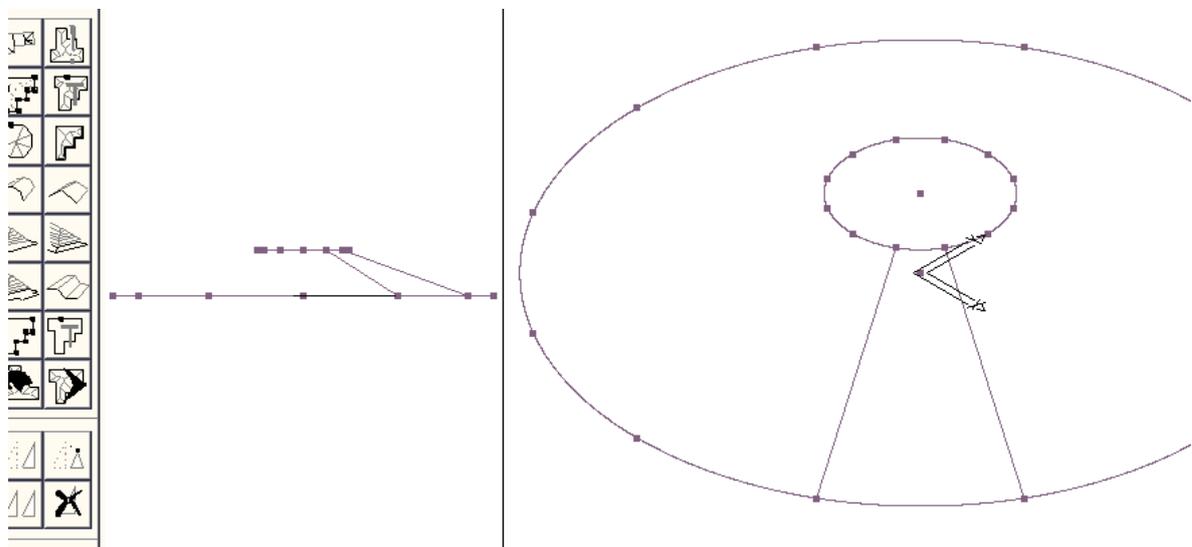
You will end up with something like the drawing shown above.

### Add Ruled Surface

You now have the right geometry to create the standing seam panel shape. You must now add a surface to the boundary lines and arcs from which the template for the panel will be generated. This surface is called a ruled surface. Use **CAD > Surface > Rul-sur > Insert > 2 Ent** (as in two entities), and select the two arcs.

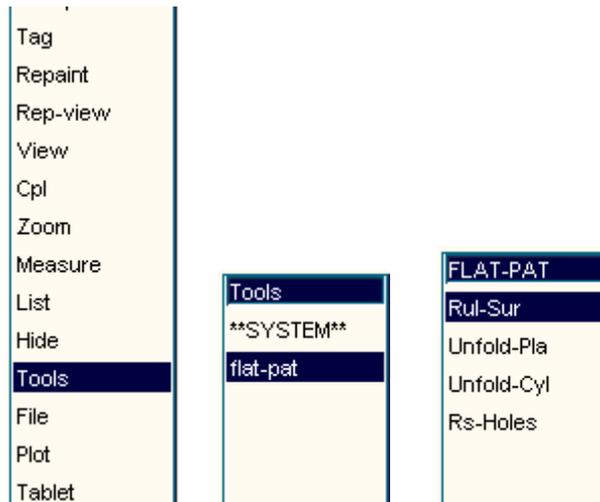


Your job will now look something like the one below in front elevation and ISO views.



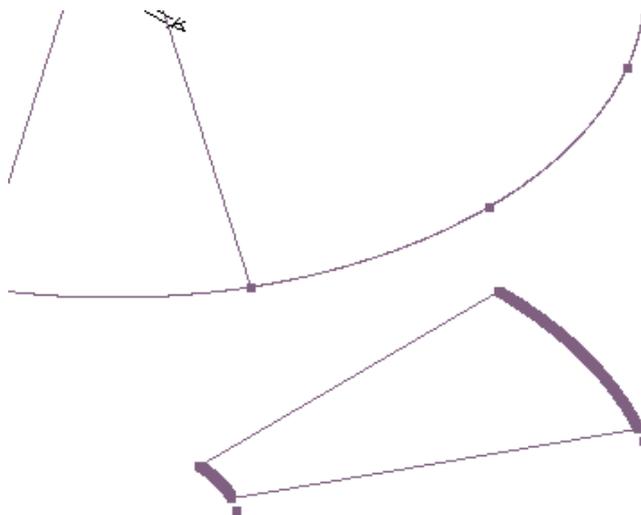
### Flat Pattern Development of Panel

Now you must project the ruled surface onto the flat. We use the command **CAD > Tools > flat-pat** to develop that shape.

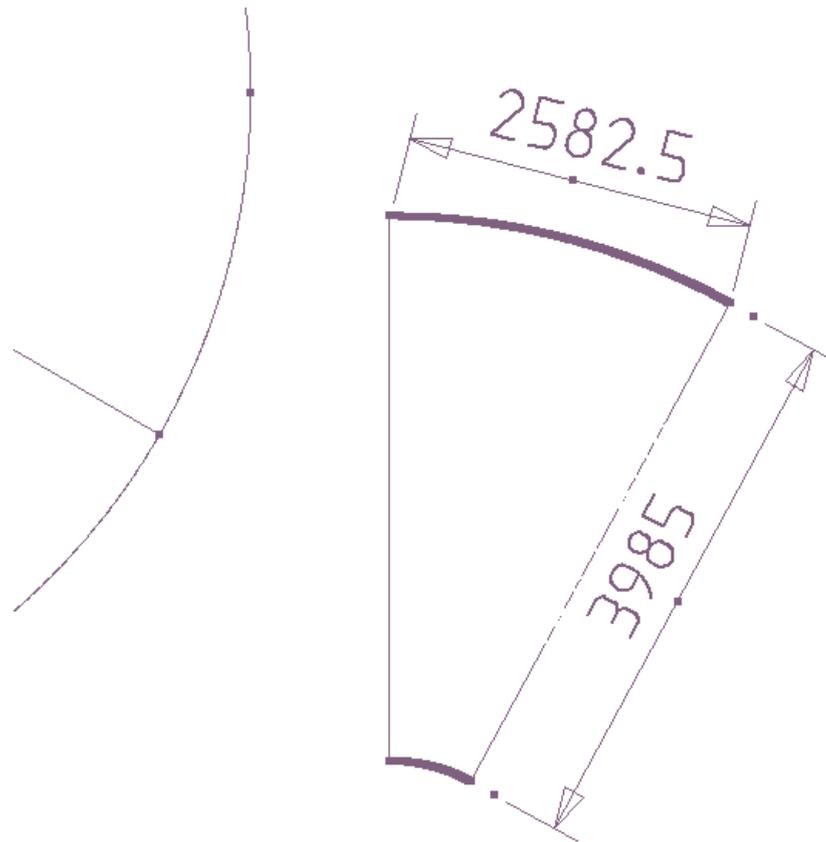


Select the command as shown above and then select **Rul-Sur** (as in the ruled surface you just made) and then select one of the lines as prompted in the prompt area.

Select the line (it really doesn't matter which one) and then click a point somewhere outside the circle (just to keep it clear of the model) and insert the developed pattern.



Now go back to your plan view and dimension the developed pattern using **CAD > Dimension > Insert** to the requirements of your metal shop. You might also add folding offsets to create the standing seam or whatever is required, such as an allowance for a Pittsburgh seam for example.



You may add as much or as little detail as you like to the drawing, but you now have everything you need to create an accurate engineering drawing of the shape of the tapered panel.

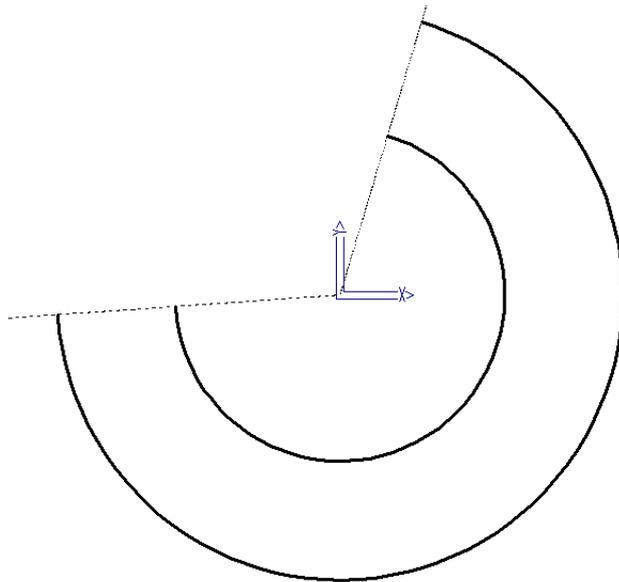
## How to Create Tapered Panels – Method 2

This tutorial will describe the process of creating a working drawing for a tapered panel for a conical or conical section of roof using basic CAD principles and the Estimate > Tapered Panels > Generate function .

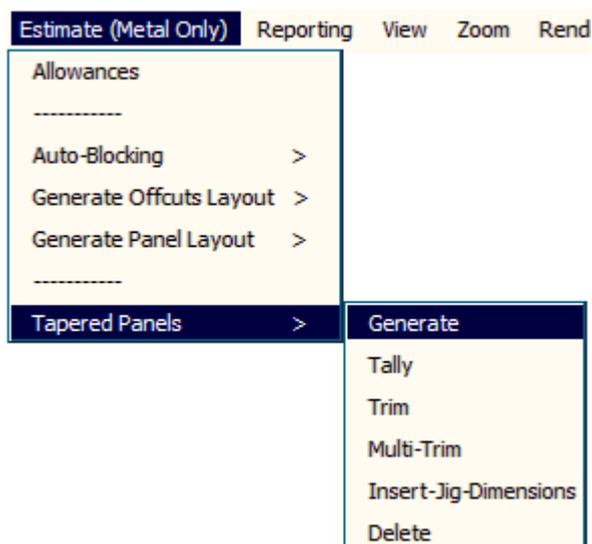
Before you begin, you must have been practicing with the use of some of the regular CAD functions to do this exercise. Also make sure you read the prompts in the prompt area, it is telling you what to do for each command.

### Exercise One

First create the two arcs as described above.



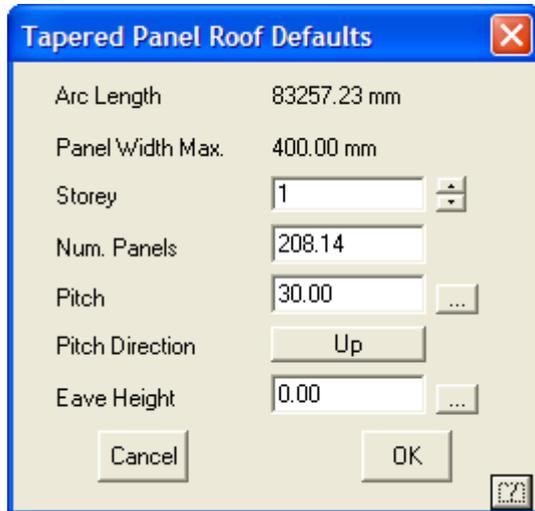
Then select the option (available from v5.6 onwards) **Estimate > Tapered Panels > Generate**.



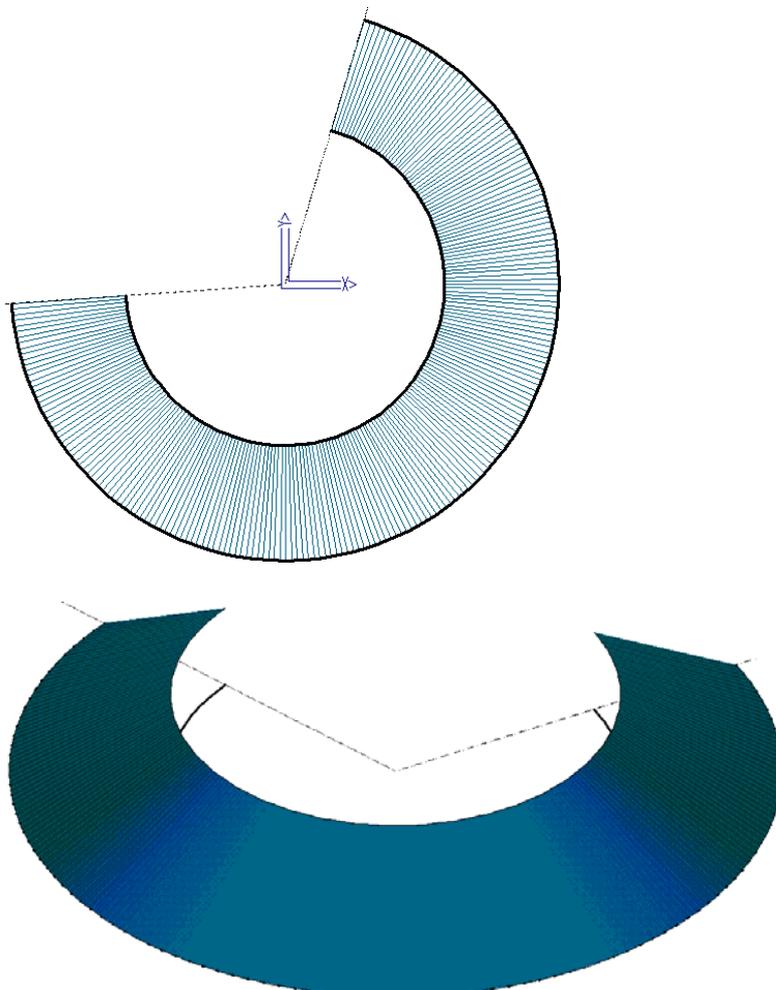
You will be prompted to select the metal panel to be used. Since we're typically using this process to fabricate the panels using the standing seam profile that will be fabricated as a

tapered standing seam, then you would typically select a standing seam profile from your list of profiles. This will be defined under **Def-Materials > Metal Panels**.

The selected profile parameters will be displayed. Select OK. You are then prompted to select the arc defining the maximum panel width, near the start end for laying the panels. The Tapered Panel Defaults dialog is then displayed.



Define the parameters as required and select OK, then you will be prompted to locate the constraining entities. Once selected, right click and the panels are drawn.

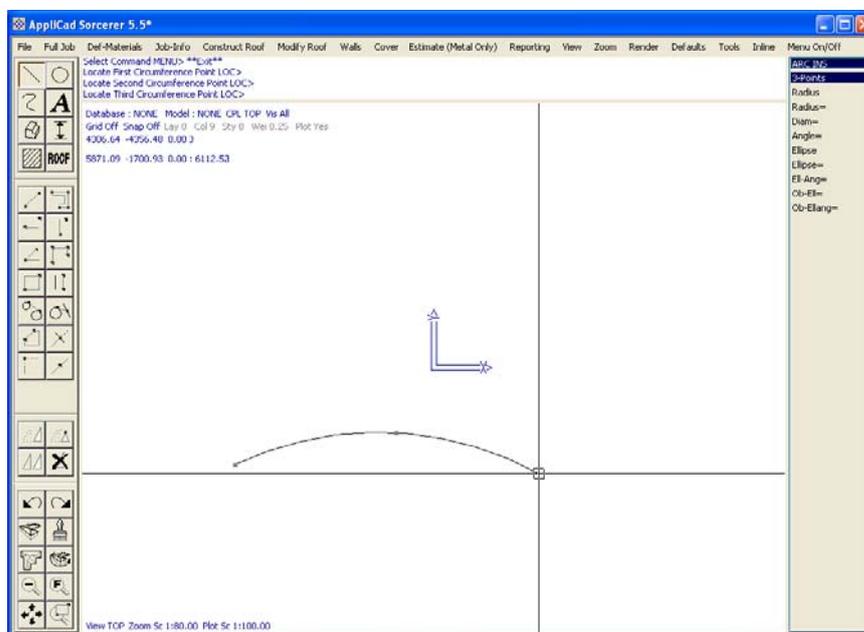


**Tally Panels** then generates the cutting list. For more information on this process, refer to the Reference Manual.

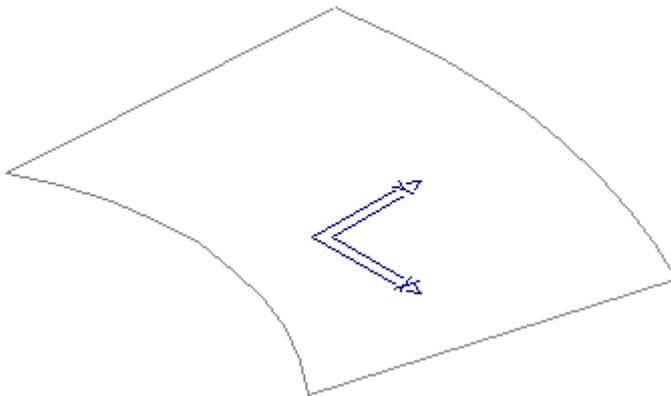
## Exercise Two

Prior to modelling any Tapered Panel roofing, we need to define the geometry that is used to place the panels upon. AppliCad have developed the code so that the geometry can be maintained in 2D, whilst the panels will be drawn accurately in 3D. The reasoning for this is that the geometry is generally provided from an architectural CAD model and is more often than provided in 2D.

As an example, we have used the CAD tools within the AppliCad CAD modelling environment to draw a 2D roof panel example. As is relatively obvious to a roofer, a Tapered Panel will generally be defined about a circular curved eave line. So, we model this circular curve using the **CAD > Arc > Insert > 3-Points** command. We could use any of the other arc commands to do this but this will suffice for now:



We then define the top of the roof panel as either a line segment or another arc and then join the sides using the **CAD > Line > Insert > Free** command, being sure to “snap” to the existing points at the corners using the centre mouse button. When viewed in 3D, the model looks as follows:

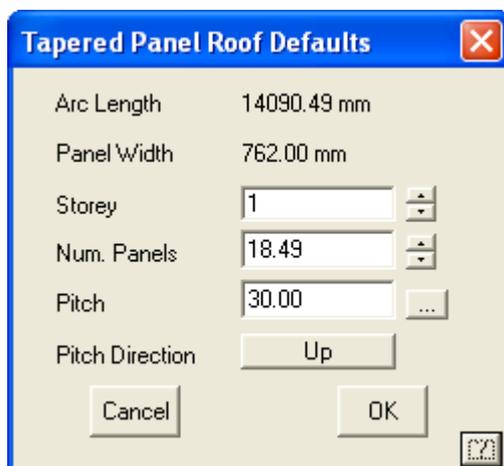


Once the graphics is defined, it is recommended to save the model away. This model can then be re-opened to provide other tapered model options depending on different roof types etc.

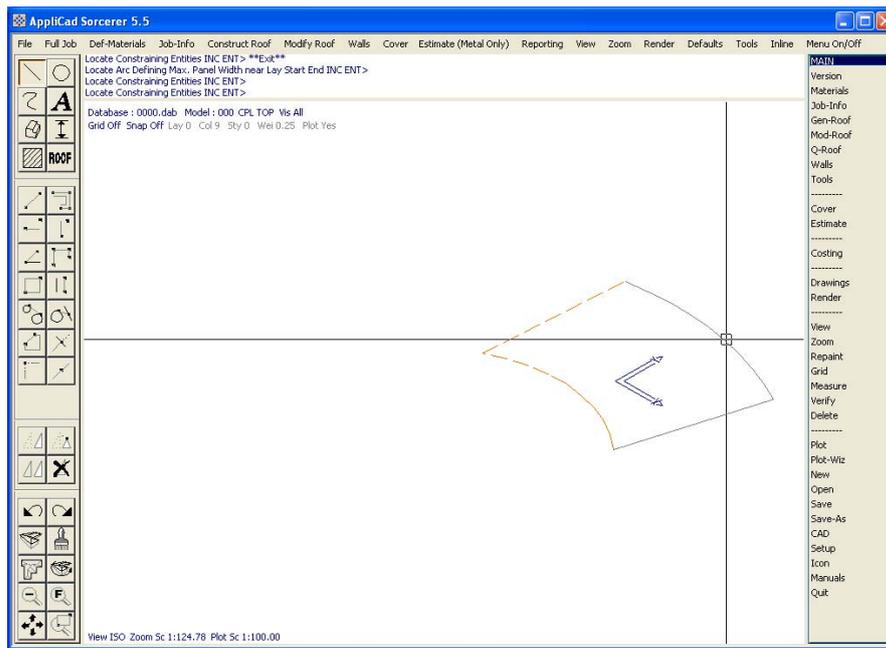
### Creating the Panels

Once the geometry has been created, we define the Tapered Panels using the **Estimate > Tapered-Panels > Generate** command. When we select this, we are asked to locate the Default Roof Material that we are going to use to cover the roof. This would generally be a “Tapered Panel” record that we have pre-created within the **Def-Materials > Metal-Panels** dialog.

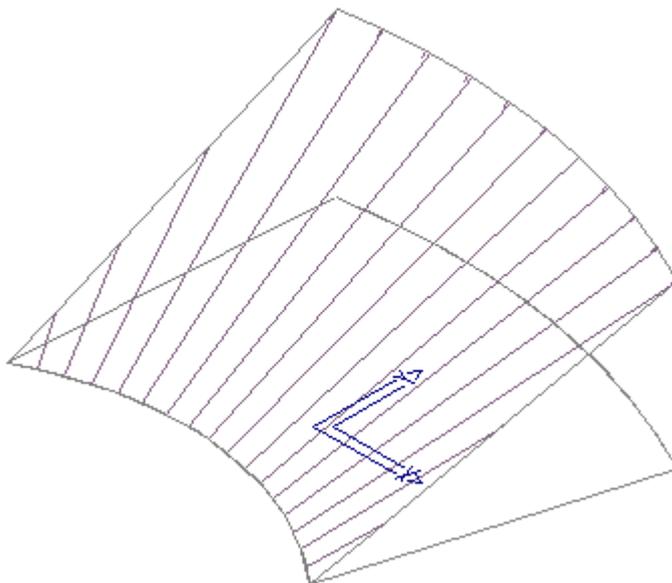
We select the Tapered Panel that we wish to use and then the software asks us to locate the Arc defining the Tapered Panels, near the Lay Start end. This is the direction in which the Tapered Panels will be laid/generated. When we do so, we are then presented with a dialog box indicating the calculated Arc Length, Panel Width, Number of Panels, Pitch and Pitch Direction:



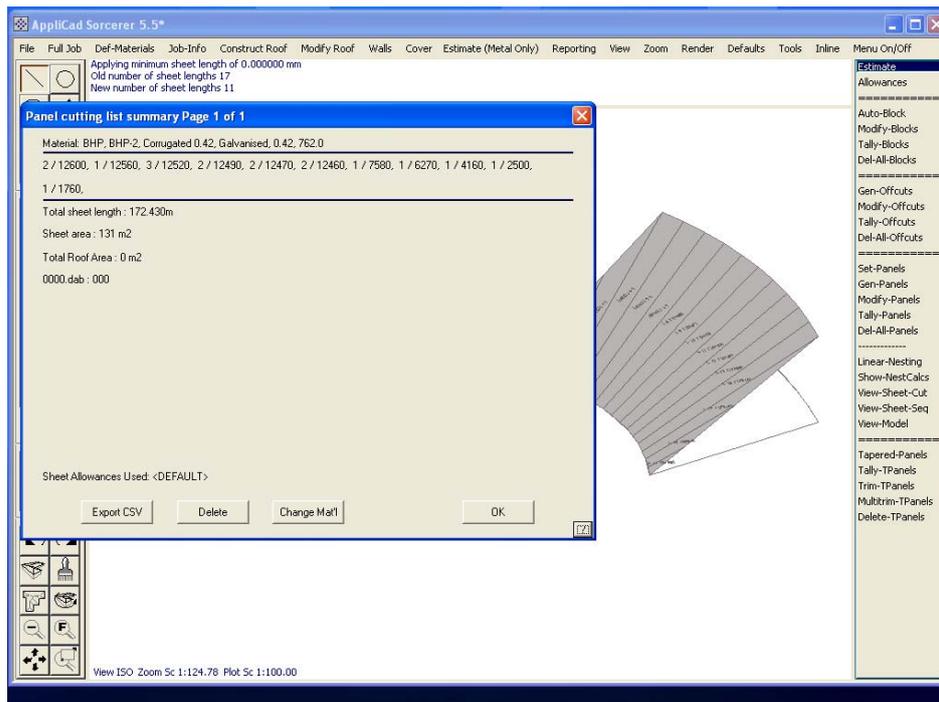
Once modified, the user is then asked to identify the entities that constrain the panels. These are essentially the remaining entities in defining the panel extents and should be located in order:



Once the constraining entities have been defined, the panels are drawn as per the shape of the panel and the information specified in the previous dialog. An example of panels being drawn on our constructed geometry is provided below:

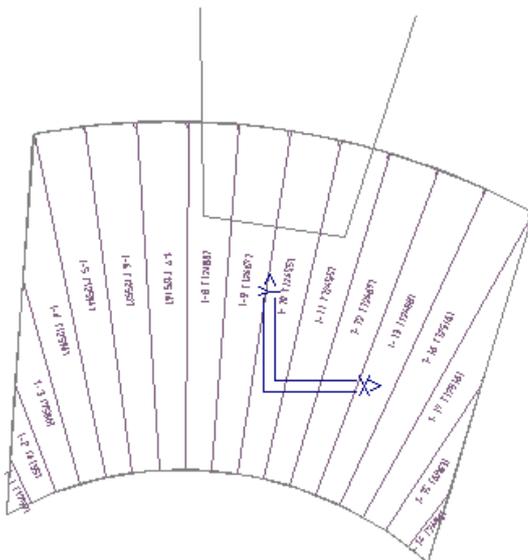


Once these have been defined, the Panels can be Talled using the **Estimate > Tapered-Panels > Tally** command. An example of this is as below:

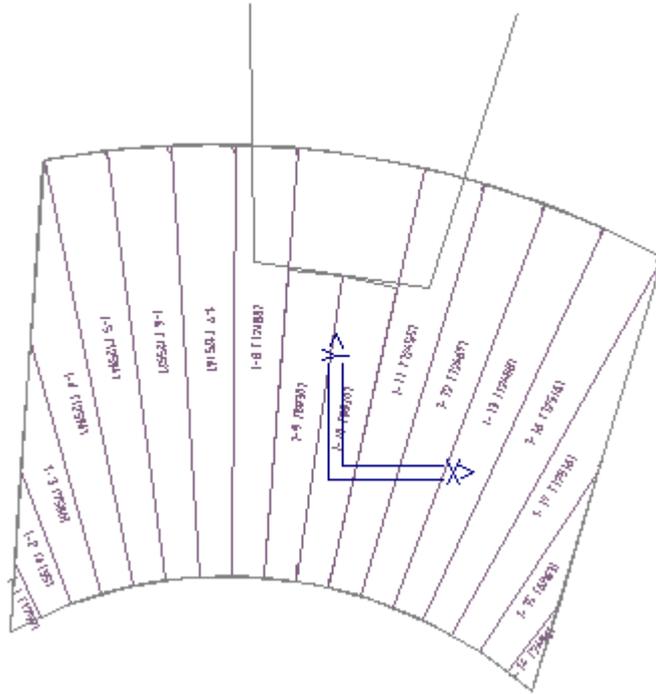


### Trimming of Panels

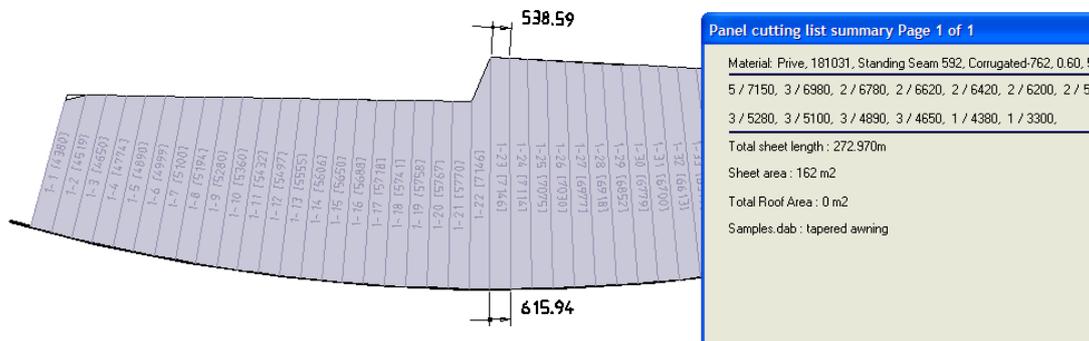
If a Tapered Panel needs to be trimmed, the **Estimate > Tapered-Panels > Trim** command can be utilised. As an example, we have provided some graphics that may be required to have the panels trimmed to. In this example, we would normally trim the 2 centre panels, leaving the 2 outside panels at their maximum lengths, as part of the panels actually extends to these lengths:



When selecting the command, we simply select the panel to trim and then select the location to trim the panel to. In this instance, we can simply snap using the centre mouse button or just use the left mouse button. Re-Tallying provides the new cut lengths prior to costing:



The geometry that constrains the tapered panels is not restricted to arcs. See example below:



This may take a little practice, but persist with it and you will get the benefits you expect from the automated process and the reports that result.

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