

Revit Architecture: Parametric Families

In this White Paper we will create a Parametric Rafter Family.

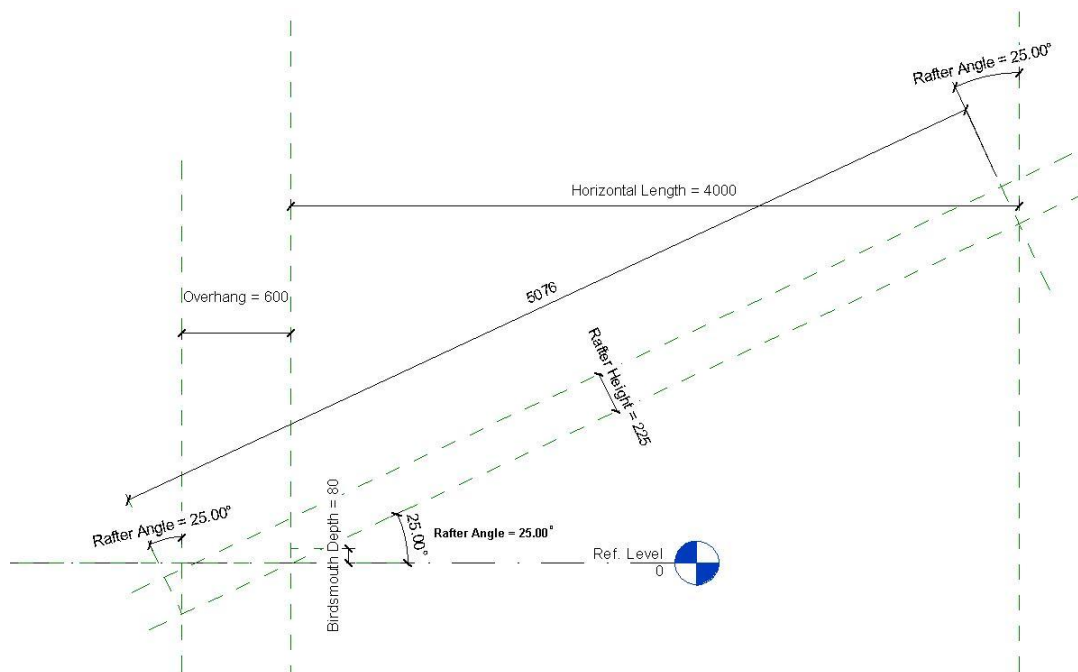
All Revit Users

Creating a Parametric Roof Rafter

Parametric families are intelligent. The parametric engine in Revit Architecture allows you to flex (change the proportions) of the family you have created. This process is demonstrated in the following example of a Parametric Roof Rafter. In my last White Paper I outlined the steps to create an In Place Roof Rafter. The limitations to this approach will become apparent when we have completed the Parametric Roof Rafter.

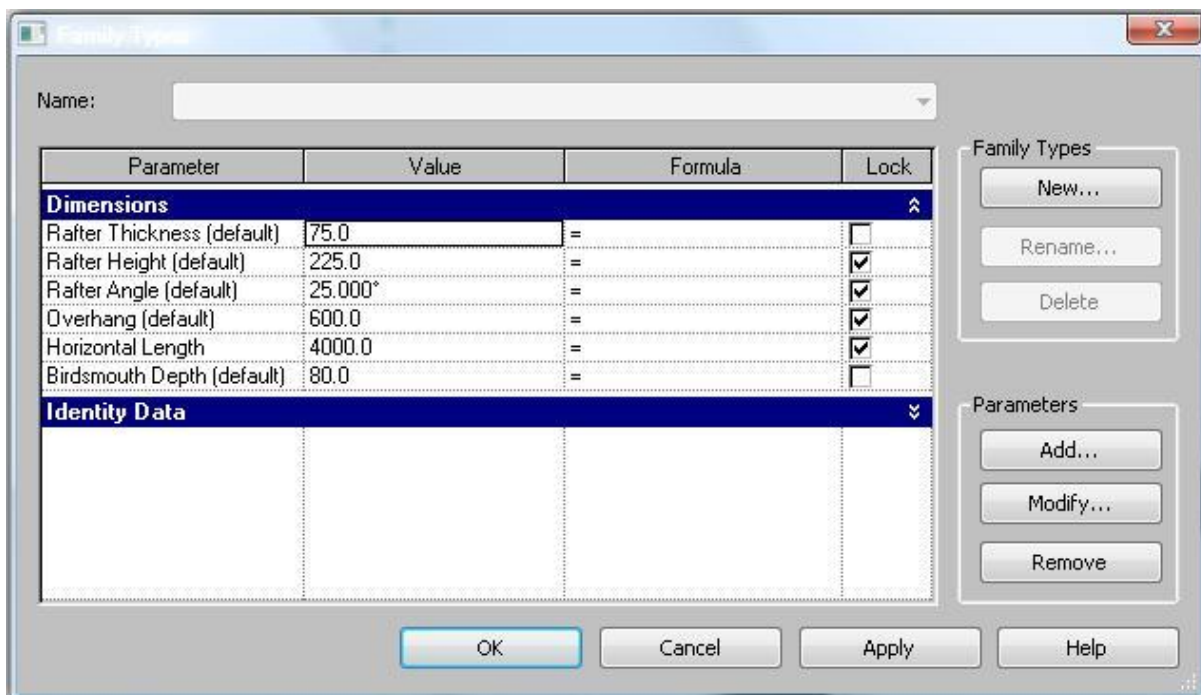
Creating a parametric roof rafter is relatively straightforward. The following example was created using the Family Editor and was based on the “Generic Model Template”.

Step 1: Set up Reference Planes to control the geometry of the rafter.



On screen the reference planes are the green dashed lines. These form the skeleton that the geometry is fixed to.

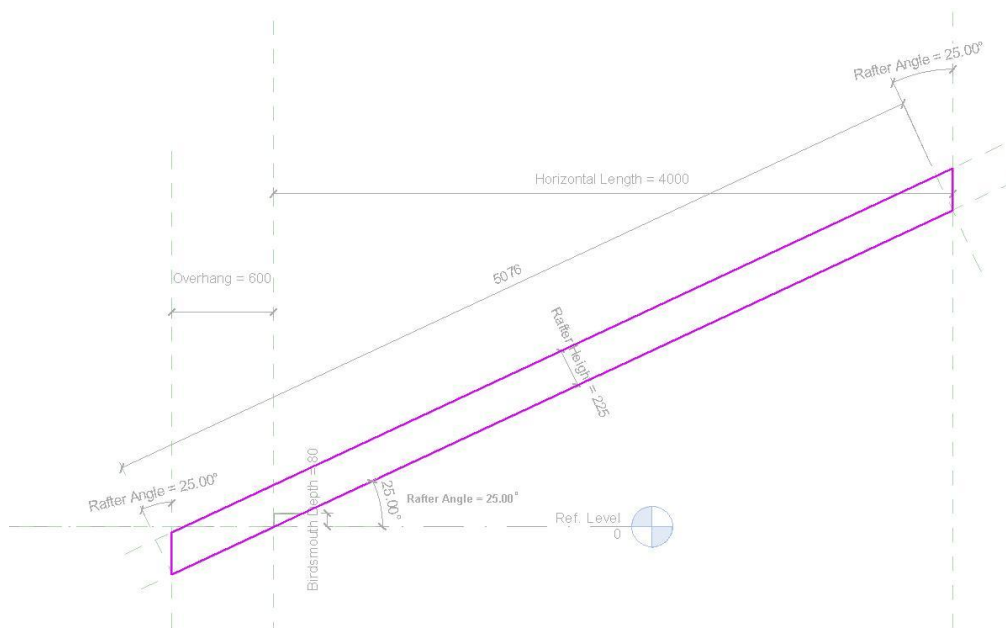
In the image below, you can see the parameters defined for the component.



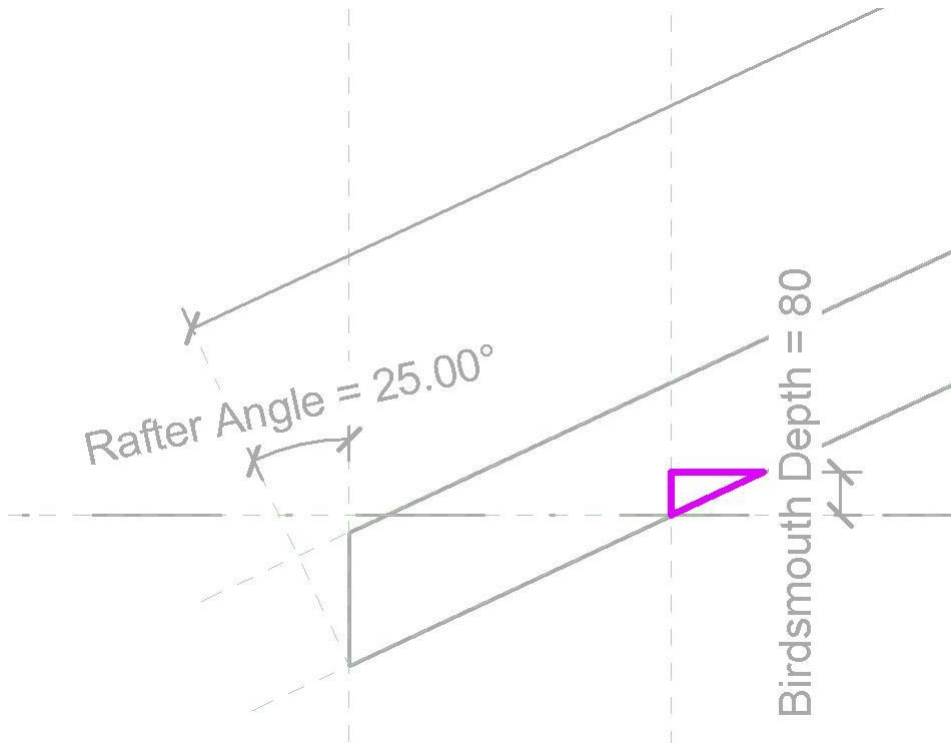
All these parameters are Instance Parameters, which means that we can change their values for each instance (i.e. each separate rafter) in the model.

Step 2: Add the geometry:

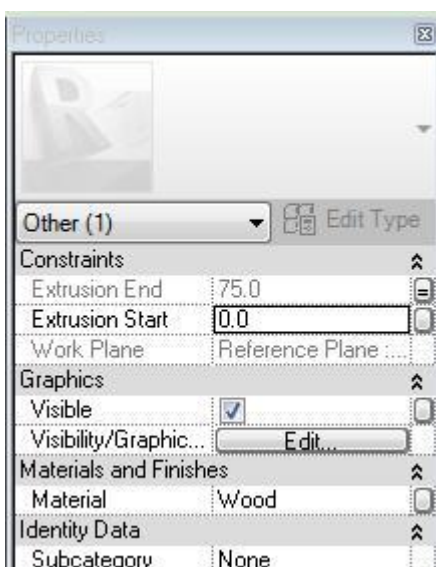
There are two parts to this. The first is a solid extrusion to form the rafter itself.



And then a Void Extrusion to “cut out” the birdsmouth notch from our (previously created rafter).

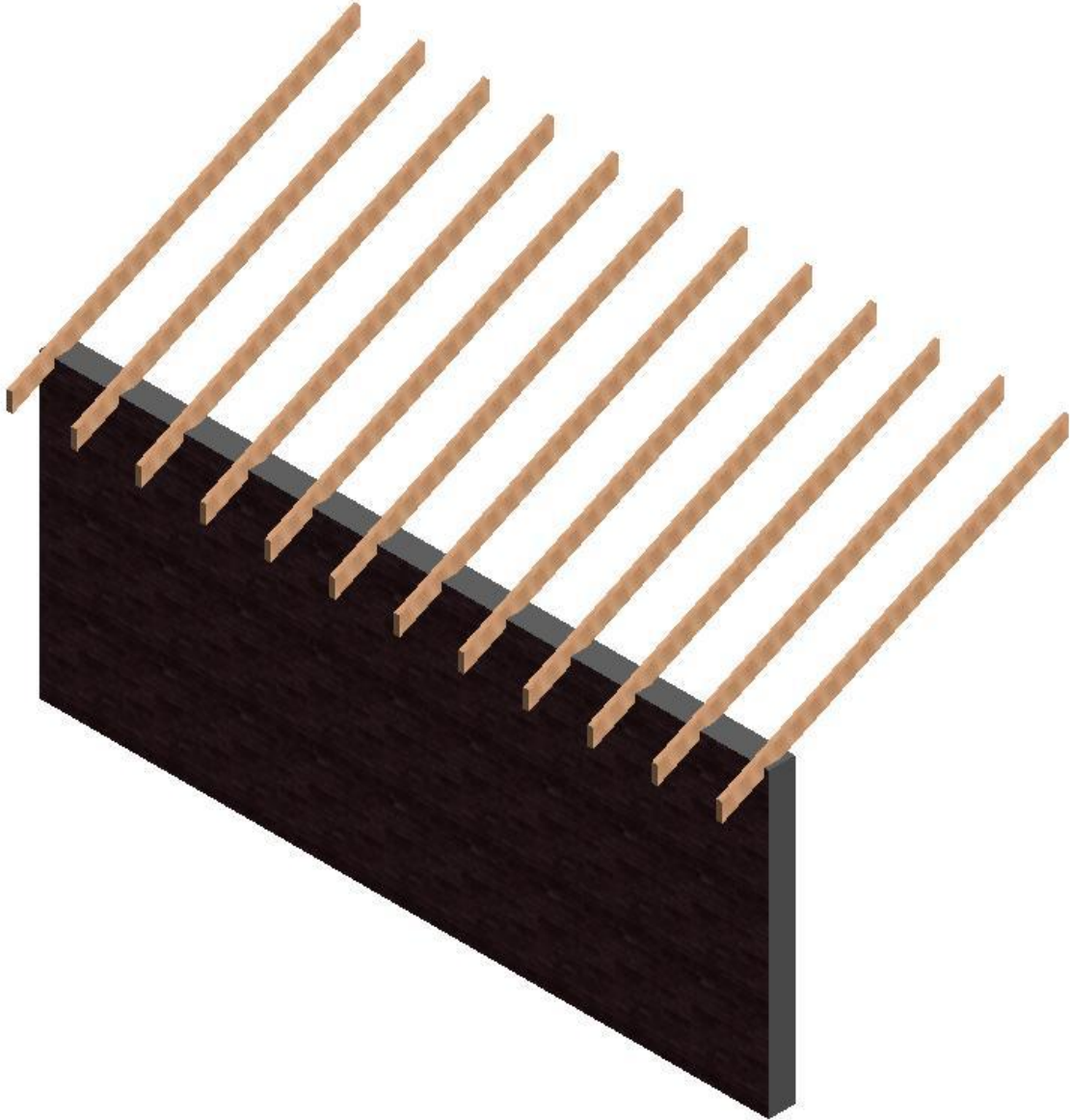


With regards to controlling the thickness of both the solid extrusion and the void extrusion, I set up a reference plane (vertically) – in which I sketched the profiles of the solid and void. I could then set the extrusion properties to start the extrusion at 0 (which means the start of the extrusion is coincident with the reference plane it is sketched on) and the “Extrusion End” can be set to the parameter Rafter thickness.



Look carefully at the Extrusion Start and Extrusion End Properties. Notice how the value for Start (0) is shown in black, while the value for End is greyed out – also notice the small = sign at the end of the “Extrusion End” line. This is because I have set the value for Extrusion End to a parameter, rather than an absolute value. Extrusion Start will ALWAYS be 0 (i.e. will always be on the same reference plane in which it was sketched), while Extrusion End will always be the value of the “Rafter Thickness”.

Step 3: Load the Rafter into a project to and see how it performs.



Here's our rafter sited on a wall. There are 12 instances of our parametric component. Pick one of the instances and look at the Element Properties for it. You will see all the created parameters. Try flexing your model by changing the parameters for each instance.