# Revit Architecture 2016 – Parametric Families

Revit Architecture 2016: Create a Railing Post and a Railing Type

This White Paper follows on from my previous White paper for October where we created a parametric chamfered column family in the Victorian Cottage style.

Model a parametric newel post and a railing type in the Victorian Cottage style.

1. Left click the Application Button drop down and select New Family to open the Select Template File dialogue box. Select the Baluster Post template. This template has no pre-set parameters in the plan view but in the left elevation view, there is a baluster height parameter and a top of post reference plane. Save the family as "Exterior Newel Post" Start by creating width and depth parameters in the Ref Level View.
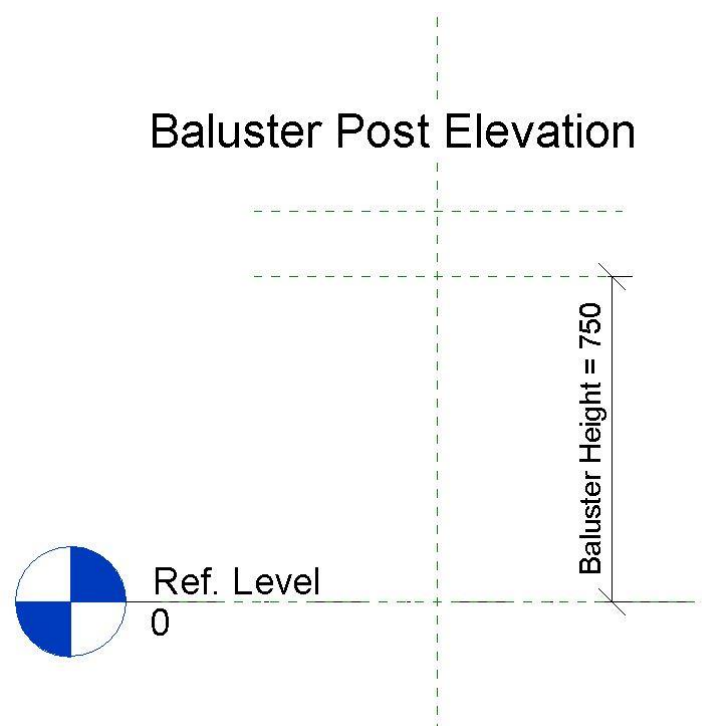
2. Open the Ref Level View. Draw ref planes above and below and to the right and left of the existing planes. It's a good idea to label these ref planes, name them left and right and front and back. Next dimension between each of the new ref planes and the existing ref planes. The existing ref planes define the centre lines of the component and its insertion point so toggle the equal icon to make sure that the new ref planes are always equidistant from these centre lines.

3. Create new parameters by dimensioning between the new ref lines. Select the vertical dimension and in the Label drop down on the Options Bar, select "Add Parameter". Name this parameter "Post Depth" and leave the other settings as is. You have now created a Type Parameter for the post. Repeat this process for the horizontal dimension and name this parameter "Post Width". Flex the model to test that the parameters work and since we want a square post, in the Family Types Dialogue, opposite "Post Depth" under "Formula", Type in "Post Width" or whatever name you gave the other parameter just to the right of the equal sign. The post will now always be square. Type in 150mm by Post Width to make sure the parameters flex properly.
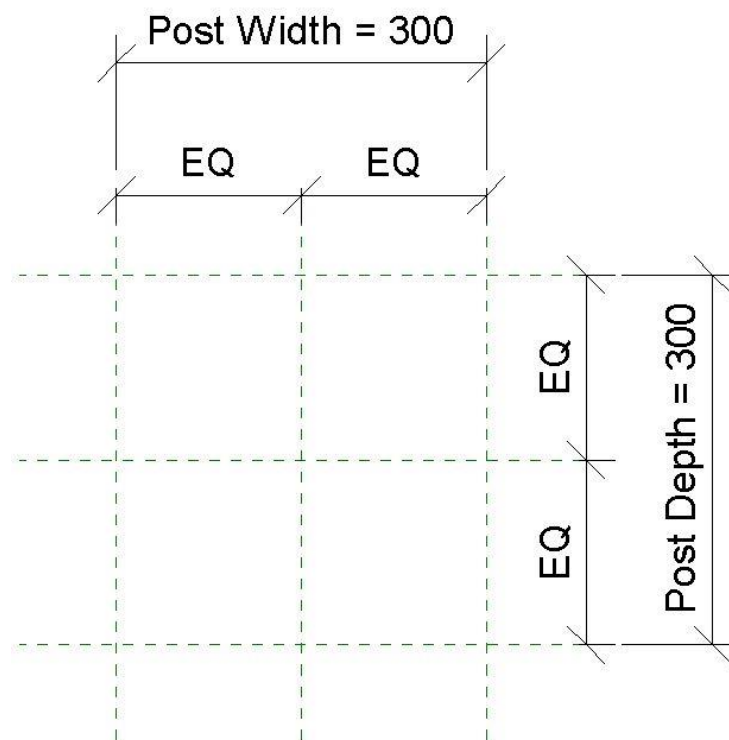
4. Open the left elevation view to create vertical constraints. Create a new ref plane just above the Ref Level. Name this level "Base Height" and dimension and lock it 150mm above the Ref Level. The base will now always be 150mm high no matter the size of the post. Place another dimension between the Baluster Height plane and the ref plane above it. Lock that dimension at 150mm. The baluster will always extend 150mm above the railing balusters. You can amend this at any time if you don't like the proportions.

5. We will now create the post shaft using an extrusion. In the Ref Level view, go to the Home Tab and select extrusion. Using the rectangle draw tool, draft a rectangle within the width and depth ref planes. Align and lock the rectangle sides to the ref planes. Finish the extrusion.

Post Extrusion Profile 1
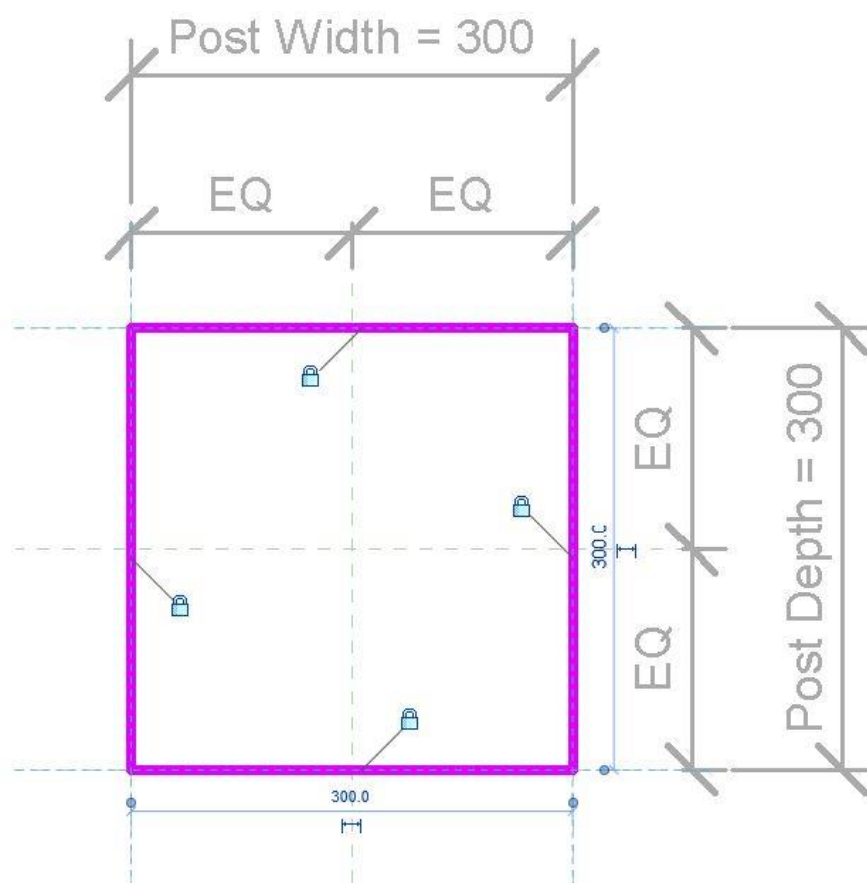
6. Open the left elevation and align and lock the bottom of the extrusion to the base height ref level and the top of the extrusion to the ref plane 150mm above the Baluster Height plane. Open a 3D view and flex the model to check it works.


Baluster Post Elevation
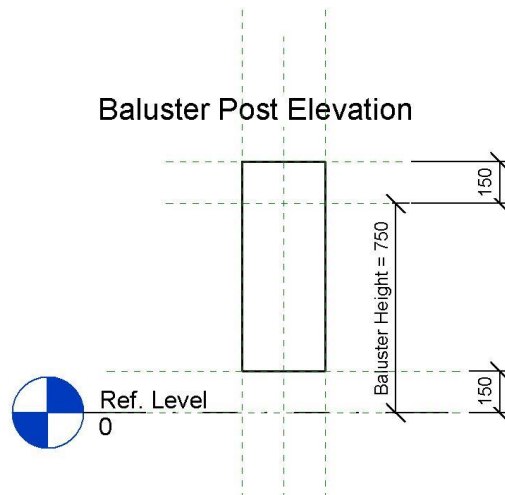
7. Create the column base with a second extrusion. Use the pick draw tool and offset the sketch lines 25mm outside of the width and depth ref planes. Dimension and lock this 25mm offset then finish the extrusion. In the left elevation, align and lock the bottom of the extrusion to the Ref Level and the top to the base height ref plane (150mm above the Ref Level).

Post Extrusion Profile 2
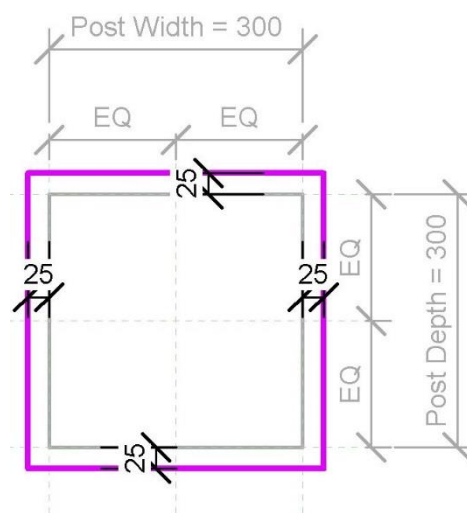
8. Next bevel the top of the post and add a cap. You can complete both tasks with a single sweep. Open the Ref Level View. From the Home tab on the Ribbon, select the Sweep tool in the Forms panel and then Sketch Path. Use the Pick Lines tool and pick and lock the four ref planes that form the post width and depth. Finish the path. Next edit the profile in one of the elevation views. Sketch a wedged shaped profile on top of the base. Align and lock it to the base top and the shaft of the post. Sketch a sloping top profile on top of the shaft. align and lock it to the top of the shaft and the component centre line plane. Dimension and lock an over hang and thickness of 25mm. Finish the profile and the sweep.

Post Sweep Profiles
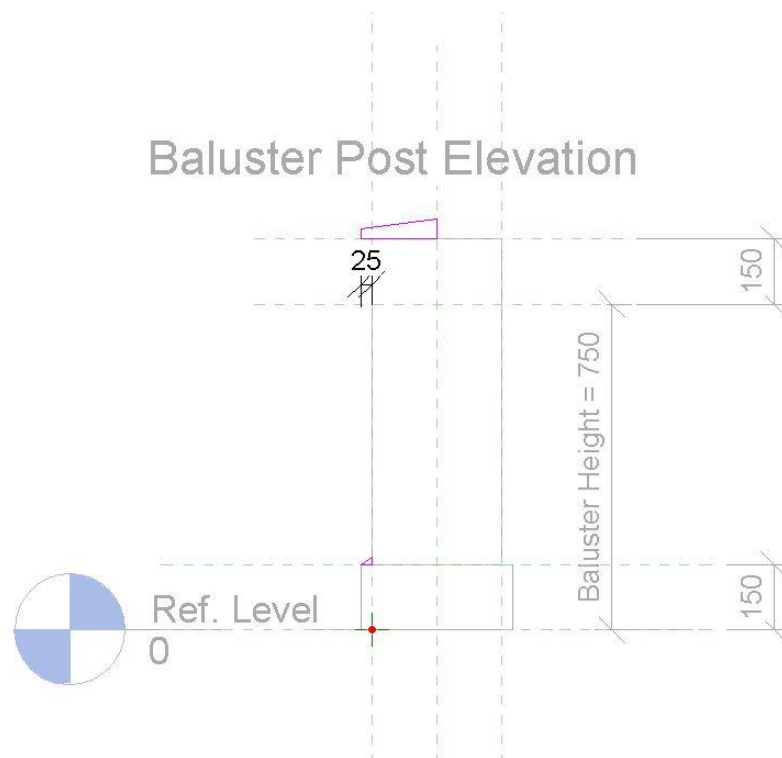
9. Open the 3D view and examine the completed newel post family. Again flex the model to test that it's completely parametric. As final steps, create a, "Finishes-Exterior- Newel Post" material parameter and assign it to the shaft, base and sweep elements. Finally make Type Families for 200mm, 150mm and 100mm and load the component into the project.

Completed Newel Post
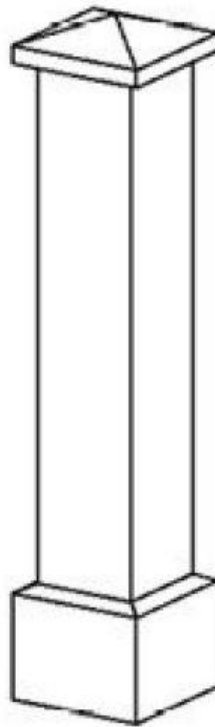
Hopefully this exercise will give you some practice in working in the Family Editor environment and increase your understanding of working with extrusions, sweeps, parameters, constraints and materials.