



Creating a Haunch in Analysis by Structural Toolkit

Structural Toolkit Analysis allows you to input a haunch in a portal frame.

In this tutorial:

- Splitting a member for different haunch sections
- Adding Result points
- Creating haunch sections

Input frame geometry

The first step is to input the geometry of your frame and assign the column and rafter sections. For information on how to do this you can watch the "Brace Frame" video in the Analysis by Structural Toolkit section of the Learning page on the website.

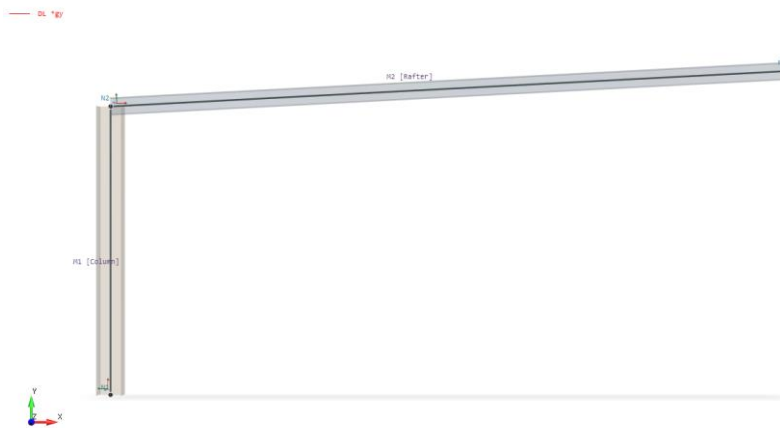


Figure 1 – Typical Portal knee, prior to haunch being inserted

Splitting the member for haunch

You will need to split the rafter to allow the haunch to be inserted. To do this correctly, you should split the rafter at a distance of the length of the haunch plus half of the depth of the column as the node is at the centerline of the member. To split the member, select member, Right Click>Member Selection>Split. For a 5m haunch connected to a 530UB column, you will need to split the beam at $5\text{m} + (530/2) = 5.265\text{m}$

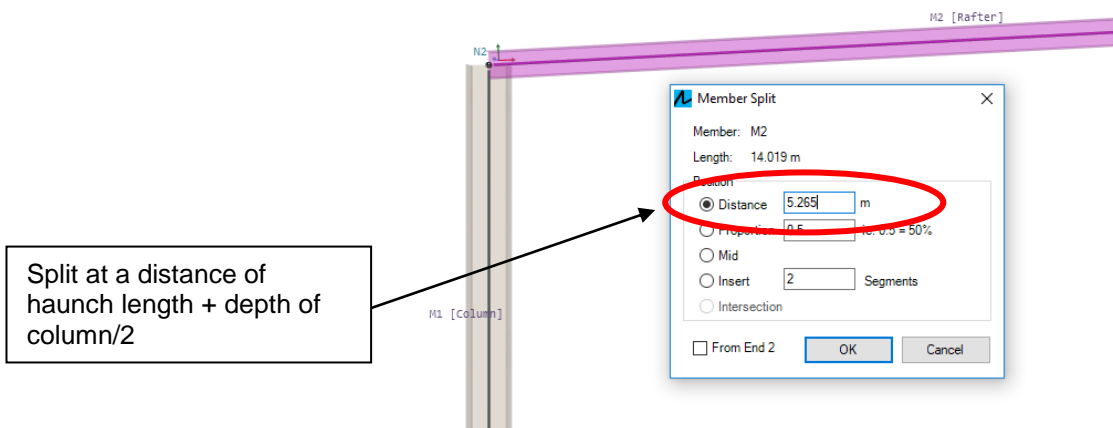


Figure 2 – Splitting the rafter at the end of the haunch



You will then need to split the section you have just created to allow for 2 different sizes of haunch. Structural toolkit does not allow for a uniformly reducing haunch, therefore to model it you will need to put several different sections of reducing haunch sizes. In this example we will be using 2 sections, however you may wish to add more.

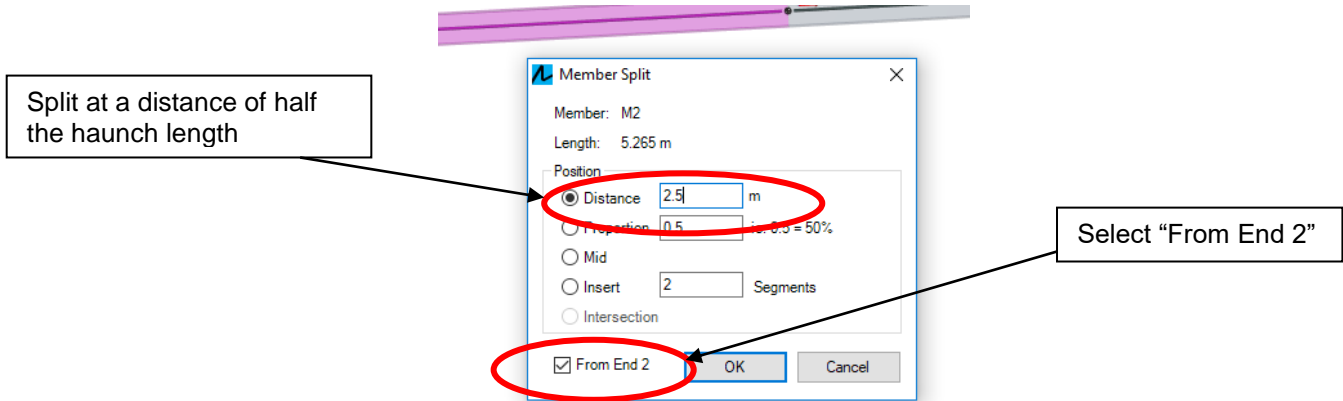


Figure 3 – Slitting haunch from End 2

It may be easier to split the member "From End 2" as you will not need to consider the depth of the column. For 5m haunch simply split at 2.5m from end 2.

Adding result points

You may wish to add a result point at the face of the column to allow you to easily see the results including bending moments and shear and axial forces at this point.

To do this select the member (rafter) adjacent to the column, right click Member Selection>Result Points>Edit

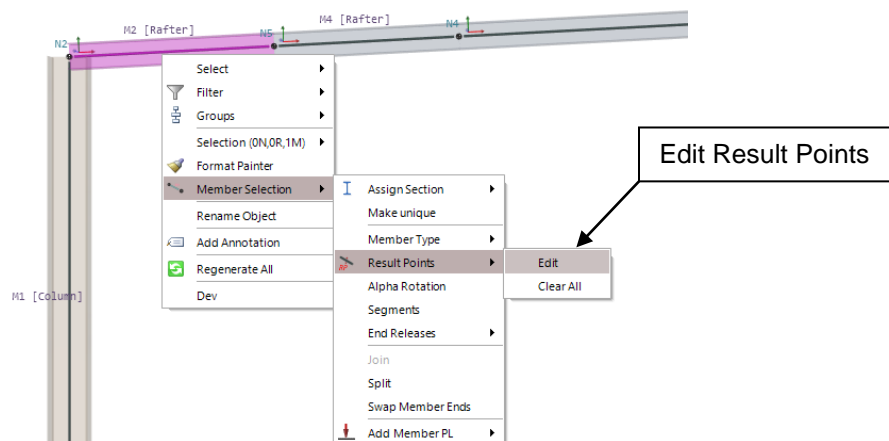


Figure 4 – Add/Edit Result Points

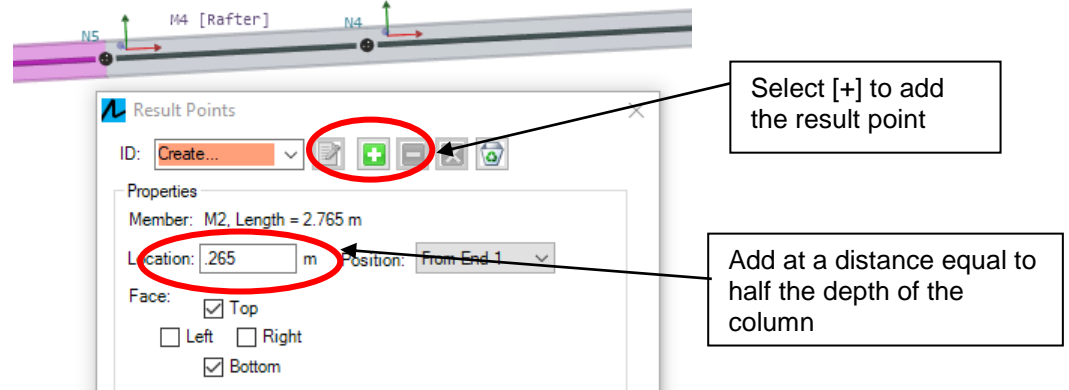


Figure 5 – Inserting Result Point

Creating the Haunch Sections

First you will need to create a haunch section which will be the Section you plan to use to make the haunch out of. In this example we will use a 360UB57.

Following this we will create the first section of the haunch which will be between the column and 50% of the haunch. We will nominate this section "Haunch_75". Once the section has been created change the input from Library to Haunch, then click the pencil writing on paper icon to the right of this box.

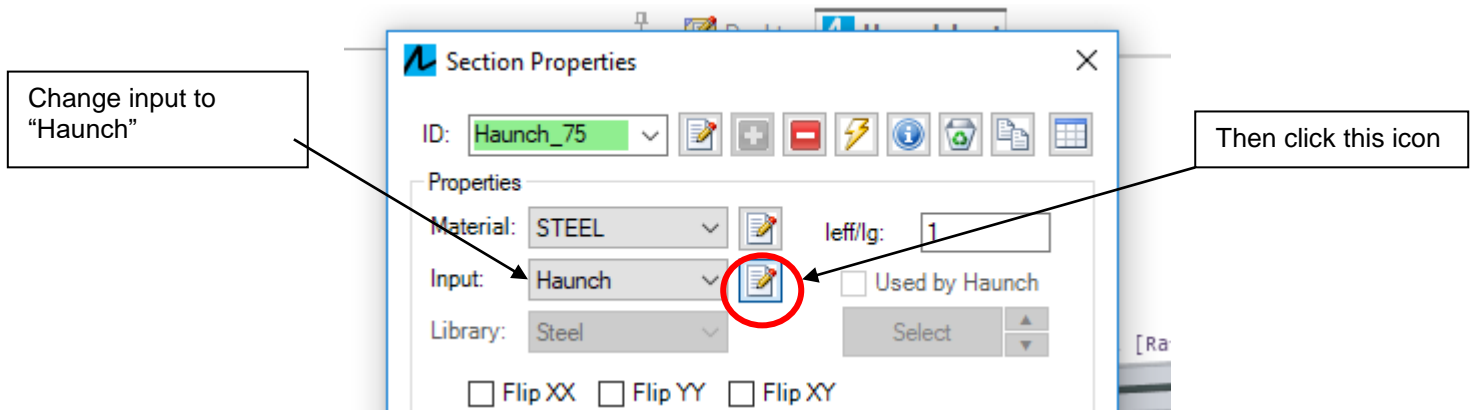


Figure 5 – Selecting Haunch Input Type

In the next dialog box, nominate the Rafter and Haunch which will be used to make up the section. Then nominate the distance from the beginning of the haunch that the section will be modelled on. This is generally at the midpoint of the selected portion of the haunch segment. For the first section we will nominate 25% from the start which will be 75% of the size of the haunch. The second section will be 75% from the start.

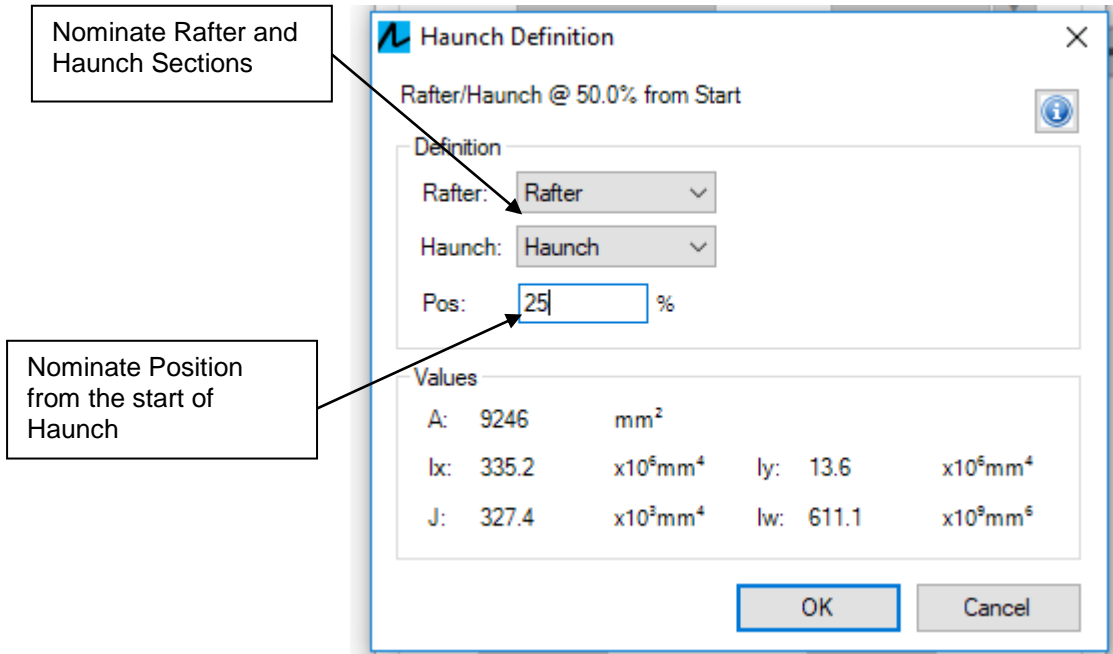


Figure 6 – Nominating Rafter and Haunch and Position of Section

Assign the haunch sections

The last step is to assign the haunch sections to the model. You will see the varying sizes of the haunch sections to demonstrate the reduction in size of the haunch. Then you can input your loads and restraints and analyze your model.

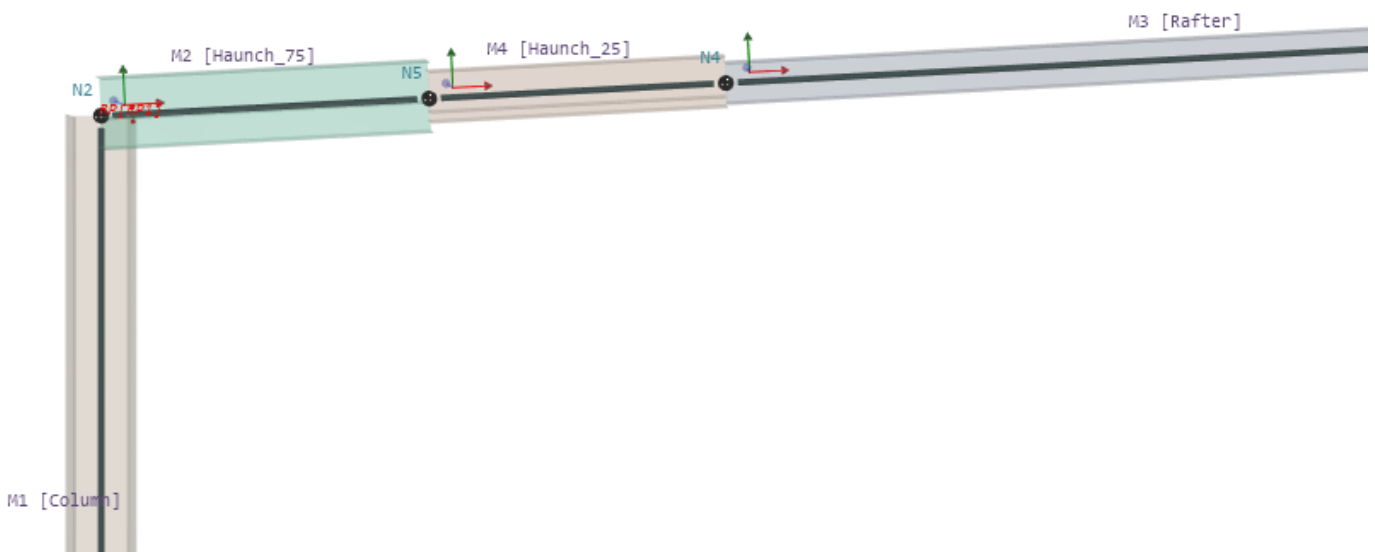


Figure 7 – Typical Portal Knee with Haunch