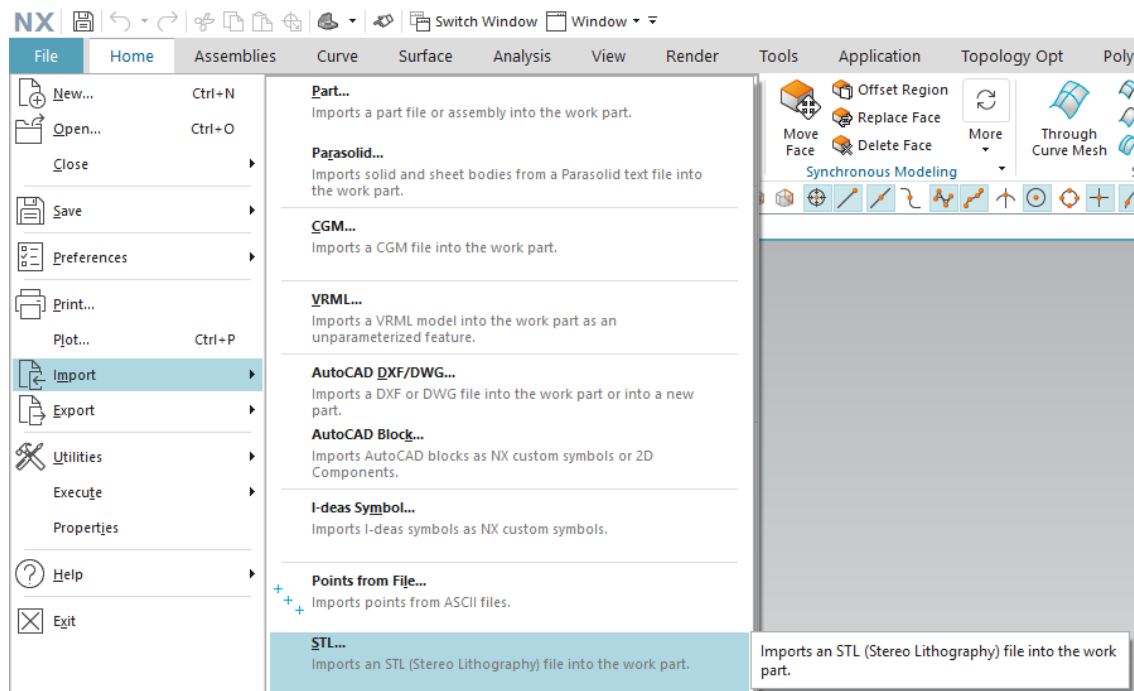# Reverse Engineering

This tutorial demonstrates how Polygon Modeling can be used to correct imperfections from the part. The part file comes from scanned data, represented in STL format. Polygon Modeling can be useful for downstream operations in Reverse Engineering.
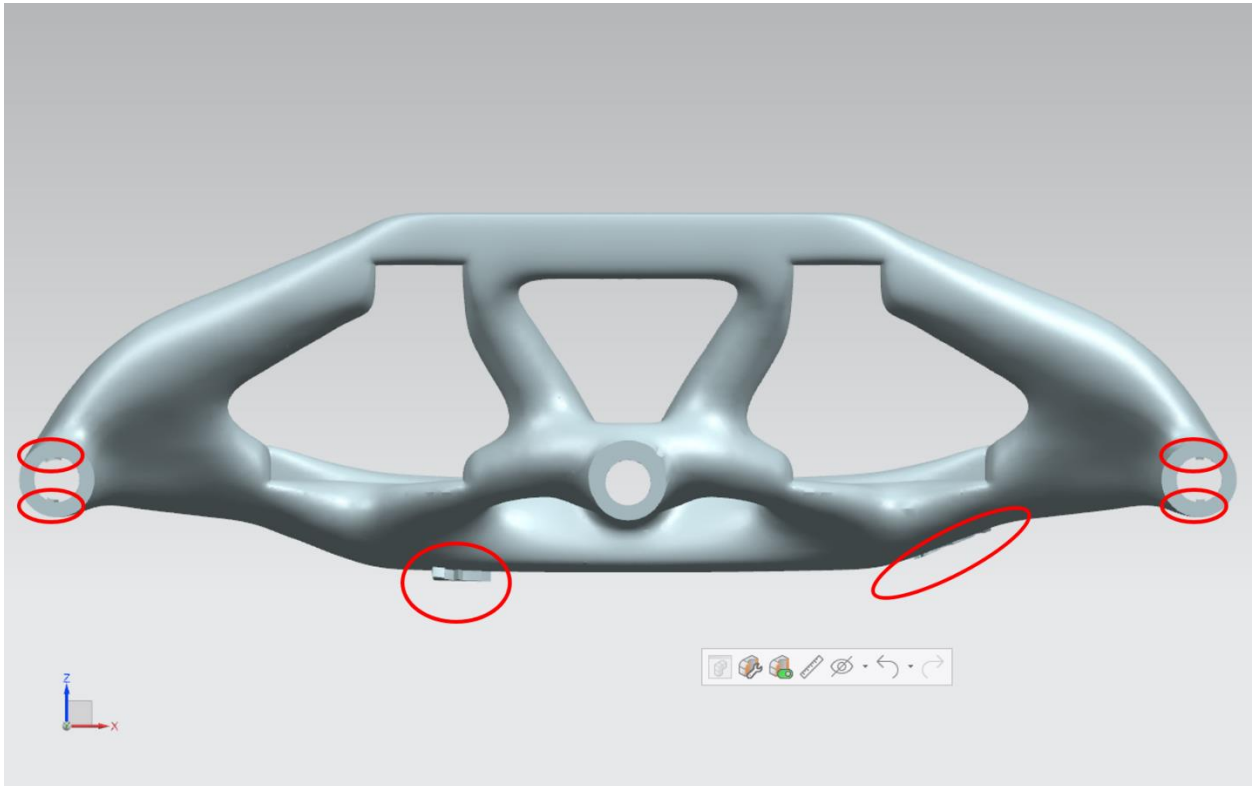
IMPORT STL FILE

1. On the **Ribbon bar**, click **File** → **Import** → **STL**

2. In the **STL Import** dialog box, browse for the STL file "**Simple_Cantilever_RE_STL**"
3. Use the following settings in the **STL Import** dialog box
   Facet Body Output Type = Convergent
   Check Automatic Clean Up
   Minimum Angle Folded Facets = 15.0000
   Minimum Facet Number = 100
   Uncheck Show Information Window
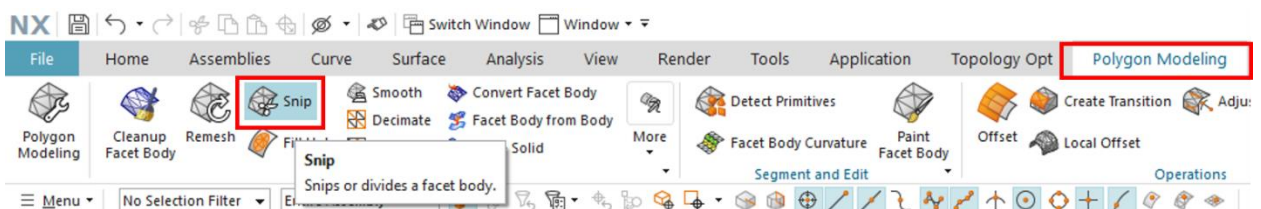   **STL File Units = Millimeters**
4. Click **OK**

5. **Notice** the part imperfections in the areas shown in the picture. This could be a part that was Additively Manufactured with supports. The supports were removed and the part was scanned. This part must be restored to its original part geometry by using some tools

SNIP

The **Snip** feature is used to snip-off undesirable facets from a facet geometry. When facets are snipped off from a solid body, the solid body converts to a sheet body.

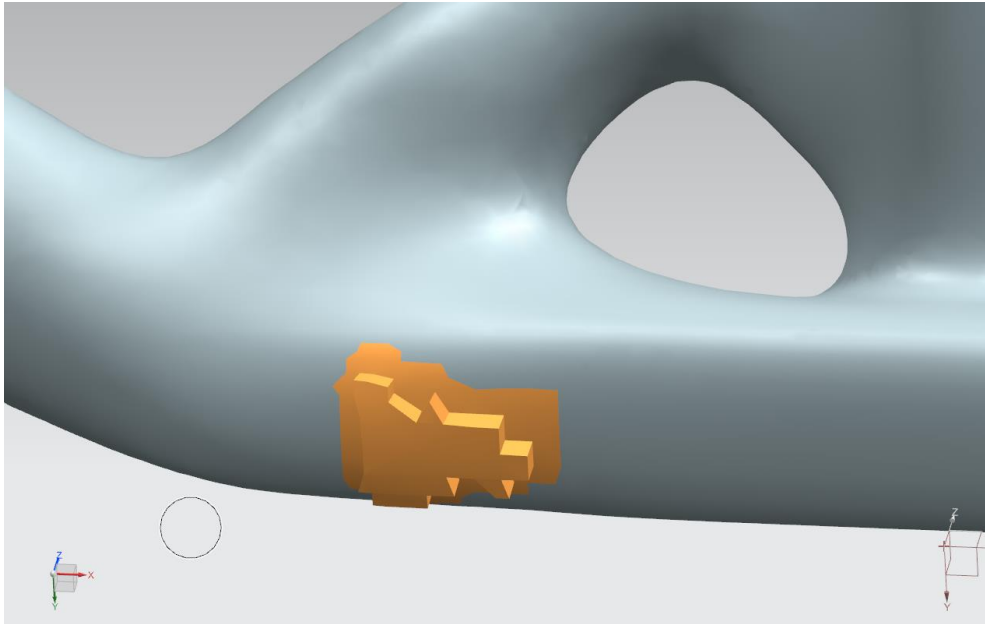1. On the **Ribbon bar**, in **Polygon Modeling**, click **Snip**

2. In the **Snip Facet Body** dialog box, set the selection mode to **Snip by Region**

3. On the **Top Border Bar** of the **Ribbon bar**, from the drop-down menu of **Selection Rule**, select **Rough Brush**
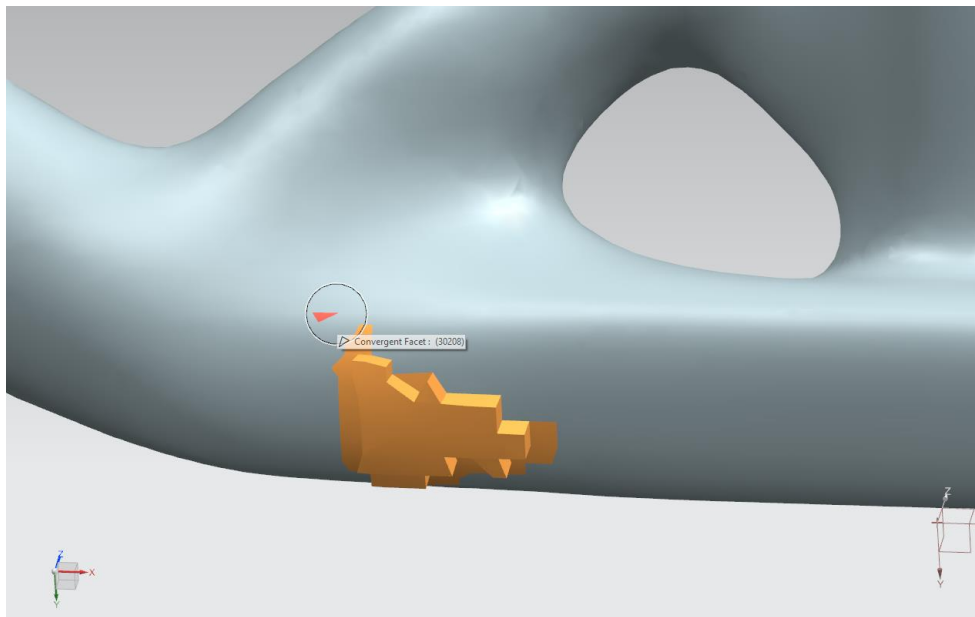   **NOTE:** Change the **Selection Rule** according to the facet situation (see video)
4. In the **Region Definition** group, select facet region by clicking on the general desired snipping area in the graphics window
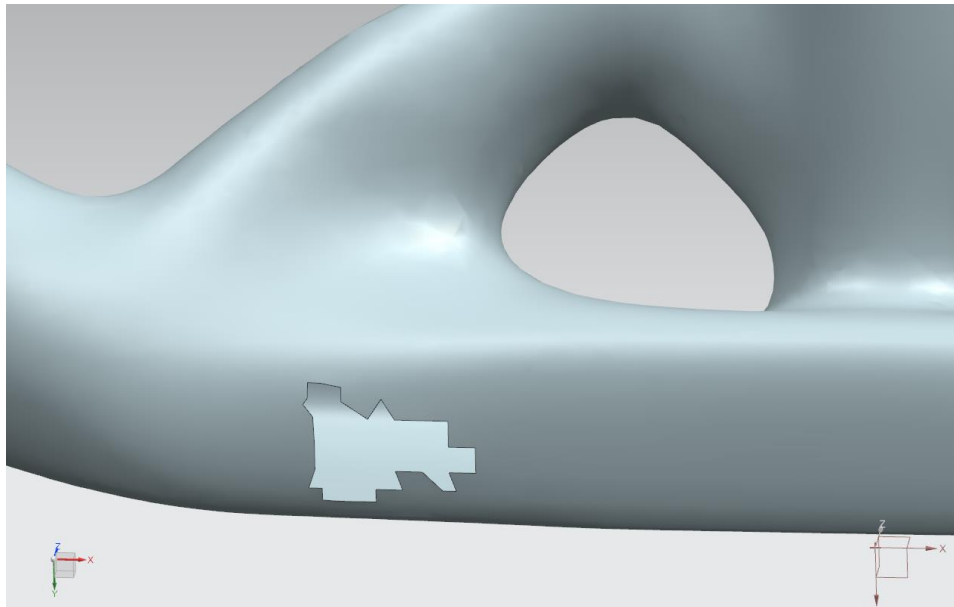   **NOTE:** Some facets may be over-selected

5. Over-selection of facets can be removed by using **Shift + mouse click** in the over-selected area

6. In the **Regions** group, set the selection mode to **Remove Selected**
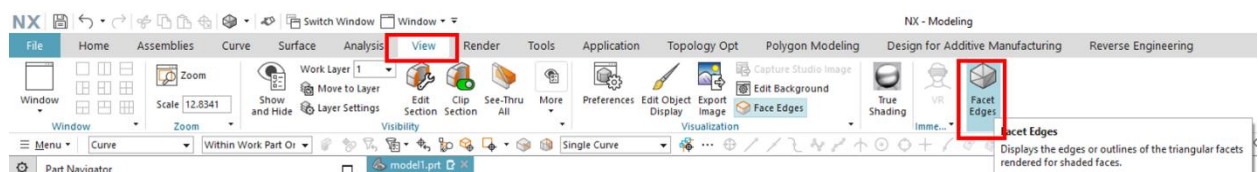7. Click **Show Preview**
   <u>**NOTE:**</u> The solid body has converted to sheet body
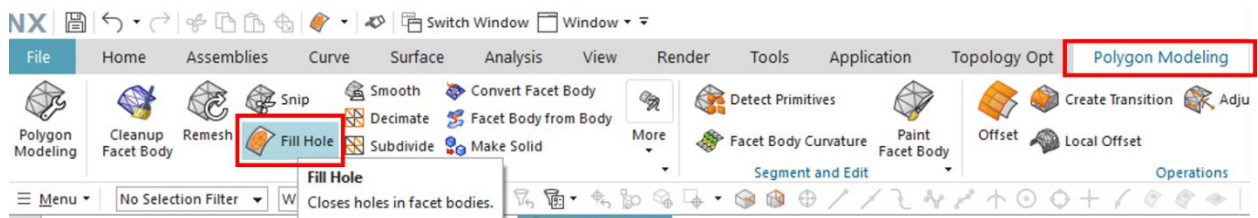

FILL HOLE

The holes generated by the **Snip** command can be filled using **Fill Hole**. The smoothness mode of the fill can be selected such that it blends close enough with the mesh in its neighboring area. The smoothness can be selected based on the curvature of the neighboring topology.

1. On the **Ribbon bar**, in **View** tab, click **Facet Edges**

Notice the mesh geometry turned visible on the part in the graphics window

2. On the **Ribbon bar**, in **Polygon Modeling**, click **Fill Hole**

3. In the **Fill Hole** dialog box, set the selection mode to **Fill Hole**
4. In the **Facet Body** group, select body from the graphics window
5. In the **Edge Selection** group, set the selection method to **User Selected**
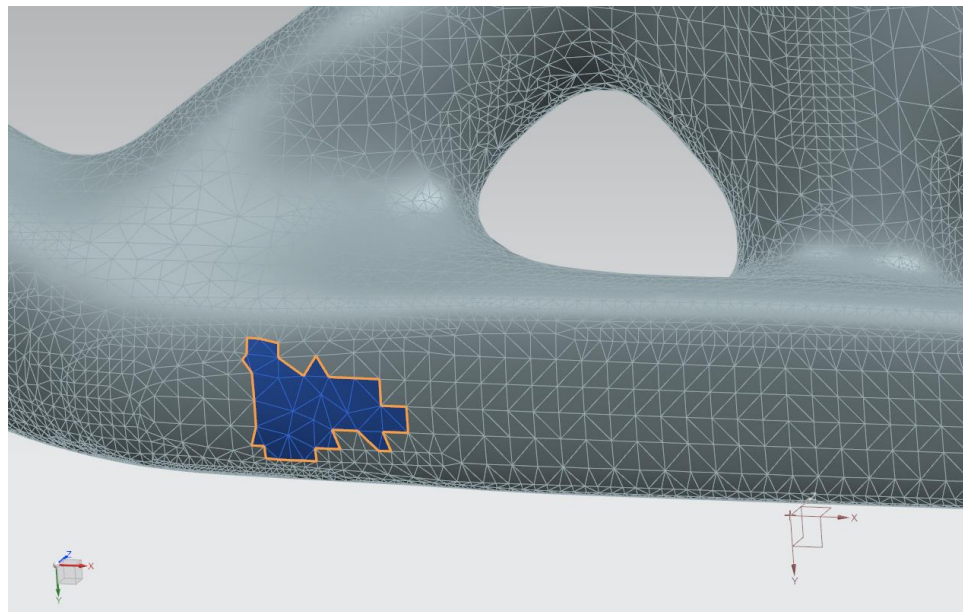   Select hole by clicking on the edges of the hole on the part (see video)
6. In the **Smoothness** group, set the selection mode to **Curvature based**
   NOTE: Experiment with the selection mode accordingly to mesh with the surrounding geometry
7. In the **Settings** group, **uncheck Edit a Copy**
8. **Check Preview**

Notice the hole fill in **Curvature Based** mode

9. Click **OK**
   Notice that after all the holes are filled, the sheet body becomes a solid body