AUTODESK

Exercise duration: ~15 minutes

Practice exercise: Parametric saw blade

Create a unique saw blade using sketching, patterns, and features.

Learning objectives:

- Create a component.
- Create a sketch with dimensions/constraints.
- Create a sketch projection onto a surface.
- Use Extrude.
- Create a Rectangular Pattern.

The completed exercise

1. Open the supplied dataset ***saw blade.f3d***.

Figure 1. Uploaded design.

2. Click Assemble > New Component and create a new Standard component named New_Blade.

NOTE: It may be helpful to hide the Blade_Holder component and show the origin of the New_Blade component in the Browser for the next step.

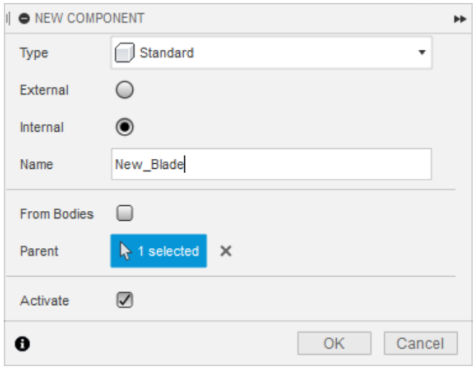

Figure 2. Create a new component

3. Launch the Modify > Move/Copy tool and set Move Object to Components. Select the New_Blade component and set the Move Type to Point to Point. Select the New_Blade component origin as the Origin Point and select the center of the circle on the front face of the saw blade as the Target Point. Click OK to confirm.

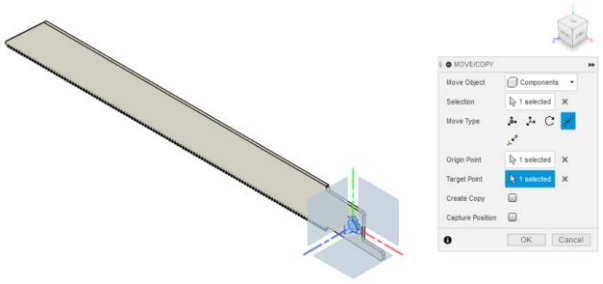

Figure 3. Move the component origin

4. Activate the New_Blade component and start a new sketch on the front facing plane of the component origin.

NOTE: Ensure that the origin belongs to the activated New_Blade component.

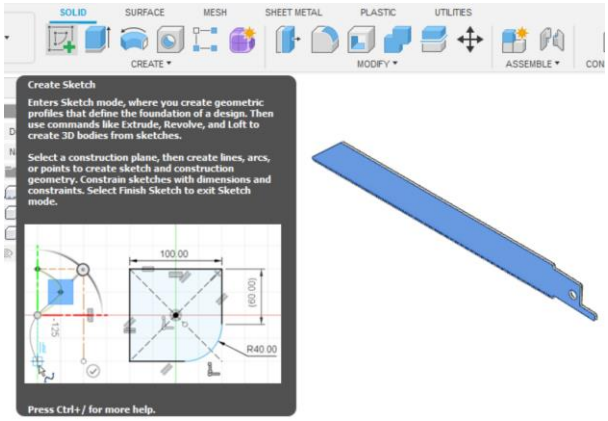

Figure 4. Create a new sketch

5. Use Create > Project/Include > Project to bring in the entire silhouette of the blade except for the saw teeth.

NOTE: With the desired reference geometry pulled into the active sketch, hide the original Blade component.

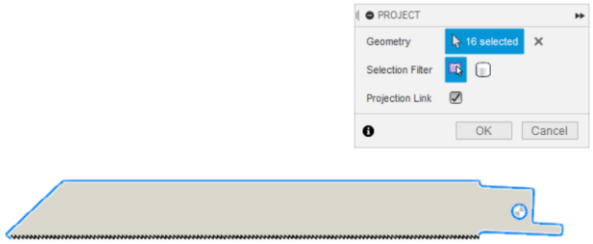

Figure 5. Project desired reference geometry

6. Create a custom saw tooth sketch profile. The dimensions provided in the profile pictured in Figure 6 may be used.

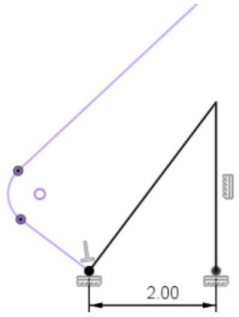

Figure 6. Create saw tooth profile

7. Create a horizontal line that extends from one end of the projected geometry to the other end. For the opposite end of the saw tooth profile, create an angled line and apply a tangent constraint with the projected arc.

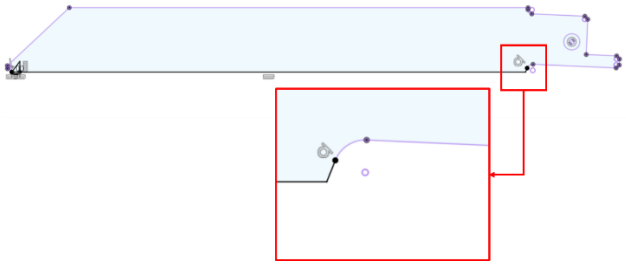

Figure 7. Close saw blade profile

8. Finish the sketch and launch the Create > Extrude tool. Show the original Blade component in the Browser. Select the blade and tooth profiles in the sketch (excluding the hole). Set the Extent Type as To Object and select the opposite side of the original Blade component. Ensure the Operation is set to New Body and click OK to confirm.

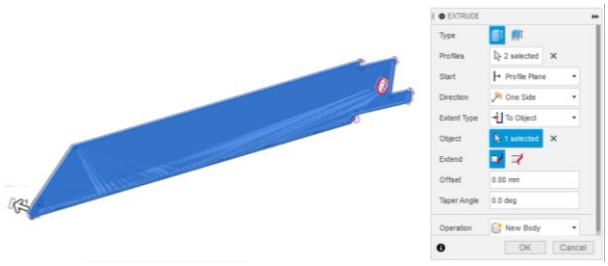

Figure 8. Extrude the saw blade

9. Hide the original Blade component once again and show the sketch on the New_Blade component.

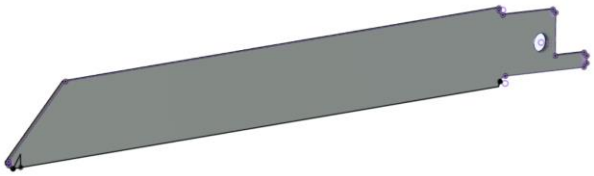

Figure 9. Show the new blade sketch

10. Launch the Create > Extrude tool and select the saw tooth profile. Ensure the profile is cutting into the blade solid body and set the Extent Type to All. Click OK to confirm the operation and hide the sketch in the Browser.

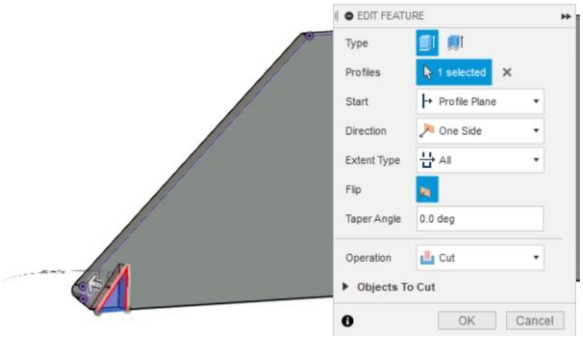

Figure 10. Use Extrude to cut saw tooth profile

11. Use Create > Pattern > Rectangular Pattern to create the remaining teeth. Set the pattern's Type to Features and select the Extrude cut operation in the Timeline. Set the Direction to the bottom edge of the blade. The pattern will have a Spacing of 2mm with a Quantity of 64. Click OK to confirm the pattern.

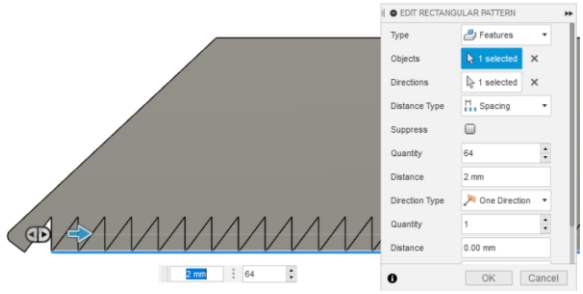

Figure 11. Create pattern of saw tooth profile

12. Activate the top-level component and show the Blade Holder component. Review the new saw tooth design and compare it to the original Blade component.

Figure 12. Open sketch in Browser

13. To practice, consider editing the saw tooth sketch on the New_Blade component to have a different profile. Modify and finish the sketch to see the solid body automatically update.

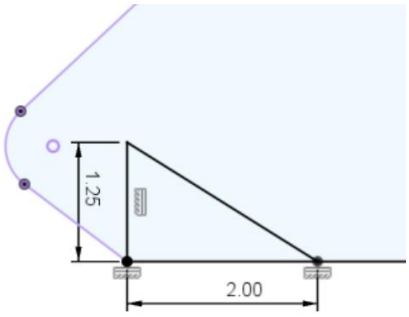

Figure 13. Open sketch in Browser

14. Review any final changes and save the design.

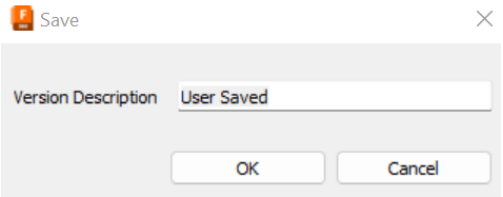

Figure 14. Save