

EDU[**CAD**]TION **STUDY GUIDE**

## **How to Use Shell, Fillet, and Analysis Tools in CAD**

Chapter 2, Lesson 4

*SendCutSend*

### Creating a Shell

- The '**Shell**' feature hollows out a solid object, leaving a uniform wall thickness, perfect for creating enclosures or housing cavities.
- To use the '**Shell**' tool, go to **Modify** → **Shell** (see Figure 1.1). A dialog box will appear prompting you to select a face or body. The selection you make will determine where the void is created.
- For this lesson, select the top face of your box, and enter your desired wall thickness. ex: a 0.125-inch wall thickness was used to match the previously extruded bottom wall.
- After applying the Shell, you can always adjust its thickness later. Simply right-click the Shell in your timeline and choose "**Edit Feature**". Adjusting the wall thickness (for example, from 0.125 to 0.1) allows fine-tuning of internal clearances without rebuilding geometry.

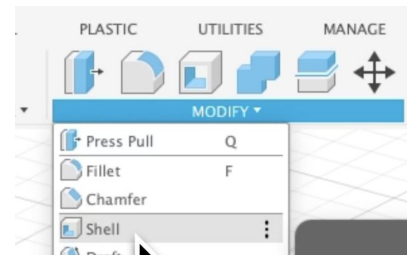


Figure 1.1

### Alternative Methods

- **Reminder:** There's more than one way to do things in CAD. So instead of using Shell, you could sketch an offset from the base and extrude upward to form the walls manually (see Figure 1.2).
- However, Shell provides a faster, parametric solution that's easier to modify later.

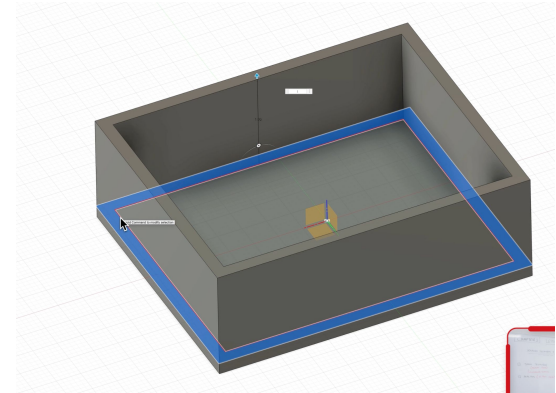


Figure 1.2

## Adding Fillets (Corner Radii)

- '**Fillets**', also known as corner radii, help round off sharp edges, improving both aesthetics and manufacturability.
- To add '**Fillets**', go to **Modify > Fillet**, then select interior edges (see Figure 1.3).
- Input a radius value (in this case, 0.125 inches) to match the wall thickness (see Figure 1.4). Larger radii (like 0.5 or 0.75 inches) may cause interference with internal components, such as the Arduino board in this lesson, so always check for clearance after applying (see Figure 1.5).



Figure 1.3

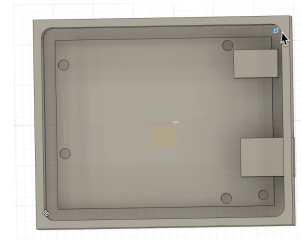


Figure 1.4

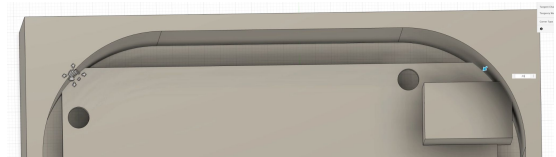


Figure 1.5

### Using the Section Analysis Tool

- The '**Analysis**' Tool gives you X-ray vision into your design.
- Found under **Utilities** > **Section Analysis**, this tool allows you to create a temporary cross-section view through your model (see Figure 1.6).
- Select a reference plane and drag it through the part to view how components interact internally.
- Each body is color-coded, making it easier to distinguish between parts (e.g., orange for the box, yellow for the Arduino)(see Figure 1.7).

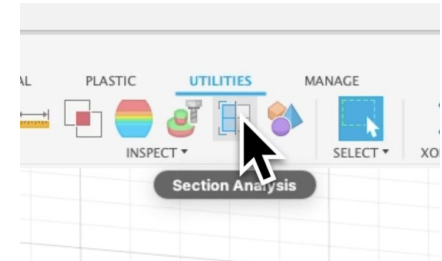


Figure 1.6

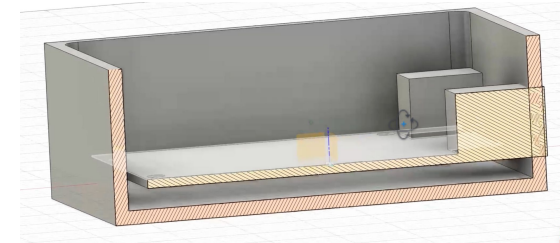


Figure 1.7

## Managing Analyses

- '**Section Analyses**' appear in the browser tree under the '**Analysis**' folder (see Figure 1.8).
- You can toggle section views on and off, adjust their position or rotation, or create multiple section views to examine your assembly from different angles. These views are non-destructive, they don't change your model, only improve visualization.
- You can also create different analyses to view your model from various perspectives. However, only one analysis can be viewed at a time. If you need to make changes, simply right-click on it and select **Edit**.

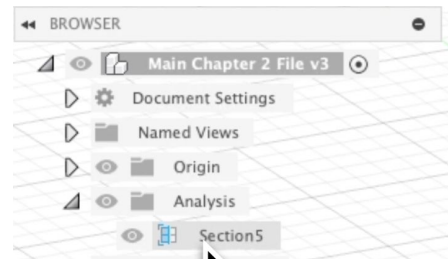


Figure 1.8

### Summary

By combining Shell, Fillet, and Section Analysis tools, you can build refined, manufacturable parts while maintaining clear visibility into your design interior. These techniques ensure precision, improve usability, and help catch design flaws early in the CAD process.

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