Project Overview:

How to make a Custom Battery Case for the Ryobi Drill

This 3D custom battery case is modeled on Fusion 360 and printed on RoboR2. The case is made to conveniently store drill and driver bits on the bottom of the Ryobi battery.

How To Info:

Time to complete: 10 hours (3D print time) + days or hours depending on experience (digital)

Tools:
Fusion 360
Robo R2

Steps:

Step 1: ANALYZE BATTERY
I took a look at the battery and noticed that most of the battery was geometric except for the front where it tapers out and has a semi-circle.

Step 2: IMPORT INTO ILLUSTATOR
I took a picture of the bottom of the Ryobi battery and imported the image into Illustrator. I used a ruler to measure the width and length of the battery and scaled the image accordingly. I made a new layer on Illustrator and began tracing the shape using a pen tool. I saved the file as an SVG in order to import it into Fusion 360.

Step 3: IMPORT INTO FUSION 360
I started the model in "Sculpt mode", which can be found on the top left. In this mode, I was able to manipulate my model in smaller sections and make tiny adjustments using the Modify tool found on the top left. Once I was done sculpting the model, I clicked Finish Form on the top right and the mode changes to "Model".

Note: Once the mode changes to MODEL from SCULPT the model cannot go back to sculpt and make changes.

Step 4: DESIGN AND MODEL FRONT

Note: I created the full model on Fusion 360 and then split the front from the rest of the model to work on it separately.

To not waste plastic, I designed and modeled the front of the battery first before printing the rest of the attachment. There needs to be a latch that hooks onto the battery where it tapers out so that it doesn't slide or break off when it is in use. I printed a total of 4 versions (featured in the images) before getting the right dimensions.

Step 5: FINALIZE LENGTH AND WIDTH OF MODEL
Next, I printed a thin layer of the bottom of the model to test the entire fit of the attachment on the battery. I continued to make small adjustments and used my caliper to measure each time I printed a new test piece.

Step 6: FLATTEN AND CREATE BOTTOM OF MODEL

I created a sketch on the bottom of the model and extrude cut .10”. I removed the cut section from my model and then I was left with a flat surface. I then offset the lines to create the bottom of the attachment. I extruded the selection up 0.06” and made sure the operation was on join and not cut.

Step 7: MODEL SLOTS FOR DRILL AND DRIVER BITS
For the driver bits, I modeled slots that measured at (L x W x H) 0.65” x 0.05” x 0.35” with 0.25” between the cavity. The slots for the drill bits differed in spacing due to the drill bits being different sizes: 1/4” = 0.25”, 3/16”= 0.14”, 1/8”= 0.10”

Step 8: SAVE AS AN STL
I highlighted the entire model and joined everything into one component. Then I saved the model in millimeters as an STL.

Step 9: IMPORT INTO CURA
I imported the STL file into Cura and rotated the model to sit flat on the bed. There is an option to change the settings, but the recommended settings worked fine for me. I saved the G-code onto a USB drive.

Step 10: PRINT MODEL ON ROBO R2
I inserted the USB drive into Robo R2 and searched under files to locate the correct G-code. The model took a total of 10+ hours to print.

Note: Make sure there is enough filament and that the spool is running smoothly without getting tangled within itself. This can disturb the print and cause the print to fail.

Step 11: REMOVE SUPPORTS ON MODEL
Once the print was done, I carefully removed it from the print bed and pried the support off the model using a metal scrapper.