

For the 2020 CAD Make it Real challenge, our team chose to make a clip for wire management. Wire management has been a problem for our team so far this season, we have gone through a lot of unnecessary zip ties and have had to spend a lot of time using zip ties to tie down wires, only to have to take them off again when we want to make a change. Our solution to this problem is to make a wire clip that can be bolted onto our robot. This simple yet useful clip will ensure that the wires stay where you want them but at the same time having an easy way to unclip them and move them around. Our design will eliminate the need to use zip ties that you can only use once. To use our design, you will only need to screw it onto a piece of metal and then put the wire inside of the clip. Our design is sleek and easy to use. Even though we can't use it in an actual competition, we will be using it for practice, because we will be making many changes and modifications to our robot.

We used Fusion 360 2020 version 2.0.9313, 2020 to CAD this design. The final product is the third version of this idea we tried. We started off on the first day just doing a simple cube with a couple of zig-zag slits cut in it, we did not dimension anything besides the cube, we had this as almost a proof of concept, and as you could probably imagine, it didn't work. This first design was made to put the wire inside of a trap, almost like a spiral. We soon figured out that PLA plastic can flex enough to "snap" the wire into place. For our second design, we started fresh, and made what resembled two triangles with the points touching each other. This was made to be able to "funnel" the wire in and then snap it into the main spot where it can move around freely. After we printed our second design, we tested it and where it was supposed to snap into place, there was way too much space. So, we went into the original sketch and moved

the pinch point together and then centered everything with the dimension tool. We printed our third design and it fitted perfectly.

As far as actually designing it, it was a fairly simple process. First, we created a 0.5in square by creating a sketch, using the square tool and dimensioning it accordingly. We then exited the sketch and extruded it by 0.5 in. Next, we made a second sketch and created with the line tool the basic shape that we wanted. We used the dimension tool to make it all even and we used the extrude cut tool to cut it out. The next thing we did was create a third sketch and make a circle centered on the bottom for the screw to go through. We had to also make a hole on the top big enough for the screw head to get through, we then did a partial cut. We finished everything off with some fillets to make it nice and smooth and to make sure the wire did not get cut. We have printed it at 15% hexagonal fill and 100% fill and we found out that it does not affect the functionality of the part at all.

From this project, we learned that there are many small problems all around us that can be fixed with easy solutions. We also learned that it is ok to go through many prototypes of something before reaching a final design. From what we learned in this project we believe that we will use CAD for other things this season. Our team is working on converting an old 3D printer to a plotter to make business cards for our team, and we have things that we will need to design for that. This year we have also begun to CAD parts of our robot for our engineering journal. I think this software would help on a competitive robotics team by helping to build and envision custom parts that could help your team win. If any of us decide to go into the STEM

field one day, we believe that the knowledge of 3D design software will help us. With the need for jobs such as engineers and machinists increasing, it will be a good idea to know basic CADing now, to help us in the future.