“Spacer Screws” - Team 68333A (Obliterators)

Our CAD Challenge part was created to solve the issue of spacing. Regular spacers are a fixed size, which can make it difficult when trying to separate two parts by a precise distance. We worked to create an adjustable spacer that allows the builder to alter the size of the spacer to the length that they want.

Our new part is essentially two identical spacers that screw into each other. To change the size of the spacer, the smaller side is screwed into the larger hole of the other spacer. In a complete robot design, having a more precise spacer length would help with building different parts that require detail. The part works in the same way as a regular spacer, but multiple of them can be screwed into one another to make spacers of different sizes. Furthermore, you can change the size of the spacing by adjusting the amount that two spacers are screwed together.

We designed the spacer on version 2.0.9439 of Fusion 360. We started by sketching two cylinders and uploading them to Fusion 360. We built one cylinder using the dimensions of a regular spacer, but increased the inner diameter by 2.5 mm. Then we created another cylinder and attached it to the first one. It was smaller in depth, and had smaller diameters as well. In order for two of our parts to screw into each other, we needed to create threads. We did this using the thread feature on Fusion 360. The threads were diamond shaped to make the parts more similar to a screw, and easier to 3D print. We used two sets of identical threads on an individual part, one inside the bigger cylinder, which was the female connector, and one around the smaller cylinder, or the male connector.

The most important skills that we developed from this project are teamwork and collaboration. This project challenged us in multiple ways, as it required us to think outside the box, put together several theories or ideas, while also considering functionality. We brainstormed for hours, listing out idea after idea, before we finally came up with the concept of a flexible spacer, which wouldn’t have been possible without teamwork. In the future, we will use 3D design software, as it has proved to be extremely helpful when visualizing a design. Creating the part on Fusion 360 allowed us to put together our part piece by piece digitally, which gave us a concrete outline. Additionally, Fusion 360 allowed us to play around and experiment with the look of our design. This software helps us in competitive robotics because it gives us a clear method of planning out our robot beforehand. Looking at a complete design on a laptop can be useful when planning out the robot. In addition to this, we also learned a lot about problem solving when 3D printing. We encountered several problems with both the dimensions and coils/threads. These small problems made us think of alternatives that we could use for our design, while also keeping our original goal in mind. 3D learning design software will help us on our career path because it gives us an opportunity to explore, innovate, design, and more. Using this software can help us when it comes to using computers and building. As we are interested in the fields of computer science and engineering, using design software gives us access to materials that can help us study the operation and conception of robots. Overall, this project has taught us a lot about teamwork, creativity, design software and more. It has taught us to step outside of our boundaries and push ourselves to explore complex theories.