Adjustable Standoff Online Challenge

By: 507C

While building a functional robot, one of the most critical aspects is the structure. In many cases, my team and I have created sub mechanisms: a tray angle adjuster/tilter or a lift that needed to be better secured. In many occurrences, we were faced with inconvenient situations to use conventional ways to secure these parts of the robot: c-channels. Thus, we considered using standoffs however with imperfect spacing, we were forced to use spacers and washers which isn't always convenient or as secure/stable as we desired. Thus, as a result of a clear inconvenience in the traditional method of securing a part with a standoff, with not perfect spacing, my team designed a new part which is an updated version of a standoff that has an adjustable spacing. How this works is that there are two standoffs with one of them being .75 approximately the original standoff size with the end being the original size standoff (about .25 in long) (alternative option is having a .25 in standoff just attached to the new standoff, just as it is CADed), and the other standoff is the original one. This will allow the standoff to have an adjustable length so the smaller standoff will be able to move inside and out to adjust the length needed. As the end of the new standoff is the original size, this acts as a stopper and allows for a 3/32 screw to be used. One of the major things about this standoff is that there will be a clamping shaft collar that could fit over both standoffs and will have a screw that will secure this clamp and this adjustable standoff in the place needed. This is similar to how a clamping shaft collar is used for a shaft so that it can't move forward and back. This collar would be placed between the two standoffs, although as this clamping shaft collar will have to be larger than it would regularly be (for regular shafts) and instead be more similar to the high strength clamping shaft collar (high strength shafts). As it will need to be approximately 2 times the size of the regular clamping shaft collar is to fit over this adjustable standoff. To ensure that this new part can be as secure as possible.

This adjustable standoff was designed on fusion 360 version 2.0.6670. With this software, this standoff was designed, tested, and scaled. To clarify, this software was used to create an adjustable standoff witch had a regular standoff as one component, then a smaller standoff which with the software was changed the scale to make it small enough to fit inside the original part, and had its end be the size of the original standoff. It also was used to ensure that there was a way to secure the second standoff (the clamp). This was later proven and tested when using the animation part of the software. Which just illustrated how this part would work effectively in actuality. In addition, this part is not limited to not only one original standoff size. This part could be used for any size standoff as long as the length is adjusted to match the original component (approximately the best size for the adjustable size standoff is at least 2 sizes smaller than the original one used).

This project was very insightful in how cading and 3d design worked. I learned how this software can be used/works which will help me and my team in the future as we decided to cad our robot/ future designs. As we have seen how beneficial it can be to cad parts of the robot, in the future this can mean designing which chassis, lift, or even intakes are the most efficient for what we want to be accomplished. For a competitive team using this program, this can largely aid engineers to save time while creating the best robot as possible. Which will give our team an edge that will help us compete at a higher level and be able to perform better in the future. Not only that but with acquiring this skill of 3d designing, it will aid me and my team is not only for robotics but for our future careers. Whether that is in the engineering field, architecture, as a doctor, and in many other career

paths. In all these situations, there are always benefits for understanding how to use this program as there are advantages in understanding buildings, machines and even to a point of visualizing parts of the human body. With this previous knowledge of this software, I and my team will have a leg up for the future. This skill could also be useful, as I and my team will now have background knowledge in the software that can be used while 3d printing. Which could aid us in numerous different ways: bioprinting, automotive, computers, and many more. To summarize, while using Fusion 360 my team and I created an adjustable standoff which we would find convenient as a real part to use in our robot. In conclusion, while designing this part of my team and I gained skills using this 3d designing software which in the future will hold numerous benefits.