Final Report

The foam roller is our newly designed vex part. It consists of two independent pieces that work in tandem to provide a more effective means of manipulating field elements. The system consists of a clamp and a knurled spacer. Our goal with the foam roller is to provide an alternative to the classic rubber band plus sprocket setup that many teams use today. We found much frustration with the rubber bands because we would have to constantly replace them and adjust the tension, but with the foam roller, there is no need to perform maintenance on it during a competition. This will give teams much more consistency and reliability than previously available. Also, the foam roller can be of any width, which is something rubber bands cannot do as they are rotating and manipulating an object with the use of tension; in other words, we would need multiple sizes of rubber bands for different widths, which is a hassle and time consuming. Moreover, rubber band snapping and entanglement with other robots will not be a problem if the foam roller is used. These problems have plagued our team for the past two years, so we decided that we should create a part that would provide a clean and useful product.

Our idea could be used in various ways throughout the robot, many of which pertain to the robot’s interactions with the field elements. The new part would be used in robot designs as a primary intake for various objects. This part would be the backbone of many robot designs, as it allows for a better intake of balls and other field elements. It could also be used to flexibly secure field elements within the robot for later use. Finally, it can be used to gently output any field elements previously stored in the robot. The foam tube would come in one size, from which teams can cut it down to fit their needs perfectly. The clamp would be attached to the foam so that it will not wriggle around and will be held tightly. Instead of the rubber banded sprockets that stretch from one side to the other, we would use a knurled piece that would fit into the foam and hold it together with the clamp acting as the support with it, and this will be how our foam roller would work. The knurled spacer is as important as the clamp because it holds on to the sides of the foam and make it rotate in tandem with the axle. Also, it prevents the foam from getting pushed inside by force. In our robot, we use this creation for the intake of the spheres in the current challenge.

To create the foam roller, we used Tinkercad (the current version as of 12/5/2020). We first brainstormed on how to make strong braces that would keep the foam in place, and a solid substance that would provide grip and bloat out the hollow foam, which would become our knurled spacer. Then, we used basic shapes and cut around them using various shapes to make the clamp. The knurled spacer, however, took much more time because of the repeated process of making small incisions to make grips. In the end, we successfully made it work, but it took a lot of precise holing for the screw holes and reprinting to successfully create this piece.

From this project, I gained a good amount of insight into the creation of new parts and the patience and difficulty it takes to create a precise working object. However, I do believe that this was good experience as this motivated me to make interesting objects to experiment with. So, I do believe that I will be using Autodesk software in the future to create better parts and make things that interest me. Also, while doing this project, me and my team realized that 3D design would be extremely useful while creating a robot because it would let us digitally create a model of the robot without having to manually construct it. This would save time and make our robots much more precise.