Make It Real CAD Engineering Challenge Sponsored by Autodesk - 2020

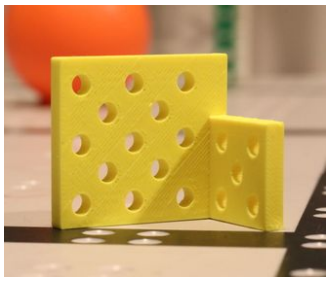
The Smarter Motor Mount

Team Corrupt Code 404a - Vex IQ

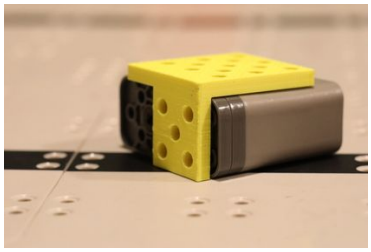
Brief Introduction:

Identify why you created the part - what functionality are you improving or what issue are you solving?

As the team builder, the thing I despise most about the building process would easily be the motor mounting. There is no real “efficient” way to mount a Smart Motor to a beam. When I found out that there were Smart Motor mounts, I was relieved. We would finally have an efficient way to mount motors to other pieces without any issues. Though when the mounts came, I was gravely disappointed. The pieces had minimal uses, and just about forced you to mount the motor in only a certain way. This was terrible news for our team, as the motor we needed to mount could not be mounted with the pieces we had ordered. Being bright students, my fellow teammates and I tried to use normal beams and standoffs to mount the motor. Although it worked, it was not compact at all. We need it to be compact because this motor needed to be hooked up to a gearbox, and because the mounting took up so much space, we could not attach the motor to the gearbox. We were disappointed. We needed to come up with a solution. Here is where our piece comes in. Our idea is to make a piece that can attach to a motor, but also attach to any beam. So, we took a ruler, a motor, and over 10 hours of Autodesk Inventor training to make the perfect piece. Our “Smarter Motor Mount” is lighter, simpler, and much much better than any other mounting method.



Explanation of how the new part would be used and how it fits into an existing design.



Our new piece would be used on many competitive robots. Many teams wish to mount motors without any excess weight. Whenever I build a new design for my team, weight is always my top priority. We want our robot to move fast, and be able to accurately maneuver throughout the entire field. We aim to eliminate all issues when mounting a motor, such as drift, friction, and overall complexity. This piece could easily make any existing design more stable, and simpler to repair. Most teams would have to temporarily take apart their entire mounting system for repairs, but if they used this piece all they would have to do is just snap it off.

Explanation of how you used Fusion 360, Inventor and/or Tinkercad to create your new part AND clearly state the version of software you used.

- Autodesk Inventor Professional 2020 (Win x64)

https://www.autodesk.com/education/free-software/inventor-professional

We first started off with a 2d drawing. Using a ruler and a beam, we were able to get (almost) exact measurements for our piece. We then used the extrude tool to expand the piece in 2 different directions. After that, we went back into the drawing to create small circles for the holes (.5 cm diameter). We then used the hole tool to finish off the job, creating our piece. Since we don't have access to a 3d Printer, we called a store in a nearby city to print it for us. One problem that we ran into while designing it was that the holes were hitting part of the piece that attaches to the motor. We fixed this by going back into the drawing and removing the holes.

Brief conclusion: What did you learn from this project? Will you use 3D design software in the future? If so, what for? How does this software help you if you are on a competitive robotics team? Will learning 3D design software help you in your career path? If so, how?

When choosing between using Tinkercad or Inventor, we picked inventor because it is the same software that professionals use! So, as a team, we learned how to use it with ease. I plan on going into mechanical engineering at a 4-year university, so learning how to use a professional CAD software will easily help me out greatly. I know that mechanical engineers use a 3d modeling software when making parts or pieces that they do not have. I plan on using a 3d design software as much as possible, as many jobs today require 3d printing and modeling. Using a 3d design software would also help me show and demonstrate new robot designs to my team without having to take apart our current robot, and risk not being able to put it back together. I feel like this challenge has really made me learn many valuable things that will help me when my teammates and I enter the workforce.