

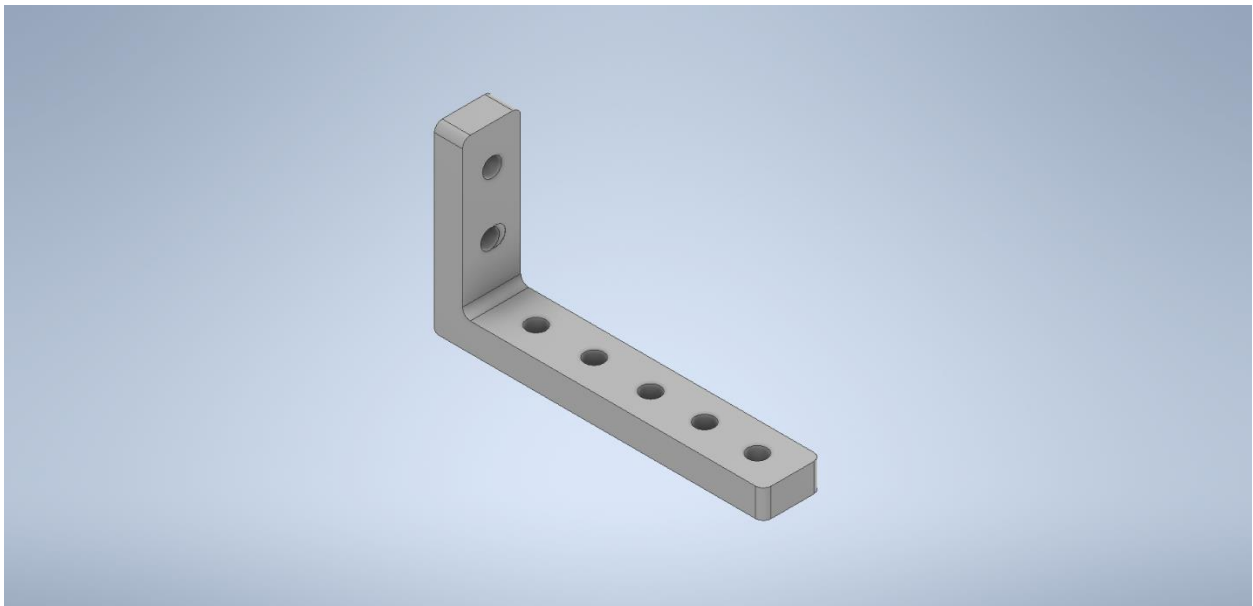
4606M—Addison Kring, Paella Madsen, Elizabeth Matthews, Ava Middleton, Mina Vendt

Make It Real Online Challenge

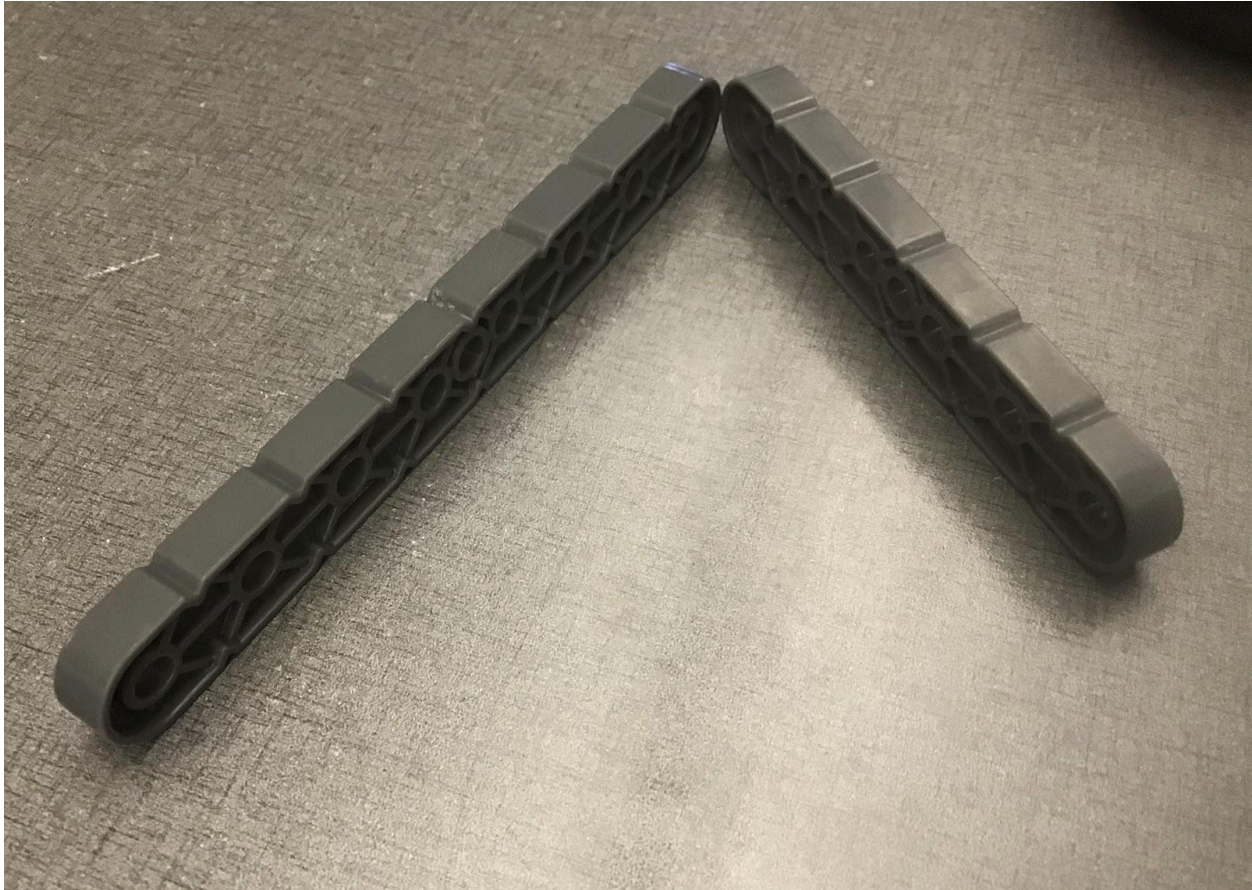
8 January 2020

Bent Beam-Make It Real Online Challenge Essay

Have you ever wanted an angle beam that didn't need corner connectors to change the direction of two other beams? We have. That's why we designed the Bent Beam (below).



The bent beam is especially built for a robot that needed to have two beams change direction, as shown below.



If a robot had parts in the way of putting a corner connector where the two beams must meet, or especially if they needed an angle other than 90 degrees, then our Bent Beam would be used. After all, the part would come in more than the 90 degree angle shown in our design, but we chose to design an example of a 90 degree angled Bent Beam.

To create our Bent Beam, we used the Autodesk Inventor Professional 2020 software. Using this software, we first created an 'L' shape, similar to the existing 3x5 Right Angle beam. The two parts are very similar, because we measured the right angle beam to find the dimensions for our Bent Beam. To this 'L' shape, we added fillets to curve the corners. Next, we added holes to the sides so that the part can be attached to another Vex IQ part. We then changed the material to plastic, and changed the color to the same gray that we are used to seeing on our Vex IQ parts.

We learned so much throughout the course of this project. For example, we now know how to be patient with not only the time it took, but also with each other and Autodesk; how to use Autodesk Inventor software; flexibility; and working together.

In the beginning, before we started using Autodesk, everyone had their own ideas about what we were going to make—we knew what problem we would solve, but many of us were stubborn about how to solve the problem that we had chosen. We all wanted our ideas to be the one that was chosen, so we had to compromise and learn we had to be patient with each other. We also had to be patient when Autodesk didn't do what we had expected.

When we started using Autodesk, we were taught how to create a rectangular prism, but after that, found out how to do the rest ourselves. By our exploration of the software, we found out how to make holes, fillets, and how to add a vertical shape onto a pre-existing horizontal shape.

We had to be flexible when we found that the software couldn't do everything we wanted it to do. We also had to be flexible when we couldn't work on it every day, and how we had to complete it within a very small time frame.

Every time we went to work on it, we struggled to all work together and design at once.

In the future, many of us are hoping to participate in Autodesk and other 3D design classes for education in high school and beyond.

This software will help us on a competitive robotics team since when you use 3D design software, you have to use the engineering design process. When working to improve your robot, and/or your programs, you must use the engineering design process. During this Make It Real challenge, we used the engineering design process by first deciding what problem we should

solve. We decided to solve the problem of not always having access to corner connectors to angle a beam. Next, we brainstormed multiple solutions, like a hinge, but we decided on the Bent Beam. After that, we planned out how we were going to make our piece and drew a few sketches of the bent beam and how it looked in our heads. We followed the plan we had set out, along with looking at our sketches, we created the piece on Autodesk.

3D design software will help one member of our team in her career path especially because she aspires to be a software engineer. The lessons that all of us have learned, thanks to 3D design software, will help us in our career paths because they have made us better people.