Angled Bearing

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Angled Bearing Overview

The Angled Bearing is an essential component that will simplify the construction of any robot. The purpose of the Angled Bearing is to secure a shaft alongside the edge of any C-Channel aluminum or steel piece, so that the shaft does not touch the metal. This will be helpful to teams that are working with multiple bearings adjacent to each other, as it is currently an issue of adjacent bearings blocking the movement of a shaft.

The 3D printed Angled Bearing piece

The piece itself took inspiration from the VEX flat bearing. The piece includes a sharp ninety-degree turn on one end of the 3-hole piece. Its dimensions are 29 mm in length, 10 mm in length, and 13 mm in height. In theory, the piece will be made out of the same plastic material as the VEX flat bearing to assure the same quality.

The piece is versatile and can be used in various ways. One way to use it is to have the short end of the Angled Bearing placed along the short side of the C-channel and then adjust the piece, so that the holes of the Angled Bearing are in line with the holes of the C-channel. After that, fasten the Angled Bearing by putting in a screw and securing it with a bolt. Do this to the two holes on the long end of the Angled Bearing. Then, insert the shaft through the remaining hole.

Other ways one could use the Angled Bearing is by inverting the bearing, so that the short side of the bearing goes over the side of the C-channel. The two holes on the long side of the bearing can then be fastened to the middle portion of the C-channel using screws and nylon spacers.

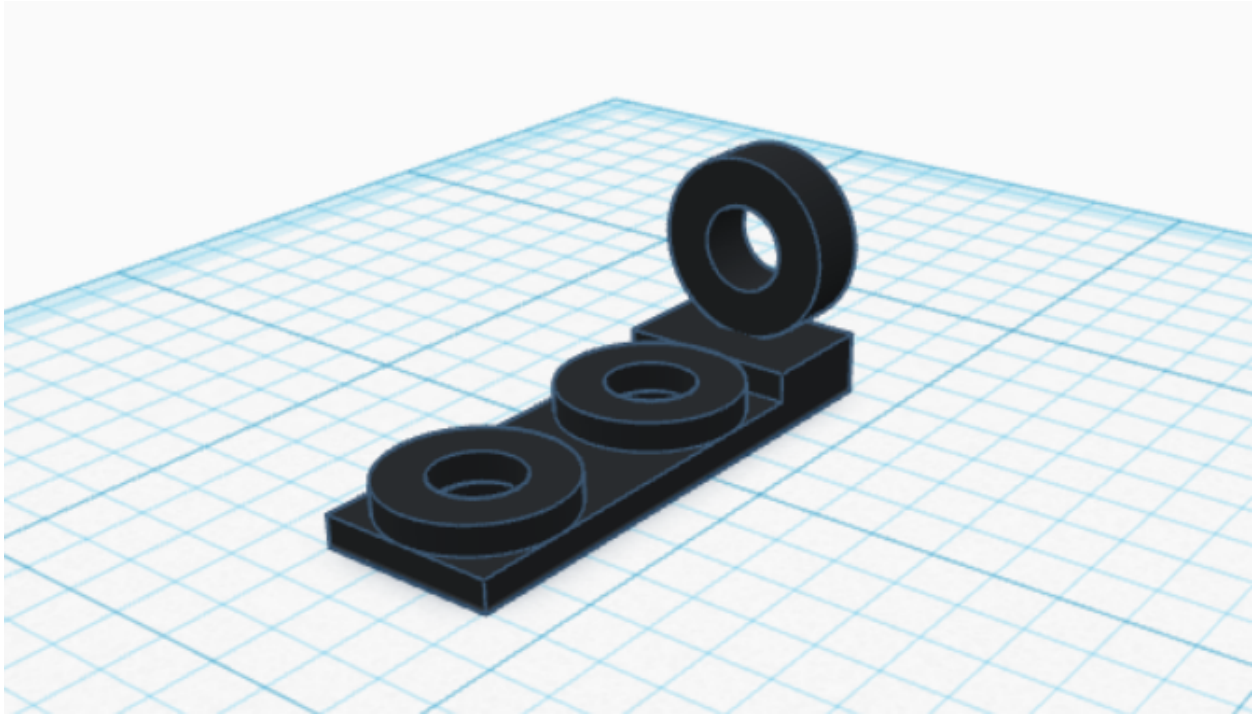
Design Process

Of our team of six members, three of us (Joshua, Dev and Sushant) worked on the CAD online challenge. At first, during the designing of the piece, all three of us worked together to brainstorm ideas. After deciding on what we wanted to create, we assigned a task to each member to be more efficient. Dev led the creation of a CAD model of our piece, Sushant led the process for printing our piece, and Joshua led the creation of our CAD report.

When deciding on a possible CAD piece, we focused on finding solutions to problems we encountered when building or driving our robot. One issue that we encountered numerous times was a lack of holes when trying to use bearing flats. Because of this, we had to make unwanted changes to our robot because we could not use shafts in certain areas on our robot. We realized that a new, more versatile bearing flat would be instrumental in helping the building process. After we decided what to build, we finalized our design concept and began designing the piece.

This year, we used the 3D Design section in Autodesk Tinkercad as our software to design the piece. First, we used basic shapes to visualize our idea. These shapes consisted of rectangles and circles. This part of the process was to help us get a better understanding of what our outcome would be. The Tinkercad software was easy to understand and allowed us to manipulate basic shapes into more complex ones. Then, we began refining our design by adding details such as making measurements more accurate and adding screw

and axle holes. These edits greatly improved our piece and gave us our final product.



This is the Tinkercad design for the Angled Bearing.

After we settled on a design of the Angled Bearing, we 3D printed our design. We tested the piece, and it works on an official VEX C-channel.

The Future of the Angled Bearing

Although what we created is a working piece, there is still much more we can do to improve the Angled Bearing. Given more time, we could find a better material to create our piece and add small textural designs to help grip onto the C-channel. Another major adjustment we could consider is redesigning our CAD model using more sophisticated CAD software such as Fusion 360 or Autodesk Inventor. This would allow us to create a more detailed version of the Angled Bearing, allowing us to make smaller adjustments.

Our Findings

We are a new high school VRC team. Competing in the CAD online challenge provided us an enriching experience, improved our ability to problem solve, and exposed us to design tools. This experience will assist us in a number of future careers, especially those in technology, robotics or medical innovation. Completing the design process, from brainstorming to assembly and finally to testing, is an essential lesson to succeed in team projects.

Credits

“Angled Bearing” by The Hexperts, Team 2657A
Dev Patel, Joshua Edwards and Sushant Bhopale