

Pneumatic Tube Handler

Team 7536S

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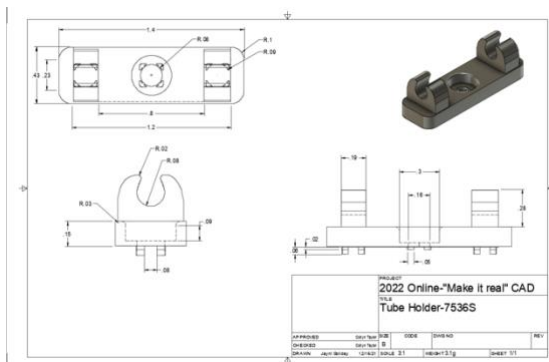
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Our CAD design allows for pneumatic tubing to be organized, protected, and held in place. There are no pneumatic parts that hold tubing as of now. Having a holder and organizer for tubing could be extremely helpful for those who have a lot of air functions, or do not want to risk their tubing getting ruptured or pulled apart. Our piece can be screwed into the metal channels the same as a bearing or sensor. There is a hole in the center of our part that nests the screw so that it is counter-sunk, which allows for less contact between the tube and the screw.

The functionality that the Tube Holder improves is management of the air tubes on the robot. The inch and a half by inch piece provides the ability to keep the loose tubing from moving into the path of moving parts or getting stuck onto another robot during a match and being pulled out. While building our robot and adding our pneumatic system and hoses we had to route our tubes through the metal holes, which can rub the tube and can eventually rub a hole in it. This makes us lose pressure in our system and makes us unable to continue that match. The Tube Holder provides the security of the tubes that could cause us to win or lose a match.



The Tube Handler is a simple install piece that can easily be fitted onto any robot in any place. A screw goes through the center hole and through the metal, then it is locked in by a nut on the other side of the metal in any direction or spot. The Tube Handler is not a very large piece and is like other vex parts, such as the pillow bearing and axle bearing, so the piece fits the other concepts of the Vex family of parts. After the design of the Tube Handler, we were

able to 3D print the piece and put it on our current robot that we compete with. We easily installed the pieces and effectively held the tube down and kept it out of the way of moving parts and reach of another robot that might attach to them. We think that our idea would be a good choice because the part is inexpensive to make and provides a function not currently available in Vex. It can be made from a plastic material and doesn't require much alteration from other parts, such as the pillow bearing or flat bearing.

When creating this piece, we used the 2.0.11894 version of Autodesk Fusion for the MacBook Air 9. We utilized the Drawing tool to get the layout of the base of the piece first. Then we extruded the drawing .15 in upward. We measured a screw and used those measurements to create a place where the screw is counter-sunk into the base, so the tube does not rub against it. We then drew and extruded boxes on the part that would later serve as the actual tub holder. We measured the

width of the tubing and made a hole in one of the boxes that is slightly bigger than the tube. Then we created a path from the circle to the end of the box and extrude cut it to get the part where the tube itself is inserted. Finally, we rounded the edges of the part using the fillet tool so that the tube is not punctured by the sharp edges.

We learned how to CAD using Autodesk Fusion, and we learned how to take measurements. Also, we implemented those measurements into a design properly and effectively as well as how to create simple, aesthetically appealing parts that work efficiently. This skill can help us create 3D printable parts quickly and effectively, which could be very helpful in a work environment, as it leads to more high-quality parts efficiently. Learning how to properly measure is an important life skill for any situation in the workforce and outside of it.