VEX AUTODESK CAD CHALLENGE

Report by team 839Z

Caution Tape Robotics Club

205 Riveira Drive
Markham, Ontario, Canada

Cautiontape.ca

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Product Summary

The VEX Tensioner is a rubber band tensioning system that is designed to provide a simple and effective way to add tension to the rubber bands used in VEX Robotics. The system is composed of a central double-ended screw and two fly nuts that attach to either rubber bands or a static point on the robot. This design allows teams to easily adjust the tension on their rubber bands, which is crucial for the performance and reliability of their robots.

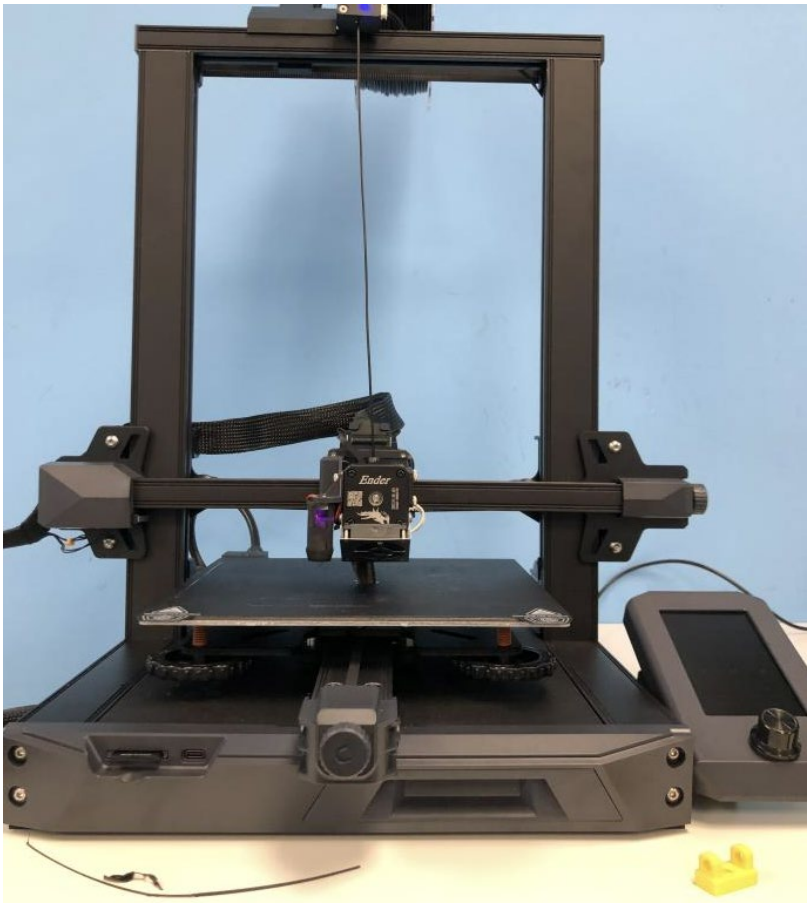

fig 1: our 3d printer making the part

Introduction

VEX Robotics is a popular program for students to learn about engineering, design, and problem-solving. One of the essential components of a VEX robot is the use of rubber bands, which are used to provide tension for various mechanisms on the robot. However, adjusting the tension on these rubber bands can be a tedious and time-consuming task. The VEX Tensioner was designed to solve this problem by providing a simple and effective way to add tension to the rubber bands used in VEX Robotics.

How it works

The VEX Tensioner consists of a central double-ended screw and two fly nuts. The central double-ended screw is inserted through the center of the tensioner and is used to adjust the tension on the rubber bands. The two fly nuts are then attached to either the rubber bands or a static point on the robot. This design allows teams to easily adjust the tension on their rubber bands by simply turning the central double-ended screw.

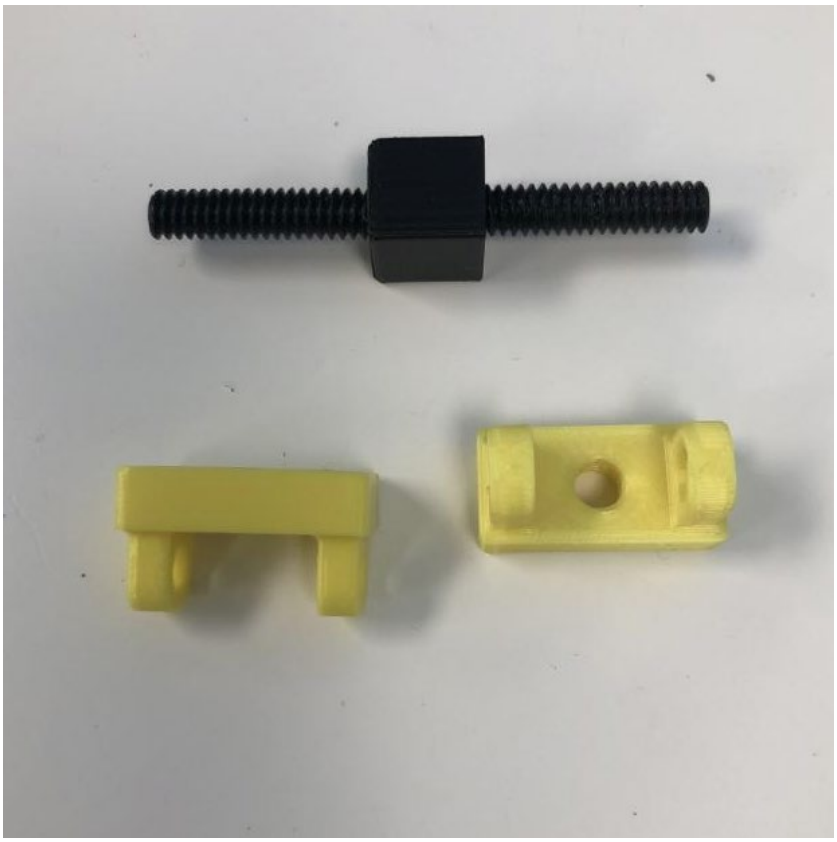

Fig. 2: the tensioner unassembled

To use the VEX Tensioner, teams first attach the fly nuts to their rubber bands or static point on the robot. The central double-ended screw is then inserted through the center of the tensioner and is used to adjust the tension on the rubber bands. By turning the screw clockwise, teams can add tension to the rubber bands, and by turning it counterclockwise, they can release tension.

The VEX Tensioner is designed to be lightweight and compact, making it easy to install and use on any VEX robot. It is also made of durable materials, ensuring that it can withstand the rigors of competition and regular use.

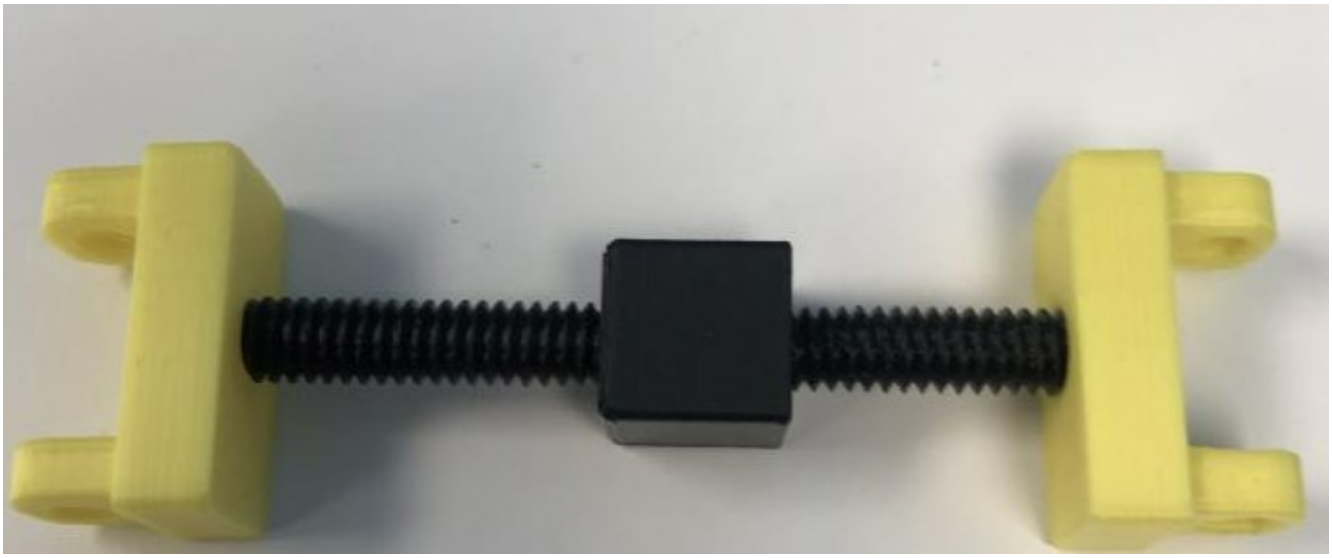

Fig. 3: the tensioner assembled

Additionally, the VEX Tensioner allows teams to make quick and precise adjustments to their rubber bands during competitions or practice. This means that teams can easily make changes to their robots during a match to adapt to different situations and improve their performance.

Moreover, the VEX Tensioner eliminates the need for multiple tools, such as pliers or wrenches, to adjust the tension of the rubber bands, this makes it more convenient for teams to use it. Another benefit of the VEX Tensioner is its versatility. The design allows teams to attach the fly nuts to either the rubber bands or a static point on the robot, providing teams with more options for how they want to use the tensioner. This allows teams to be more creative in their designs and find new ways to use the tensioner on their robots.

How it’s made

The engineering design process is a systematic approach to solving problems and creating new products or systems. It involves several stages, including problem identification, research and analysis, design and development, testing and evaluation, and implementation.

When using Fusion 360 and 3D printing to design and manufacture the VEX Tensioner, the following stages of the engineering design process are involved: Problem identification: The problem of adjusting the tension on rubber bands used in VEX Robotics is identified as the main challenge.

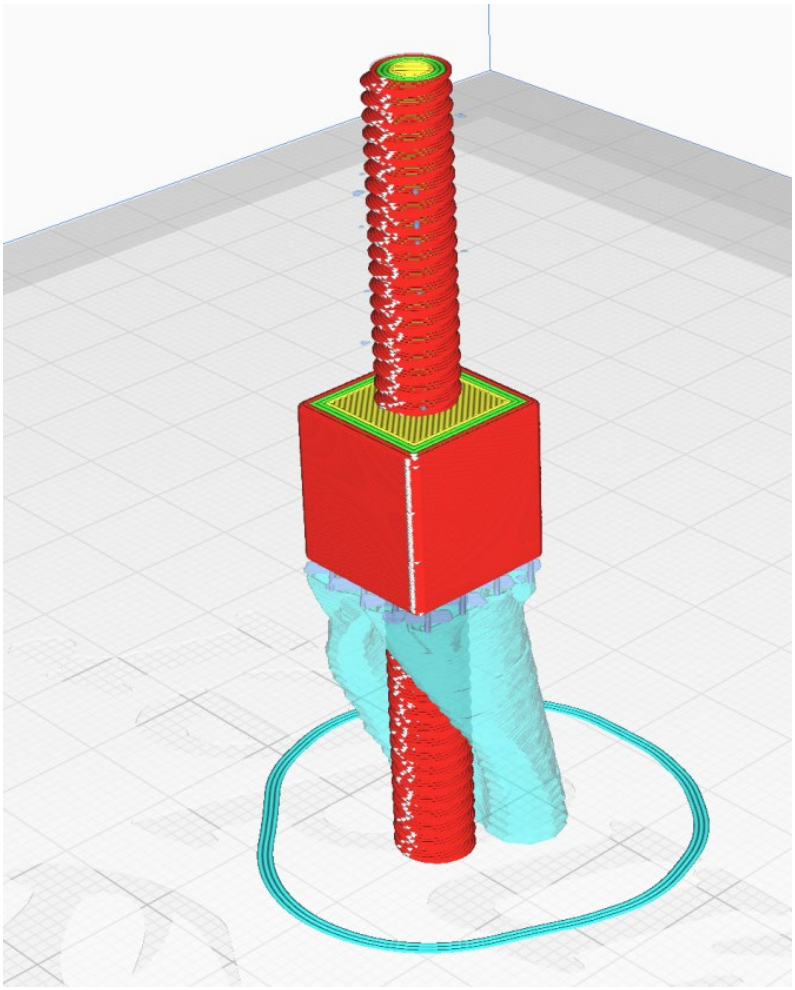

Fig. 4: the screw ready to be printed

Research and analysis: Research is conducted on existing tensioning systems and the design requirements for the VEX Tensioner are determined.

Design and development: Using Fusion 360, the design of the VEX Tensioner is developed, including the central double-ended screw and the fly nuts. The parts are assembled together to form the final product.

3D Printing: The design is exported as an STL file which is used for 3D printing the tensioner. Testing and evaluation: The VEX Tensioner is tested to ensure that it works correctly and is able to withstand the forces required to achieve the desired tension.

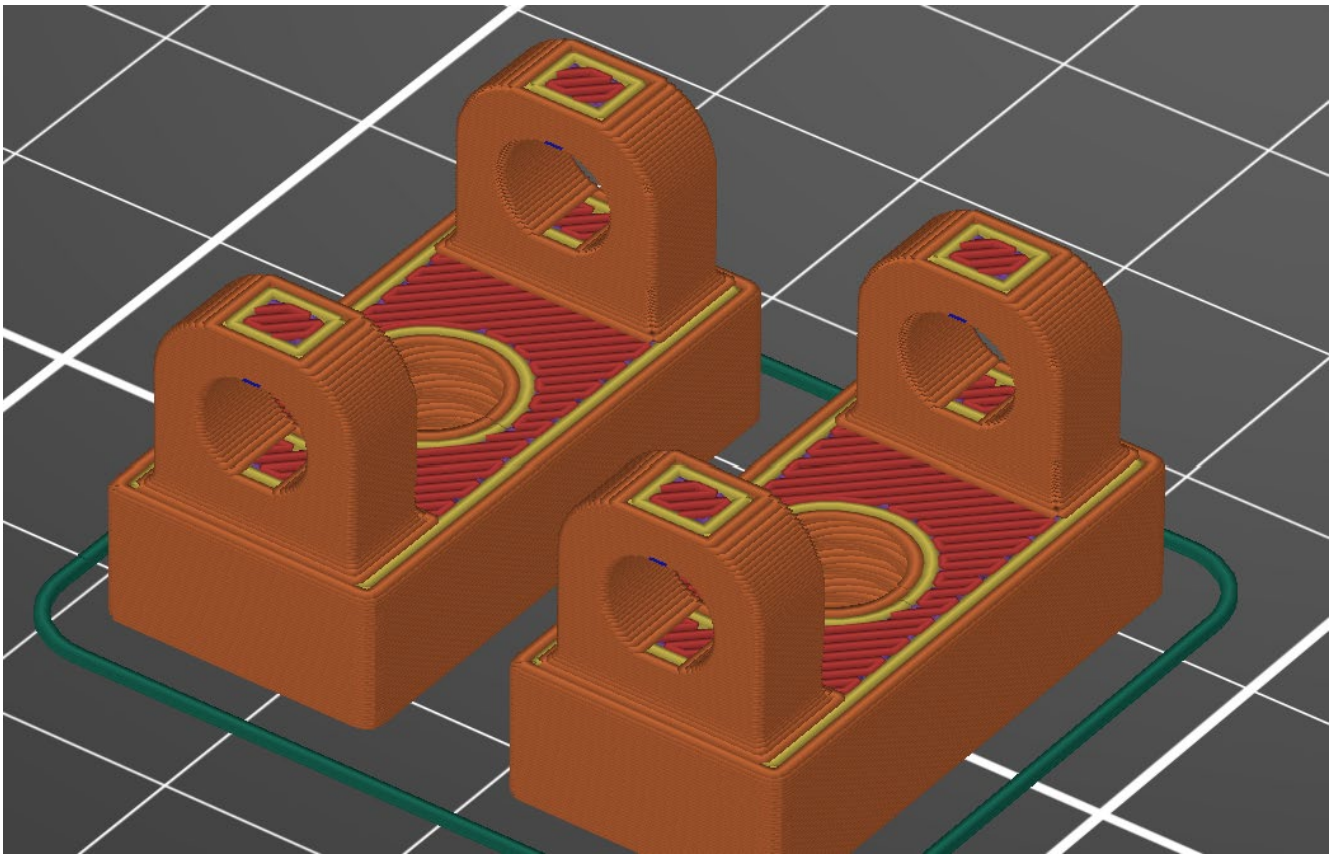

Fig. 5: the fly nuts ready to be printed

Iteration and improvement: Based on the results of the testing, adjustments may be made to the design to improve its performance.

Implementation: The VEX Tensioner is used on a testing rig and its effectiveness is evaluated.

Conclusion:

The VEX Tensioner is a simple and effective solution to the problem of adjusting the tension on rubber bands used in VEX Robotics. By providing a central double-ended screw and two fly nuts that can attach to either rubber bands or a static point on the robot, teams can easily adjust the tension on their rubber bands. The VEX Tensioner is a durable and lightweight design that is easy to install and use on any VEX robot, making it an essential tool for teams looking to improve the performance and reliability of their robots. With its user-friendly design and simplicity of use, the VEX Tensioner is a must-have for any team competing in VEX Robotics.