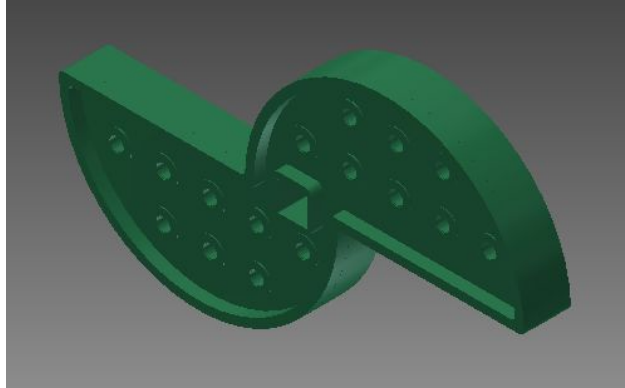


# Make it Real CAD Engineering Challenge Submission: Two-Sided Cam

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VEXMEN: X-23



## Overview

The two-sided cam would be an extremely useful part in the VEX EDR Robotics System when building spring-loaded mechanisms, like certain ones from this year's game, Nothing but Net. When creating a launcher or other mechanism that uses a cam and follower to shoot an object, there is a lot of torque required to rotate the cam. Since teams can't afford to use several motors, they use gears in order to generate enough torque. However, this causes a drastic decrease in the speed of the launcher.

The two-sided cam can easily fix this issue. Because of the unique shape of the cam, it will double the speed that any spring-loaded mechanism fires at. Also, the cam needs no extra torque in order to move and covers the same area while rotating. This allows teams to use gears to power their shooter while still maintaining a quick fire rate. As seen in the diagram below, the two-sided cam has the same "drop-off" distance as the current VEX cam. That is why the radii of the two cams' rotation areas are the same. The two-sided cam can easily replace the current VEX cam without requiring any extra torque or space.

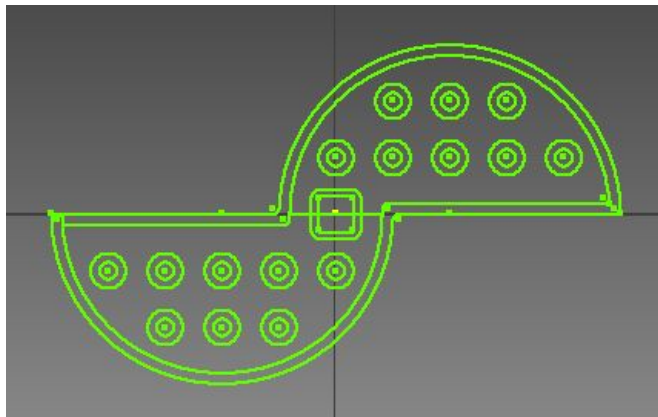
Our team encountered this problem ourselves, and we knew other teams had too. We did manage to make a two-sided cam out of polycarbonate, but we barely had enough polycarbonate to make it. When we saw this challenge, we saw it as an opportunity to share our solution for this issue with other teams, and to show how VEX can fix this issue for later games.

I created this part on Autodesk Inventor Professional by creating a detailed 2-dimensional sketch of the shape of the cam (see below). I then divided that sketch into parts and extruded each one individually to create the final product. From this

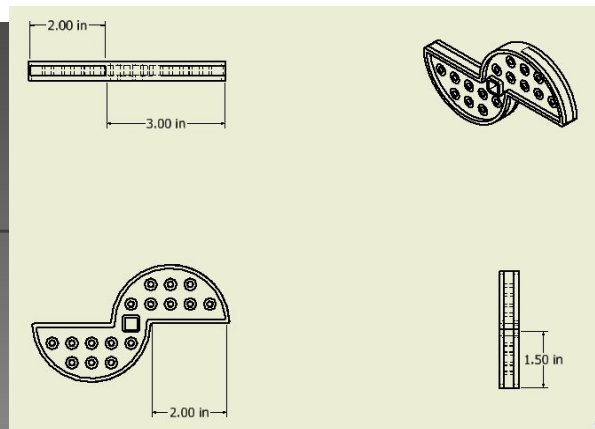
engineering challenge, I realized how inventions can be created by thinking about solutions to problems that occur in your own life.

Also, I have learned more of the functions in Autodesk Inventor. This was my second time using the program, but my first time was not as complex as this. I had to do some research in order to figure out all the features of the program. It is definitely something I will use in the future, and it will be extremely useful for visualizing ideas for future robots in the VEX Competition Program. It will definitely help our team see how all the parts of a robot fit together, and it will prevent any structural issues before we build the robot.

The program could also help me later in my life. If I want to create my own invention, I could use Inventor to help me visualize my ideas for the product before I start building mock-ups and prototypes. This would save a lot of time wasted on trial and error when building the product. Overall, the program is quite useful and its applications in people's lives are endless.



Two-Sided Cam Sketch (before extrusion)



Orthographic Drawing of Two-Sided Cam (with basic dimensions)