High strength lock bars

High strength lock bars are very useful in keeping gears from breaking in half, and keeping the hub from stripping out. The lock bar that I designed is made so that teams don’t have to us spacers to tighten the bolts without having to worry about bending the bar. Team Virus (3547) makes lock bars from vex one-bar by chopping them into 3, 5, and 7-hole high strength lock bars and sells them to teams all around the country. We have partnered with robosource to be able to sell them in Canada easily.

We make the lock bars by using a broach tool which is a rod that starts round, and turns in to a square as it goes down the rod. We also use tooling plates to keep the broach tool straight up and down as we punch the hole. We make the lock bars by cutting the one bar to the length we want, then we put the bar on to the tooling plates and drill out the middle hole to a quarter inch, then we use the broach tool to make the hole square again. Then we file the bur off the hole and sell and use them.

Because our team makes lock bars out of vex one-bar, that require spacers to tighten the screws down all the way, I decided to make one that would allow teams to not have to use spacers. The part would be used on gears in high stress areas so that they don’t break in half, but you could use them on all your gears. Since the part needs to be made from steel, if someone wants to 3-D print it they could use a process called Selective laser sintering that would make it as strong as one made from sheet metal. But it should be made from sheet metal like other vex parts.

Selective Laser Sintering is done by pointing a laser automatically in to a powder bed to bind powdered material to form the desired part. The powder for example can be steel, ceramic or plastic. For the bar, you would make them out of sintered steel, but the bar should just be made from sheet steel.

I designed this part by using Autodesk inventor professional. First, I imported the gears into the cad program so that I could match the lock bar up to the gear to make sure that it was the right size. Then I drew up the side of the part and extruded it. Then I punched the quarter-inch hole in the middle, and punched round holes on the outside of the lock bar for the screws. I used round holes so that the screws would fit in better than they do in square holes. I made three different bars, one for a 36-tooth gear, one for a 60-tooth gear, and one for an 84-tooth gear.

This project helped me to learn inventor better, then use that new knowledge to create a piece that would help teams with the problem of their gears breaking. I will use inventor in the future for designing my team’s robot, so that we can see if what we want to build will work before we build it. Learning a design software is not going to help in my career, but I am interested in being able to do it very well.