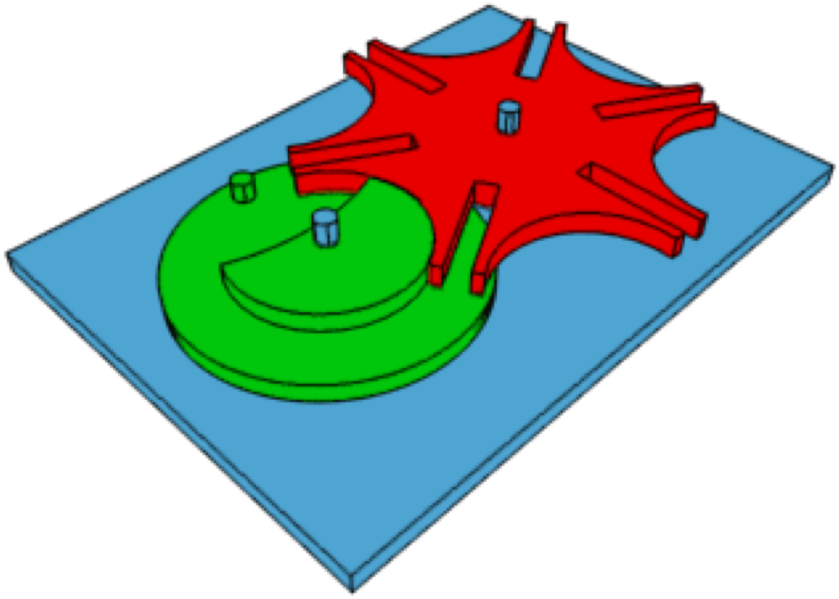
Brownell Talbot Robotics
Team 1028S



GENEVA GEAR

CAD MAKE IT REAL CHALLENGE

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INTRODUCTION

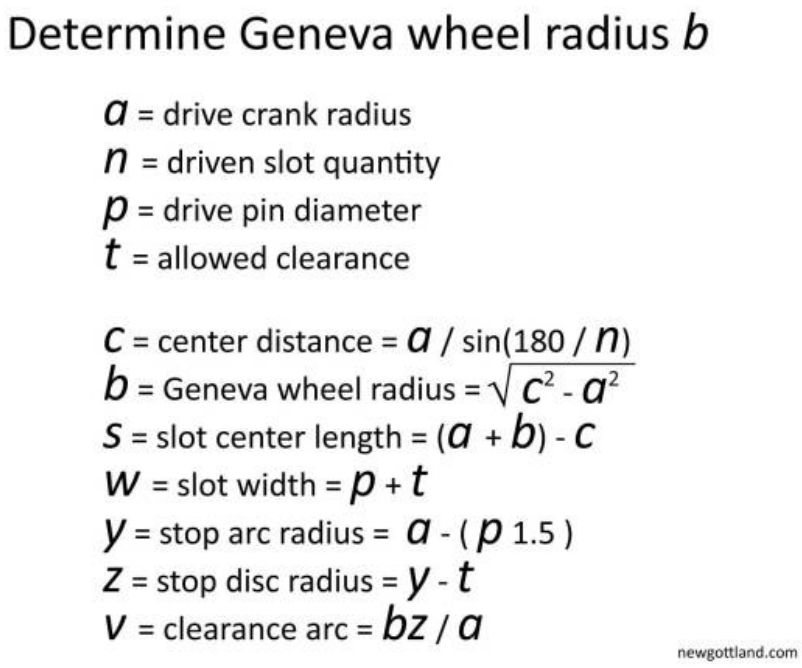
We created the Geneva gear to help us have an alternative to our gears. Instead of having to cut down the teeth of the gear to create a slip gear, the Geneva gear would be a perfect replacement while also having the gear presented in a clean way. It would also not require the pieces to be fabricated by hand.

VS.

HOW WOULD IT BE USED?

The new part would be placed wherever a gear would be, and would work like a slip gear. You would have two gears that make up the Geneva; the circle with a peg and the spiked gear that rotates. The Geneva gear design would work for the game this year, by using the intermittent rotary motion that the Geneva provides. This means that the spokes of the gear could be mathematically placed at certain degrees around the gear, and that would make the robot in turn rotate or advance in a very accurate way. The different sizes of the gears would also allow this, by using the time between each spoke to turn the gear. The Geneva not only works for this year's game, it would have worked in games in the past and into the future. In last years' game, Nothing but Net, our teams used the slip gear to launch the catapult, so the Geneva could have easily replaced that. If the future if there is any need for launching, triggering or accurate lifting and rotating capabilities, the Geneva gear would be perfect.

I created the Geneva gear on Autodesk Inventor Pro 2017. To do this, I first looked online for formulas to figure out the numbers that I would enter in the program for the dimensions. The Geneva gear consisted of three parts- the pedestal, the drive wheel and the driven wheel. The pedestal is the base that the gear is resting on, the drive wheel is the peg spinning on the circular base that sticks in the driven wheel allowing it to turn and the driven wheel is what turns in result and moves the actual robot. These three parts were put on three different files and then put together to make the whole Geneva gear.



CONCLUSION

The Geneva gear offers an unconventional solution to rotational movement. The gear is not found anywhere in VEX robotics parts. It has exposed us to a gearing system that we hadn't seen before; it also explains the third derivative perfectly well as the gear generates an infinite peak of jerk. As we are taking an engineering class, this is given us an opportunity to CAD an object not found in the high school curriculum of this class. I investigated the formula and successfully created the three parts of the gear. This has given me confidence to continue down this path as a career.