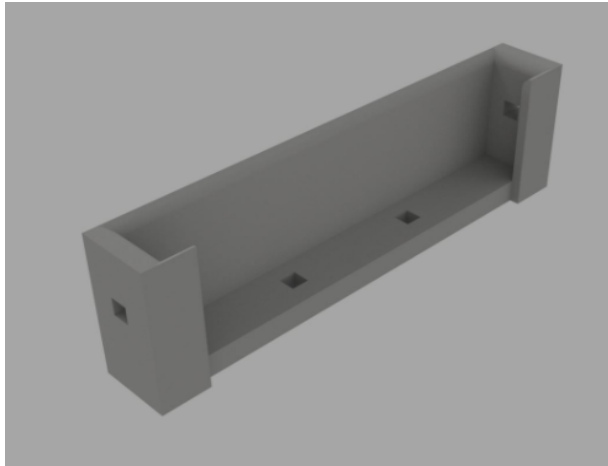


CAD Challenge Submission: The License Plate Flipper

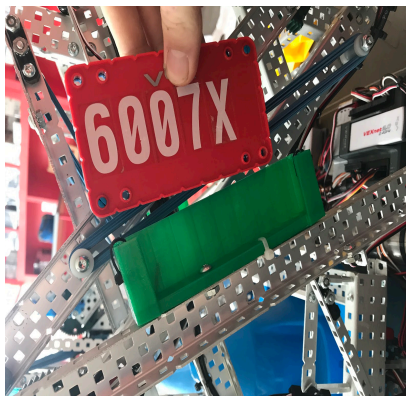


Introduction:

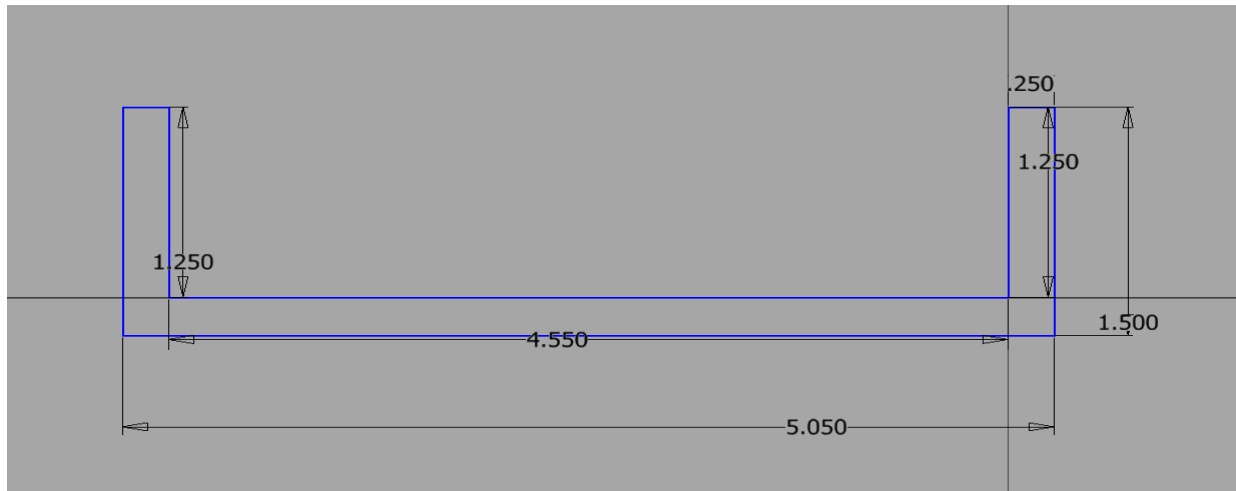
Imagine: You just finished a match and had to do maintenance on your robot. You finished fixing your robot just in time for the next match and you have 1 minute until the match starts. You now have to change out your blue license plates for red ones. Already low on time, you have to unscrew both license plates, switch them, and screw the new ones back on. License plate swaps take approximately 1 minute, so by the time you finish switching license plates, the match has already begun. We used Autodesk Inventor Professional 2017 to create the license plate flipper so we would not have to waste time switching out license plates.

Explanation of part:

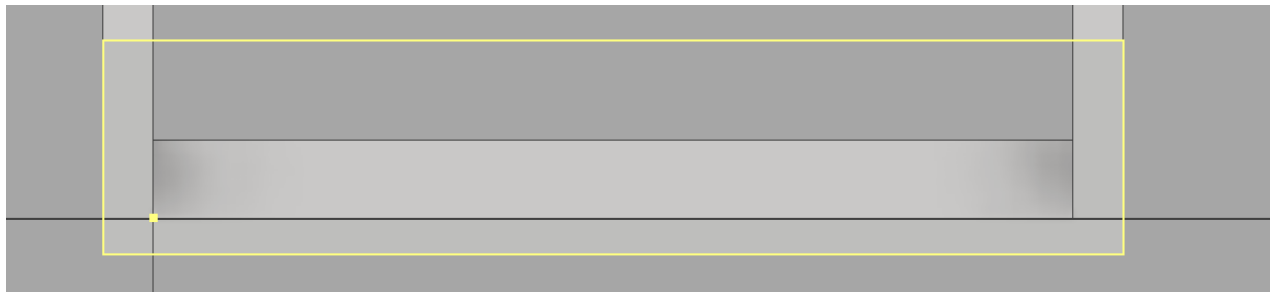
It is a very simple design which allows you to insert two standard VEX license plates “one red and one blue” from the top and switch the plate color by pulling them out and turning them 180 degrees horizontally and placing them back in the license plate flipper reversed. The License plate flipper has specially placed holes in it so it can be bolted into a VEX c-channel or L-channel. Additionally, after discovering that it was hard to align the license plates when inserting them into the flipper, we added fillets to the top of the inner faces, allowing the plates to be funneled in easily.



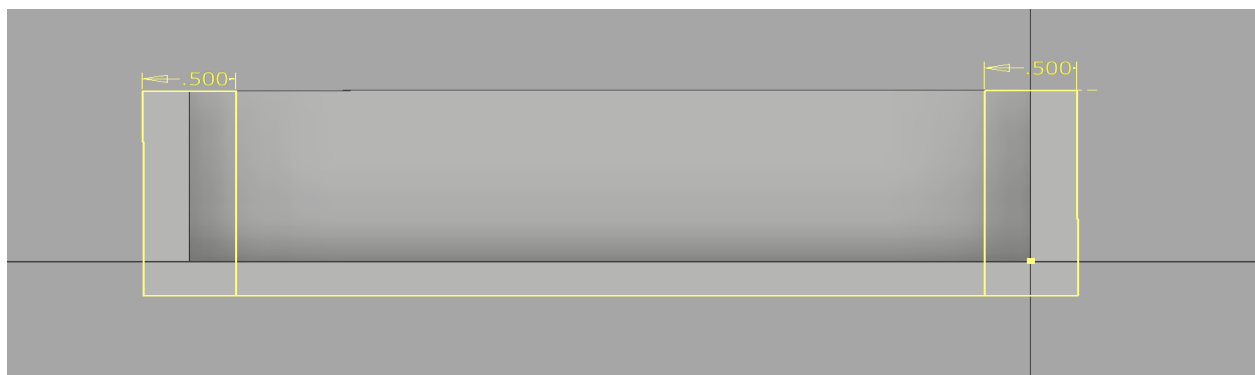
How we made the part using Autodesk Inventor 2017:



1. We made the outline of the license plate flipper to be just the right size to fit a license plate. And we extruded it .550 inches.



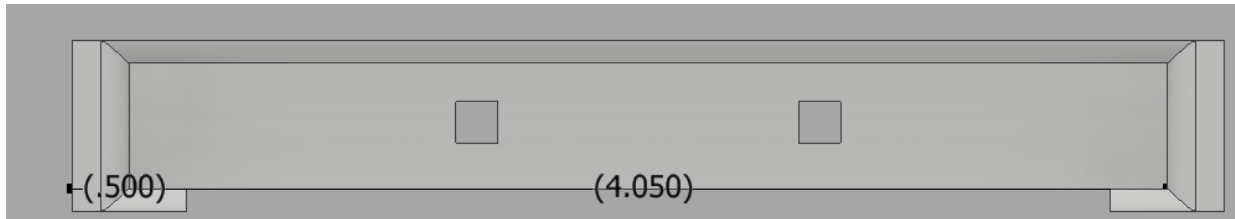
2. We needed a back wall to make the license plate flipper more rigid and so the license plate would not fall out so we made a sketch outlining the frame and extruded it .10 inches



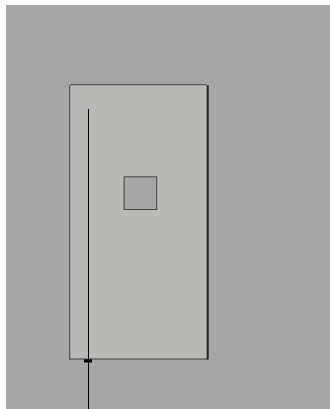
3. The front of the license plate holder also need something to hold it in as well not obstruct the view of the team number. So we sketched 2 rectangles where I wanted the holders to be and extruded them .10 inches



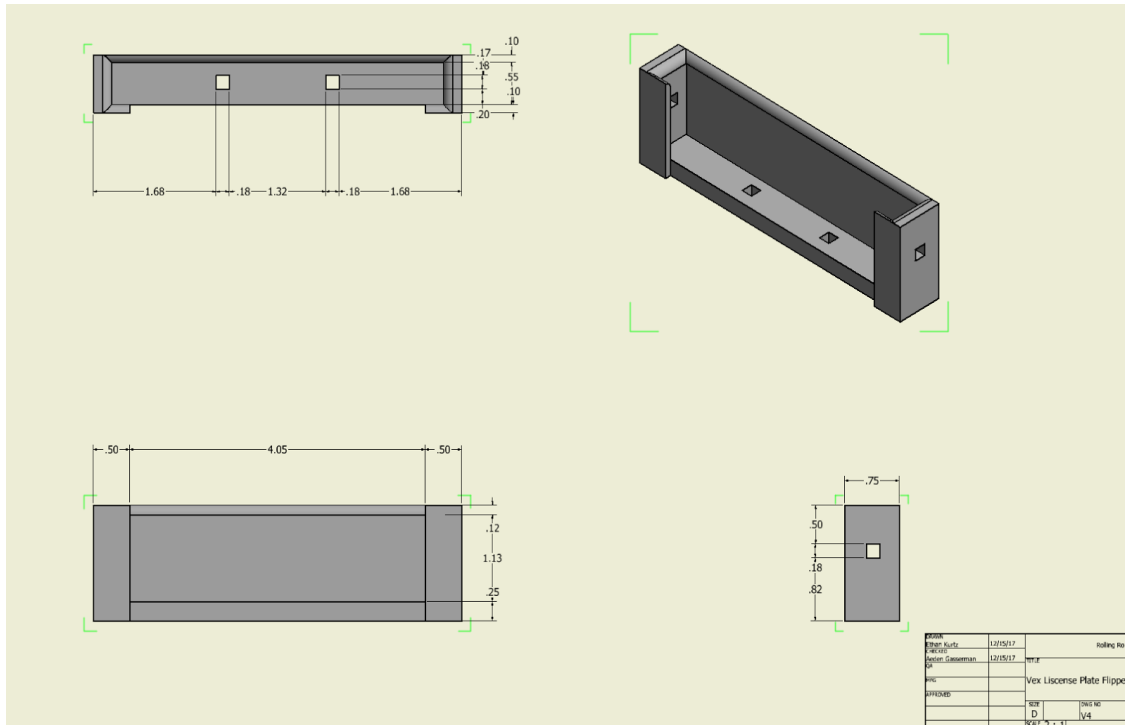
4. We wanted to achieve optimal license plate sliding to make it easier for the user to put in the license plate. So we filleted the edges with a .125 in. radius.



5. The license plate flipper needed a way to be screwed into the c-channel. So we made two holes each .182 inches wide and long which is just enough to fit a screw through and we extrude cut them.



6. We also made holes in the side just in case we wanted to screw them into a c-channel next to the license plate flipper.



In conclusion, I really enjoy using Autodesk Inventor. We have used Autodesk Inventor 2017 in sheet metal mode to model polycarbonate parts with great success. For instance, our cone intake for this year's game, VEX In the Zone, was designed almost entirely within Autodesk Inventor 2017 .The ability to make small changes to its construction has allowed us to implement an efficient iterative design process. The fact that you can take an idea, turn it a 3D model, and then manufacture it is absolutely amazing!