

Make It Real

Team Members

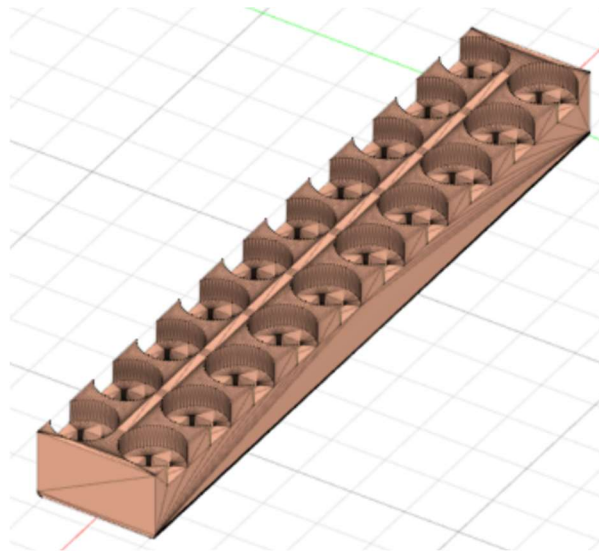
Bailey Burroughs, Michael Balazs

Team Name

CSM Talons

Location Of The Team

8730 Mitchell Road, La Plata MD, 20646

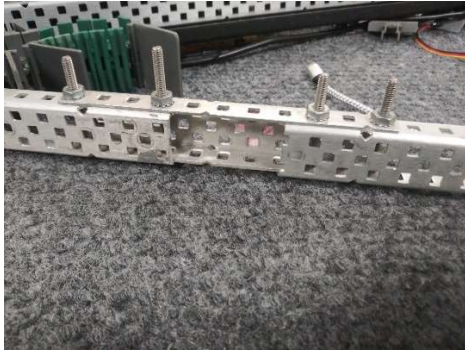


This is the final product of the challenge

Summary Report

Problem

When Creating the chassis for the 24 inch bot, to be able to reach the max length, two different lengths of C-Channels must be coupled. There are limited ways of combining the two together, which result in either weak areas near where the two are combined or becoming very difficult due to tight area.

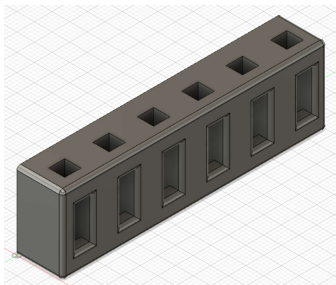


This is an example of a situation where two C-channel are connected. To combine the two, you would have to use a short third C-channel as a connector. There are two different ways of connecting the C-channels, both being difficult to do, due to the limit space. You can run a long screw through the two C-channels or use shorter ones and screw them together on the inside. Doing this is a hassle because it makes it hard to hold the nuts with the wrench since the area in between the C-channels are limited. Also with this method, the C-channels alone still have room to wiggle around.

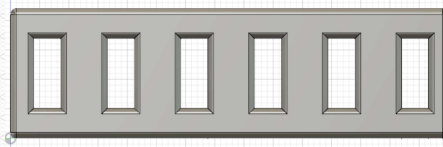
Solution Designs

All CAD items were developed utilizing Fusion 360

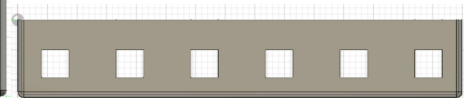
The Block



Full View



Front View



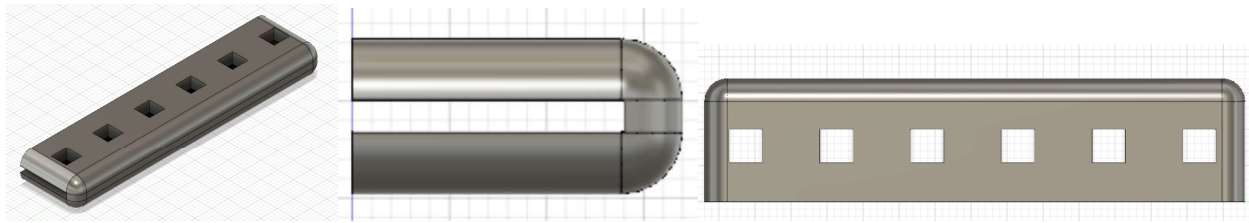
Top View

This design would slide in like the Coupler Insert. It would line up with the holes of the C-Channel and you would run a long screw down it and bolt it on the other side to hold it in place.

Pros- Has a simpler design, supports the C-channels inside, fits in the dimensions.

Cons- Does not support from the back, too bulky.

Wall Slider



Full View

Front View

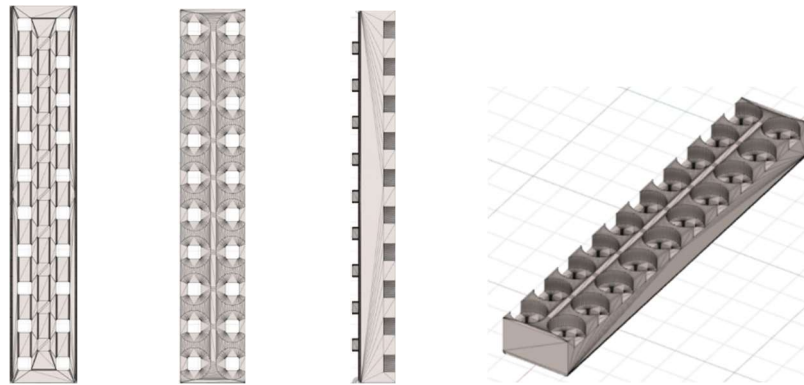
Top View

This design requires two of them to work. You will get both and slide them in the walls of the C-channel on top and bottom. They are fastened by screws and nuts through the hole to hold the two C-channels together.

Pros- Simplistic design

Cons- Outside desired dimensions, does not support back

Coupler Insert



Back View

Top View

Side View

Full View

This design is made to slide in the C-channel and screw to the back. Small screws with nuts are used to fasten to the C-channel. It also has slabs that allow for exact alignment for when fastening.

Pros- Back support, exact alignment, fits in desired dimensions.

Cons- complex design

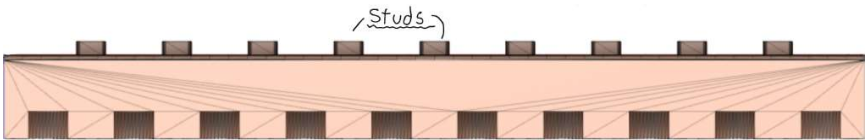
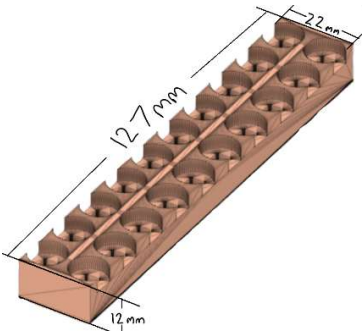
Decision Matrix

Designs	Does it fit in desired dimensions?	Simple Design?	Print Time?	Effectiveness?	Total
The Block	3	2	2	3	10
Wall Slider	1	3	3	2	9
Coupler Insert	4	2	2	3	11
Scaling					
Bad		Ok	Good		
1		2	3	4	

Solution

The best solution that was found is a Coupler Insert that is 127mm by 22mm by 14mm slab that is inserted inside of the C-Channel that holds the two together. The slab has holes through that allows for it to be screwed to the C-Channels. The back has studs that allow for it to lock into the C-Channel with ease. Without the studs, the depth is 12 mm The Top has circular holes that allow for the nuts of the screws to fit inside so that it stays flush of the dimensions of the C-Channel.

Coupler Insert was developed by Michael



Applicable Use View

The design choice was developed due to wanting to stay within the dimensions of the C-Channel for the chassis. Staying flush inside of the C-Channel is required so that the maximum space can be utilized for the bot, so that is why there are indents that allow the head of the screws to sit into. The back side having studs allow for exact alignment and extra support so that the Coupler Insert can maximize the amount of strength to the overall combined C-Channel.

Conclusion

While doing this project, the team found out many things while doing the process of developing methods to solve the problem. The team found that the simplest design sometimes not is the best method for the solution. It was found that getting more complex with the designs proves to be more useful in the long run. We found that we could get the CAD files from the Vex Robotics website which allowed for better measurements of the dimensions for the C-channel, and this will be useful in the future by allowing the team to make more precise custom CAD parts for our bots.