GNG 2101 Deliverable I

Deliverable I: Final Prototype Update

Submitted by

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Introduction

Prototypes are a way to test and experiment different components or designs of an idea. As more and more prototypes are created for a specific design, they will become more like the final ideal product. The third and final prototype of the posterior walker will be very similar to the final design, minus some minor tweaks and adjustments after testing the third prototype. For this project, the third prototype is very similar to the second prototype which was fabricated out of a different material and had temporary unfinished mechanisms such as the joints. In the third/final prototype, the material (pvc) was replaced with aluminium, and the joints were replaced with full working joints.

Due to an outbreak of Covid19 (Coronavirus disease), all workspaces were closed, and most social gatherings such as Design Day were cancelled, forcing the third and final prototype production to be halted. Covid19 is an infectious disease, very similar to the flu. This virus infects the lungs which causes respiratory problems, many symptoms similar to the flu, and in some cases death (mostly affectings people of older age, or very young age). Because of all of this, it is necessary to keep a far distance with everyone (approximately 1 meter or 3 feet) which led to the halt of this prototype.

Status update

As of this moment, the prototype has the main structure and joints created. These components have been tested and work very well! However, The corner joints which would hold the left and right side of the body to the back supports were not machined on time, and with the workshops closed, we were left with no other choice but to stop working (Figure of supports found in Figure 1). We had functional wheels and a functional braking system which was at the time being implemented onto the walker. The brakes needed to have some 3d parts printed so that it could fit onto our walker (as seen in figure 4), the original brakes (Figure 5) were not big enough to fit around the aluminium tubing. The wheels and brakes were removed from an old walker which we bought off of Kijiji (as seen in Figure 3). We had done this because of the availability and difficulty of finding the right components onlines (perfect size brakes and wheels). Besides these simple components, paint, clasps/locking mechanism (as shown in Figure 2), and comfort padding, the walker was nearly complete.

The purpose of this prototype was to create something almost identical to what we had designed initially. This prototype would be used for communication (to the client) as well and a whole assembly which would in time be our final product. The client would be able to use this prototype as a walker and test all of its wanted features.

Since the final prototype wasn't complete, we do not have a video of the final prototype being used, nor were we able to perform any testing to compare with target specifications. However, we assumed that the weight of the final prototype was as hoped (near the 8lbs target spec), as well as foldability and stability. The walker, even in it's unfinished state was very stable and the folding mechanisms were smooth and strong.

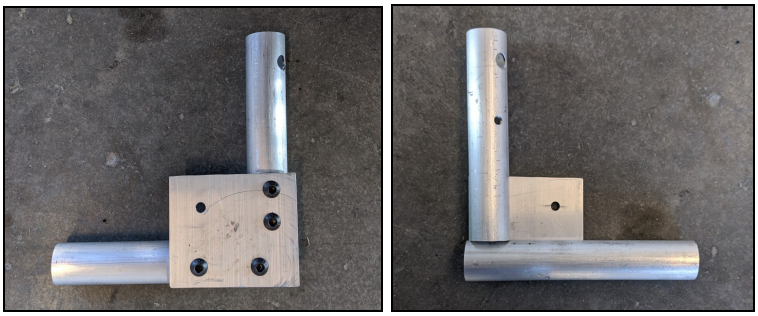

Figure 1: Aluminum joint plate U-shaped supports.

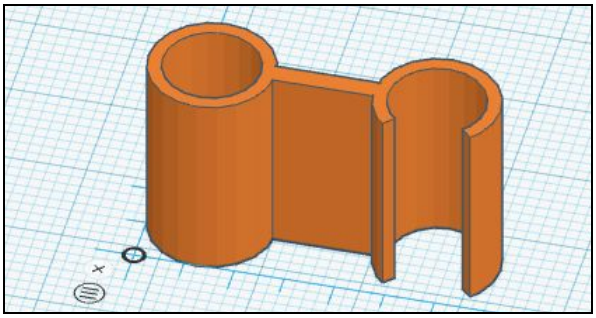

Figure 2: Latch clip updated for final prototype.

Figure 3: Second-hand walker purchased off of Kijiji for the purpose of recycling the wheels and hand brakes.

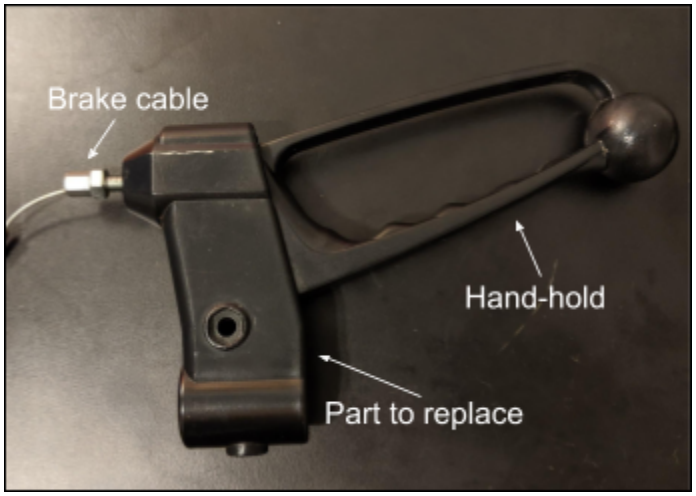

Figure 4: Original handbrake from walker with handhold and wire attached.


Figure 5: Comparison of walker handbrake part (inside view) and proposed replacement.

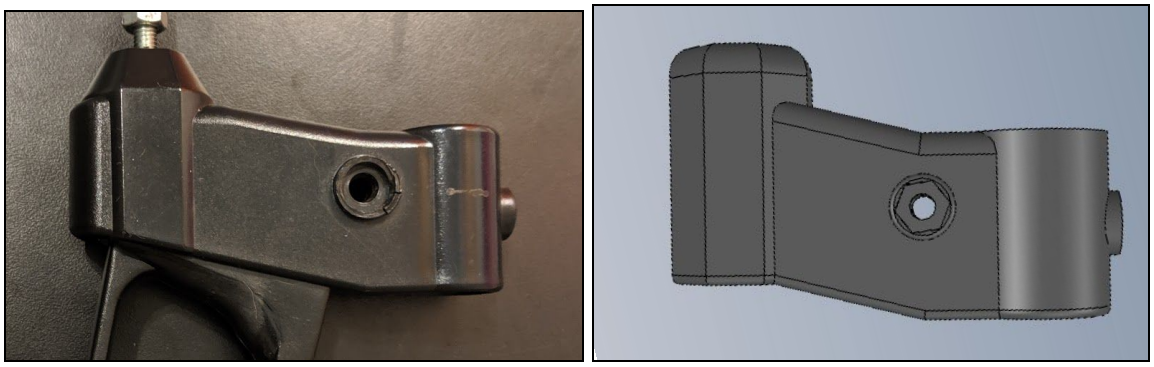
Figure 6: Comparison of walker handbrake part (side) and proposed replacement.

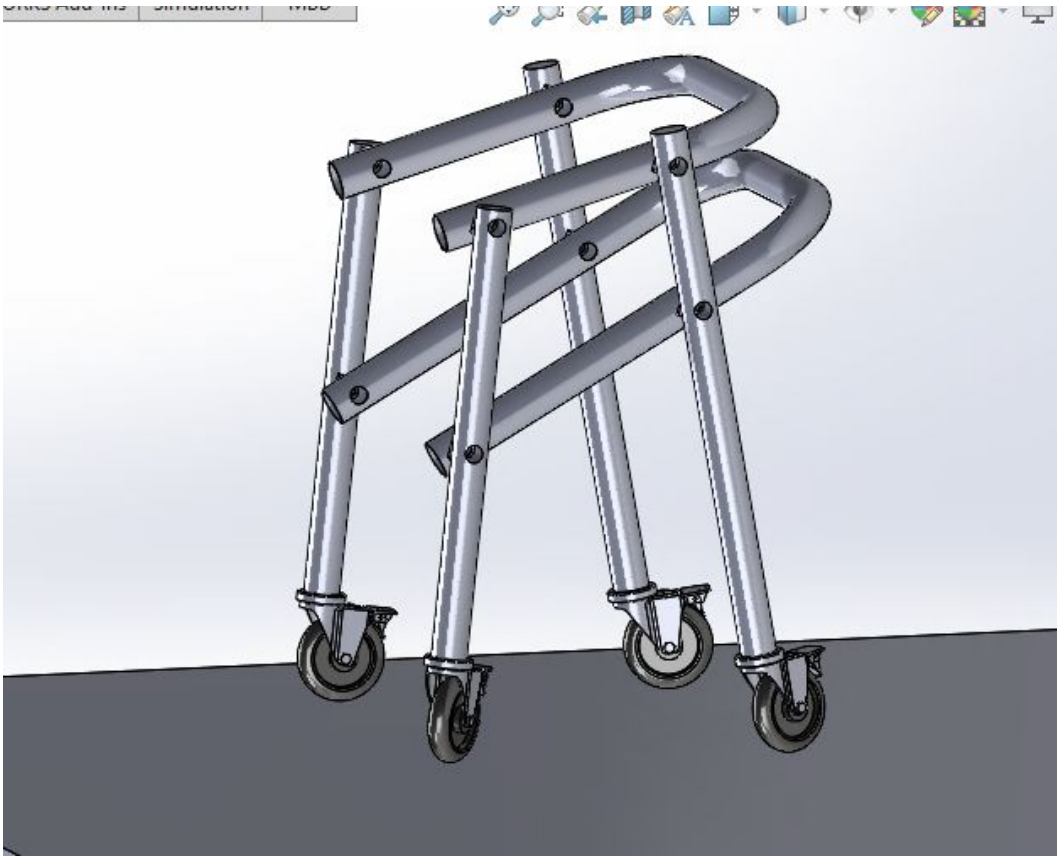

Figure 7: Solidworks Diagram of Walker

Testing Results

	Metric	Unit	Expected Value	Actual Value
1	Total Weight	lbs	>8	<10
2	Width of Collapsed Walker	in	>13	15

3	Wheel Movement	deg	360	360
4	Load Exerted	lbs	140	140+
5	Loading Time	s	25	10
6	Front Wheel Width	in	>7	5
7	Ideal Walker Height	in	>35	40
8	Maximum Back Wheel Width	in	>8	5
9	Maximum Wheel speed	cm/s	>20	NA
10	Brake Efficiency	%	>20	NA
11	Handle weight	lbs	1	NA
12	Compact Lock Strength	N	5	>10
13	Weight of Wheel	lbs	>2	2
14	Ideal Walker Width	in	23	18
15	Length of Handle Grip	in	>4	5
16	Maintenance Time	min	>15	NA
17	Unit Manufacturing Cost	$	100	140

Table 1: Showing Expected Values versus Actual Value

Planned schedule and tasks

The Covid19 outbreak, has caused the third prototype and the third client meet remain incomplete and unintended due to social constraints. Because of the severity of the outbreak, Design Day has also been cancelled completely. We are working the best we can to complete what we can, although it may not be much.However, deliverables, the final presentation and the user manual are still ongoing future projects that need to be worked on and will be completed in time.

The few plan steps that needed to be finished (before the whole Coronavirus outbreak) were Prototype III (Testing materials, Noting failures and changes needed, final tweaking to product), the third Client meet demonstrating our third/final prototype and gathering feedback, Final review and creation of the product as well as testing the final product to note any constraints/missing features, Final product presentation, Design Day (as well as preparation), and finally, the User Manual and final meet with the client. There wasn't much to finish, although, with the conditions of today, we were simply unable to do so.

Conclusion

We have worked very hard to get to where we are with the project and to support our client. Although, we were not able to finish the final prototype/product due to the constraints caused by Covid19. We will continue to work as hard as we can to deliver something functional to our client, although nothing can be guaranteed. We have our final goals to set for this project, and we hope to accomplish them in time.

List of cited work

Public Health Agency of Canada. (2020, March 26). Government of Canada. Retrieved from https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html