



**ACCMT ENGINEERING LTD.**

**Helping Hand Walker  
Project Progress Update**

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ENGR 232

MARCH 6<sup>th</sup>, 2020

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March 6<sup>th</sup>, 2020

Dr. Emeka Oguejiofor, Faculty of Engineering  
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Dear Dr. Oguejiofor,

Please see the attached enclosed Design Project Progress Update requested for March 5<sup>th</sup>, 2020. This project, "The Helping Hand Walker" is an effort performed by Group 7 towards helping individuals with mobility issues that use a walking aid, such as the elderly to get from a sitting position to a standing position. It will help the user achieve more mobility while standing up into their walker effortlessly and painless while allowing them to maintain an independent lifestyle. Enhancements to the Helping Hand Walker have been made and Group 7 has been progressing effectively with few setbacks. This is the second document of three that will be submitted outlining the progress that has been made and the goals Group 7 has set to achieve regarding this Design Project. Please let Group 7 know if you have any questions or concerns.

Thank you for your time reviewing this progress update for The Helping Hand Walker.

Regards,

Amelia LeBlanc  
Cameron de Winter  
Connor Lobb-Macdonald  
Michael MacGillivray  
Tristan French

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March 6<sup>th</sup>, 2020

Mr. Paul Doiron, P.Eng  
275 Main Street – Suite 100  
Antigonish, Nova Scotia  
B2G 2C3

Dear Mr. Doiron,

Please see the attached enclosed Design Project Progress Update requested for March 5<sup>th</sup>, 2020. This project, “The Helping Hand Walker” is an effort performed by Group 7 towards helping individuals with mobility issues that use a walking aid, such as the elderly to get from a sitting position to a standing position. It will help the user achieve more mobility while standing up into their walker effortlessly and painless while allowing them to maintain an independent lifestyle. Enhancements to the Helping Hand Walker have been made and Group 7 has been progressing effectively with few setbacks. This is the second document of three that will be submitted outlining the progress that has been made and the groups goals has set to achieve regarding this Design Project. Please let Group 7 know if you have any questions or concerns.

Thank you for your time reviewing this progress update for The Helping Hand Walker.

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Table of Contents:

1 Introduction..... 5

2 Review of Goals ..... 5

3 Project Specifications ..... 5

    3.1 Safety Regulations..... 5

    3.2 Design Updates..... 6

    3.3 Mechanical Workshop..... 7

    3.4 Electrical Workshop..... 8

    3.5 Load Research..... 8

4 Website Update ..... 8

5 Gantt Chart ..... 9

6 Next Step ..... 9

7 Worked Cited ..... 9

## 1 Introduction

This is a progress report from Group 7 in efforts in creating The Helping Hand Walker. Progress has been made with safety and load research along with design and website updates. There is also an updated timeline with upcoming meetings and the next steps in the project.

## 2 Review of Goals

After the project proposal was submitted a large list of goals was set by the group. By this time, we intended to complete setting up a meeting with healthcare providers, developing an AutoCAD and Inventor Drawing and begin torque calculation and required power in the motor.

The Helping Hand Walker is an innovation to the Walker intended to lower the user's risk of injury when going from the sitting position to a standing position. Changes to the design of the product have been made to improve its performance, load. These modifications include adding a stability stand and geared motor. Progression on the project has been on schedule, with a few setbacks that have occurred.

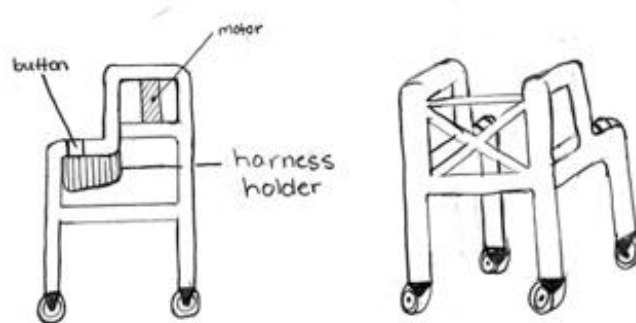
## 3 Project Specifications

### Safety Research

Safety is always a significant concern for Engineers when designing new products but for this project especially. The research was required to figure out a way for someone who uses a walking device to safely and independently stand themselves. The proper techniques to getting up are for the user to move themselves to the edge of their chair, place both hands on the armrest of the chair, lean forward and to use their arms to push off the chair. Once the user starts pushing off the armrests of the chair, they can start to gradually straighten their legs. These are aspects to help understand the movement of the body and what is required to lift a person up from the sitting position to the standing position.

"Injuries and medical conditions aside, the normal aging process causes the body to lose muscle mass (sarcopenia). Because of this, it's easy to lose strength in the hip muscles and knee extensors the muscles that help straighten the legs. Your body relies on these muscles to walk, climb stairs, and rise after sitting" (Inverarity, 1). With this information, The Helping Hand Walker aims to relieve the stress that is put on a person's lower body while standing up.

## Design Updates



*Figure 1 "Original Design Sketch"*

After the project proposal, a few questions needed to be answered. First, how is the walker going to stay upright and not tip over during the lifting process? To solve this, the design was modified, and a triangular stability stand was added to the back two legs of the walker. The stands will counteract the backward force the walker will take from the user's body being pulled up. Next, the harness used for the lift needs to be positioned properly so it will cause minimal strain to the user. After discussions with a fourth-year nursing student, in her opinion, the best option for a harness would be one that wrapped around their waist and underneath under their upper legs, as seen in figure 3. On Monday, March 9th, a meeting will be held with Rochelle Heighton, the Manager of Rehabilitation Services at St. Martha's Hospital, to further discuss the design needed to limit the chance of injury, and the best motion to lift. The design will also be comfortable and keep the pride of the user in the account. The motor being used will be a geared motor. It will give a large range of power which will give the system the ability to lift a wide range of people at different weights. As the design shows, there are no wheels on the new design. As of right now, the legs will have non-slip tipped legs. The wheels add an extra chance of injury when the lift is in process. Depending on the total weight of the system, if it is too heavy to lift, we will convert

back to a wheel system that has locks.

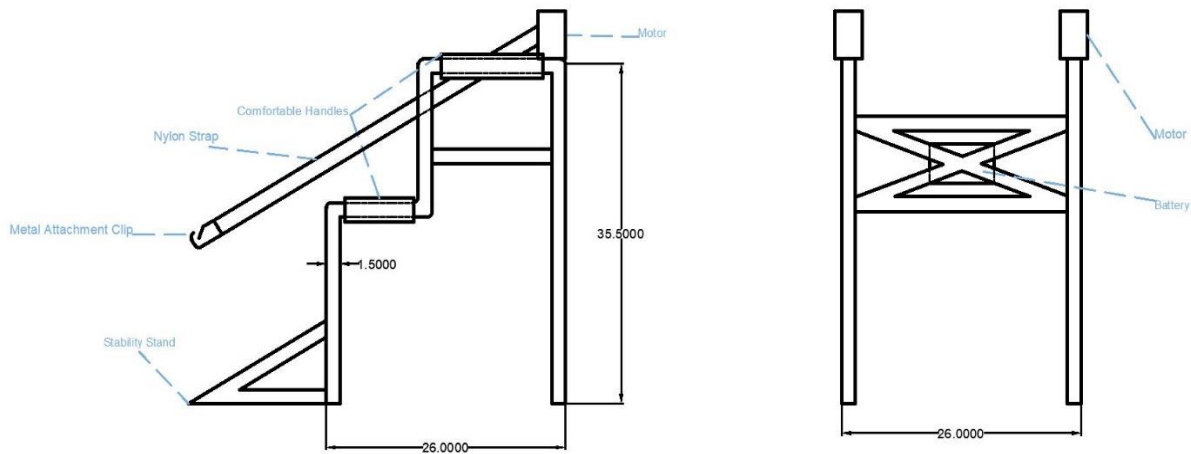


Figure 2 "Current Design Sketch"

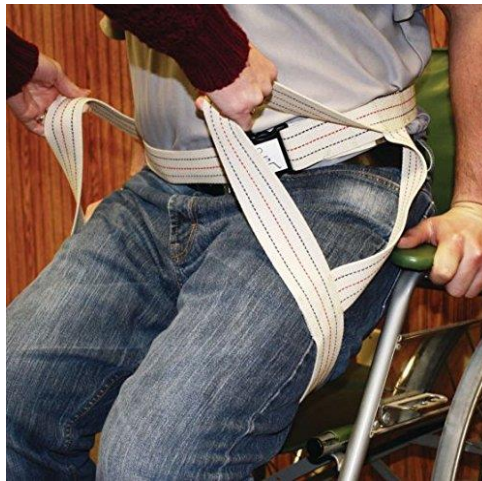


Figure 3 "Option for Lifting Harness"

### Mechanical Workshop (Mr. Steve MacDonald)

A meeting with Steve MacDonald was set up primarily to discuss Figure 1 Original Design Sketch and look at building The Helping Hand Walker. After reviewing the timeline left in this project, it was determined that there was not enough time to complete a full-scale functioning Helping Hand Walker, even when new parts were added to a store-bought walker. Finally, Group 7 with the help of Steve found that producing a smaller scale Helping Hand Walker would efficiently show the same results as a full-size Walker. By creating a smaller scale walker there needed to be a smaller motor that required the expertise of Craig Seaboyer.

## Electrical Workshop (Mr. Craig Seaboyer)

A meeting with Craig Seaboyer was set up to gain further information of what type of motor would best suit our design. Through discussions with Professor Mohammad Azad, the group intended on using a step motor for the design. Craig proposed that a geared motor would be more effective for this project. The reason for this was that step motors are unreliable and have a difficult time going in reverse. The geared motor is much more reliable and gives a larger range of torque it can provide. The possibility of using one motor over two also discussed. The one motor would pull both lifting straps and spin them into different sections on the motor apparatus so that the straps wouldn't get tangled together. Unfortunately, torque calculations were not completed before the meeting, so a weight comparison of the two smaller motors to the one larger motor couldn't be complete. These calculations will be completed in the next week so a decision can be made. The prototype intended will be a smaller scale walker. Using the electrical equipment available, an Arduino will be used to program a small electrical motor that will demonstrate this design. With the limited time left, a full-sized system seemed out of the picture.

## Load Research

The human body can be divided into two main categories when examining weight and the different factors that affect the specific weight of a human body. The first category would be the bones which can be thought of as the structure of the body. The other main category is the muscles and other organs which can be thought of as the support system. These muscles and organs are comprised of around 60-70% water, which makes the dynamic calculations behind the human body so complex. With the changing density of muscles from the compression and expansion, the specific weight of body parts changes and must be considered, as well as the other organs being moved slightly affecting the specific weight in that area. Although all these factors should and will be considered, basic calculations can be made to form a general idea of what forces are to be expected when dealing with the lifting of a person from sitting to standing. These calculations can also be applied to a model of the Helping Hand Walker giving the group an idea of what forces are to be expected when lifting a person with the helping hand walker.

## 4 Website Update

Another aspect of this project is a website component. The group has made it a priority to not only make progress with the design of the project but also the website of the project. Maintaining an updated website is very important in the upcoming weeks of this design project. By uploading previous reports, presentations, contact info, and general information onto the Helping Hand Walker's website, Group 7 has created an easily accessible way to follow the design progress of the project. Group 7's goal is to have the website almost completed before handing in the final report and presentation; that way the public, classmates, and professor will get a complete understanding of the project's timeline.





## 7 Works Cited

Inverarity, Laura. "How to Get Up From a Seated Position." *Verywell Health*, Verywell Health, 24 Jan. 2020, [www.verywellhealth.com/how-to-safely-stand-up-from-a-chair-2696666](http://www.verywellhealth.com/how-to-safely-stand-up-from-a-chair-2696666).