

**From:** The Hope Team#14  
**To:** Dr. Oman  
**Date:** 06/22/2018  
**Re:** Hard review 2

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The team in this assignment must to prove that they reach 50% of the project including all actions made in the first 3 weeks of this semester. After meeting with Dr. Oman and Amy the technical assistance, they gave the group some hints of the individual analysis topics that the team can write about it, such as comparing between two materials in terms of the lightweight, strength, and cost which are Aluminum and Carbon fiber. In addition, the group must apply the Finite Element Analysis (FEA) for each of these aspects, and write the hand calculation to prove the validation of the FEA. Our analysis and comparison well be applying in two designs. After meeting with Dr. Learner, the team conducted a solution for the balance and safety issues they faced. After meeting with the client who is Dr. Oman, the team suggested the solution they got from Dr. Learner which is added third support to fix the balance and safety issue. Finally, the team doing a background research of the human factor to help them support their idea.

### **Meeting Minutes**

**Date:** 6-20-2018

**Time:** 11:45am-12:15pm

**Topics:**

1. Individual analysis topics.
  2. Designs options.
  3. Progress of the project.
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#### **Executive Summary**

The aim of this meeting is to discuss the individual analytical report topics, designs options, and the progress of the project. The group must complete 50% of the project by the due of hardware review 1.

#### **Individual analysis topics.**

During the meeting the group discussed the analysis topics will be written in the report. The topics have been chosen are comparing two materials in term of lightweight, strength, and cost which are Aluminum and Carbon fiber, FEA on the safety and balance, Hand calculation to find the factor of safety, and the point where maximum force is.

#### **Designs options.**

After we met with Dr. Lerner we met with the client who is Dr. Oman and she proposed three different designs that we can compare between to find the best design that suits our needs. During the meetings, the team decided to neglect one of the designs due to complicity of manufacturing it.

#### **Progress of the project.**

The aim of this progress is to show 50% of the project to the client which we couldn't make it by the time of the meeting with Dr. Oman. After the team done with the meeting we met as a group and

assigned each member a task to reach the 50% which must be done by the due date of the hard review 1.

## **A list of actions for each member in the group from hardware review 1 till hardware review 2:**

### **Abdulrahman Almuqrin:**

Update the website.

Start writing the individual analytical report.

Make a research to Compare between two materials in terms of the lightweight, strength, and cost which are Aluminum and Carbon fiber.

### **Mohammad Hesham:**

Conducting a background research for human factors.

Doing the hand calculation for the individual analytical report (safety and strength).

Contribute in the FEA software that will apply in our device.

Meeting with the client.

### **Ali Alquraishi:**

Updating the CAD design.

Started working on the individual analytical report.

Doing the FEA for the safety aspect of the design.

Doing the peer evaluation.

### **Sultan Alajmi:**

Working on the third support.

Find out what is best materials to use for third support.

Working on the individual analysis report and the topic is third support (if it's approved).

### **CAD Model Updated:**

The team has developed the CAD model and updating it to reach the 50% of the project progress.

The updates including having the third support to make the balance of the device. The third support is adjustable in height. The team added a wheel to the support and a break system for the safety for the paralyzed person. It only works in the falling situation, also it is adjusted to work in specific angle of falling. The way of designing the crutches has been changed to meet the manufacturing process. The first crutch design had few designing mistakes that prevent the team to manufacture it. We modified the weak angles which changes the shape of the design and gives the team the ability to manufacture it. In this design we are trying to reduce the quantity of the welding parts and instead in some of them we will use the nails to connect the parts together in the crutches.

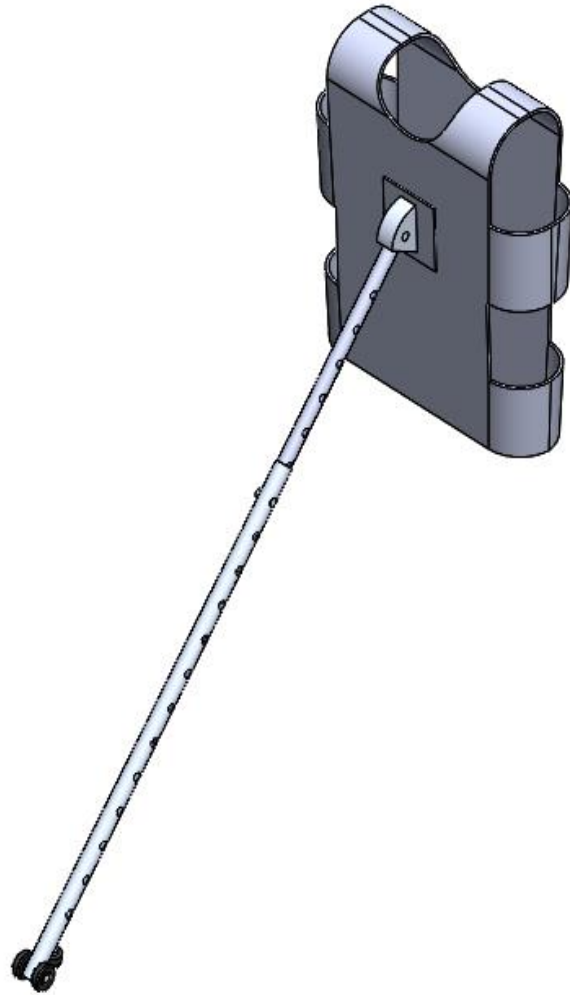


FIGURE 1: THIRD SUPPORT

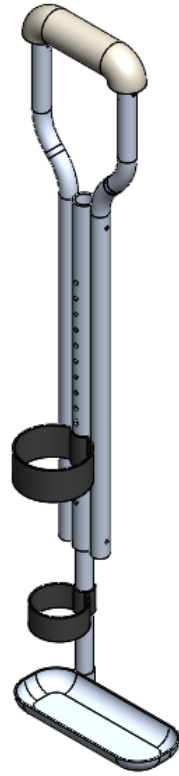


FIGURE 2: LEFT CRUTCH

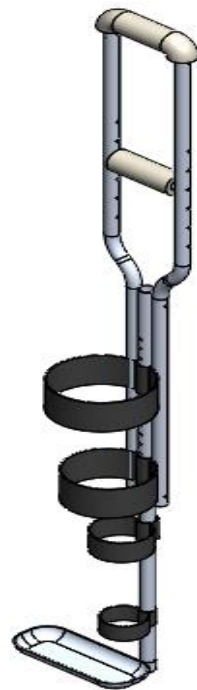


FIGURE 3: RIGHT CRUTCH

Appendix:

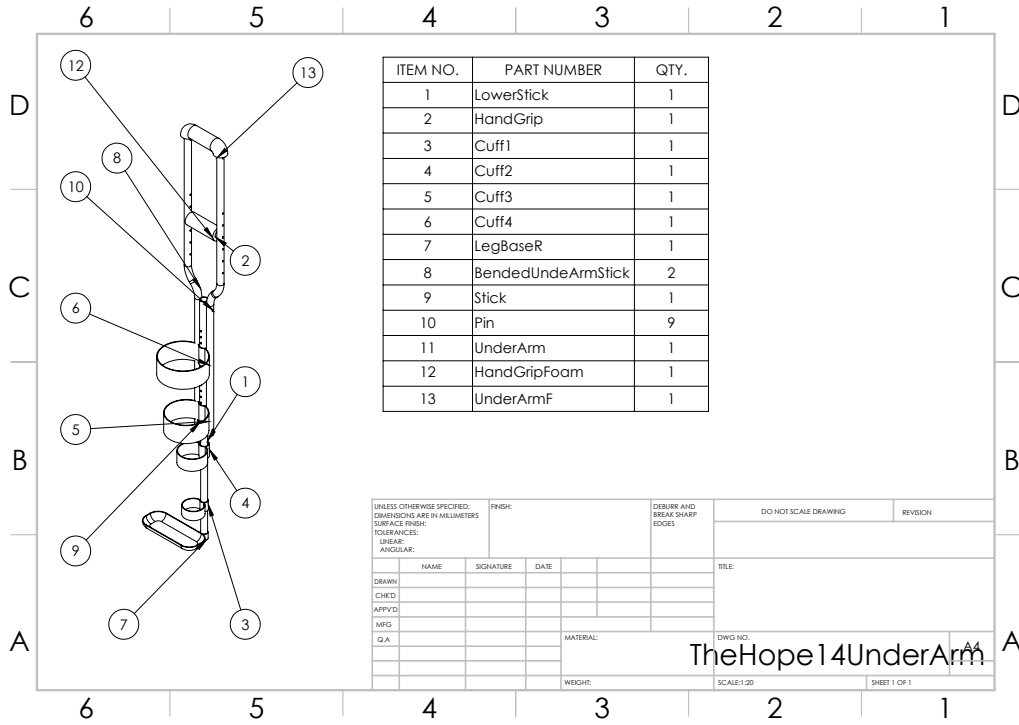


FIGURE 4: UNDERARM

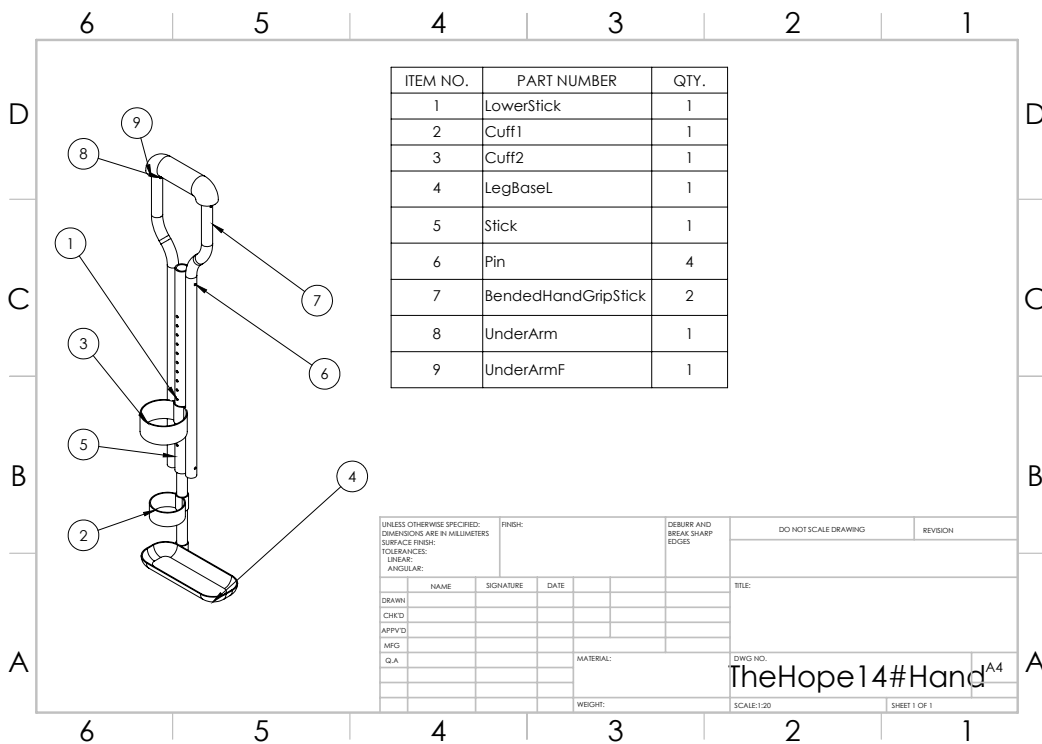


FIGURE 5: HAND

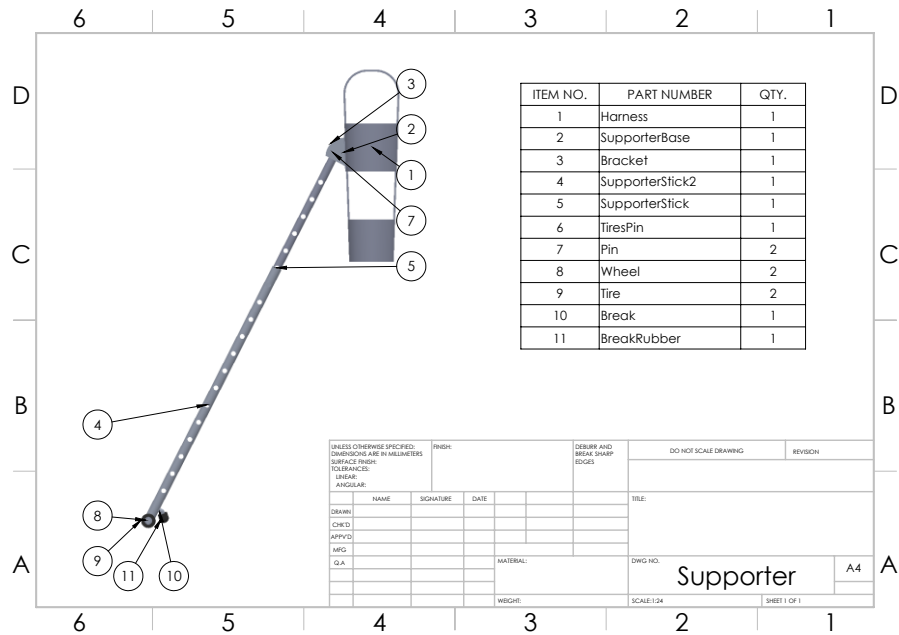


FIGURE 6: SUPPORTER

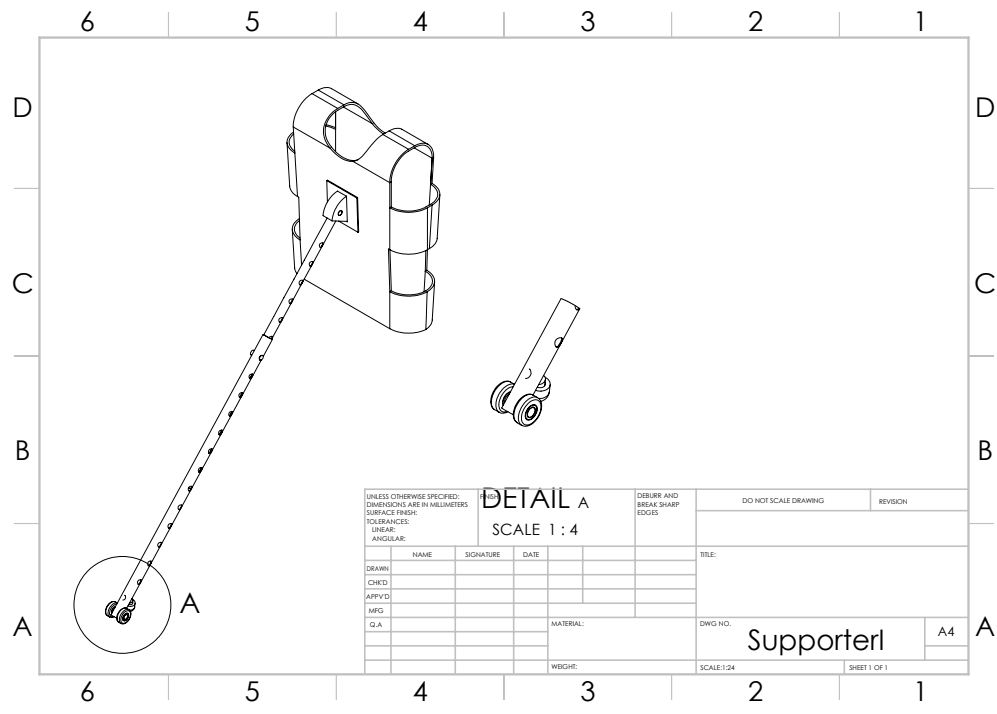


FIGURE 7: BREAK SYSTEM OF THE SUPPORTER