Final Product Testing Proof

ME 486C – Spring 2019 – Smart Helmet

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Due Date: 04/12/2019

Introduction

The team created the final version of the testing device in the smart helmet project. The major goal is to test the data for the smart helmet project to increase the safety for the football players. Many bad injuries occur during a football game. The major reason of these injuries are the helmet. As a team, the main goal of this project is to increase the accuracy of the data by doing multiple tests. The multiple tests will improve the performance of the smart helmet by increasing the safety of the smart helmet. Another goal for this project is to create a system valid for any type of helmet. Thus, the team tried to put all the system together and get the final result data from the system. This memo consists of two major parts: a youtube video link showing the tests and the test results.

Youtube Video Link

The team finished the main testing device for the smart helmet project. The youtube video link describes the process of testing the helmet in the smart helmet project. The team used a simple testing device created from the wood because the other testing devices are complex to create, and they are more expensive to buy as well. However, this process of testing the device involves with linear motion only. The link to the Youtube video was linked as number [1] in the reference or work cited sheet.

Testing device results

After testing the device, the team created testing device results by using excel. These plots describe the gravitational forces (g-forces) for the linear motion. The accelerometer sensor is the main sensor that measures the linear g-forces. The team also used a program to measure the x-axis and y-axis for the location before the testing process. The team used two different helmets for this project. Therefore, the comparison between two different data will help in understanding the accuracy of the output result from the helmet. The team labeled these axes every time at the beginning of each test. The reason of that is because the team should start at the same location every time just to increase the accuracy of data as possible. The result graphs consist of two major parts: the y-axis and the x-axis. The y-axis values are the g-forces, but the x-axis values are the time passing per second. The concept of Arduino sensor gives the result time twice each second, so the sensor will read the data twice every second.

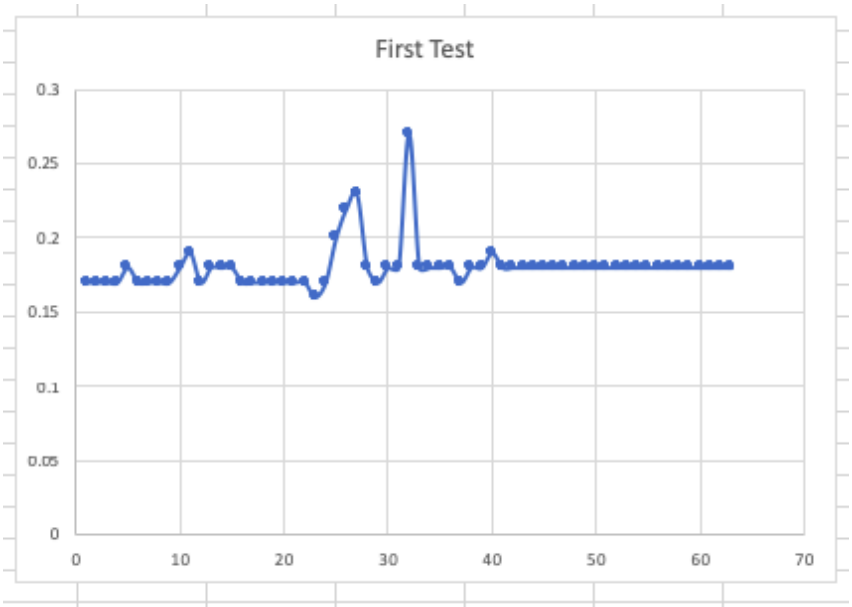

Figure 1: First test for data g-forces in (m/s^2) Vs. time in (seconds)

The first test of data was made with a 90-degree angle where the team used a stick to release the drop test for the data in the testing process for this helmet. The accuracy of getting the output result are enough to measure the g-forces in this project. The maximum g-force in this test was approximately 0.3 m/s^2.

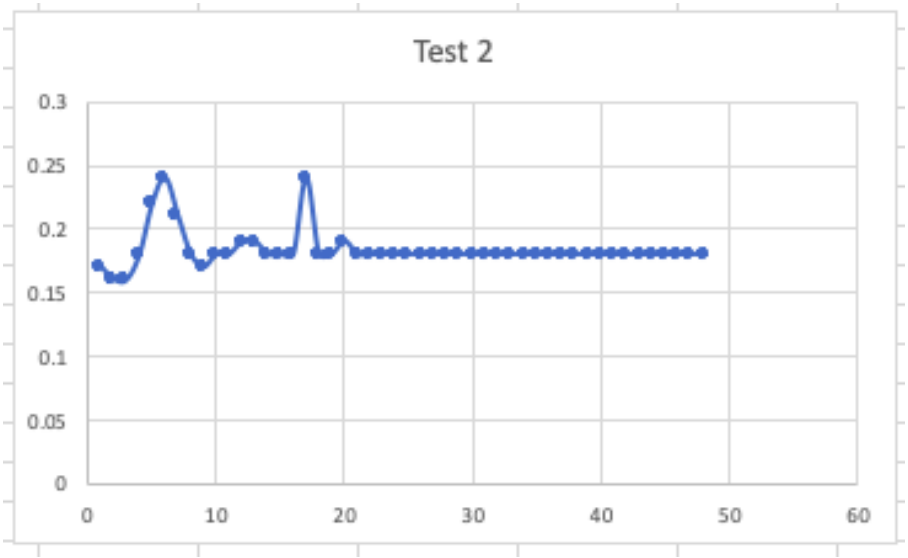

Figure 2: Second test for data g-forces in (m/s^2) Vs. time in (seconds)

The second test of data made with a 90-degree angle. The team released the stick with a holder stick. The maximum value for g-force made in this test was approximately 0.25 m/s^2.

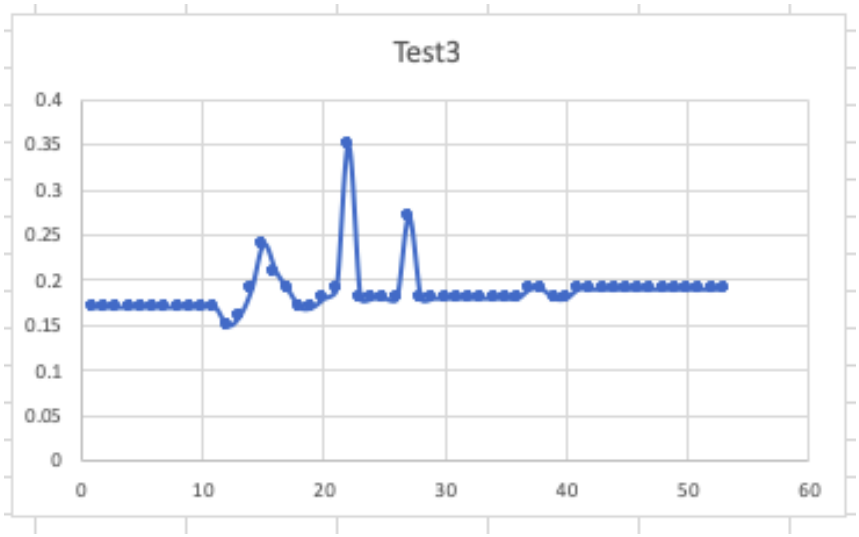

Figure 3: Third test for data g-forces in (m/s^2) Vs. time in (seconds)

This test made by a team member. The process of doing this test was by releasing the stick at a maximum angle as possible. The reason of that is because the team should get a high g-forces as possible. Thus, the safety of this project will increase by measuring more g-forces as possible. The maximum g-force made in this test was approximately 0.35 m/s^2.

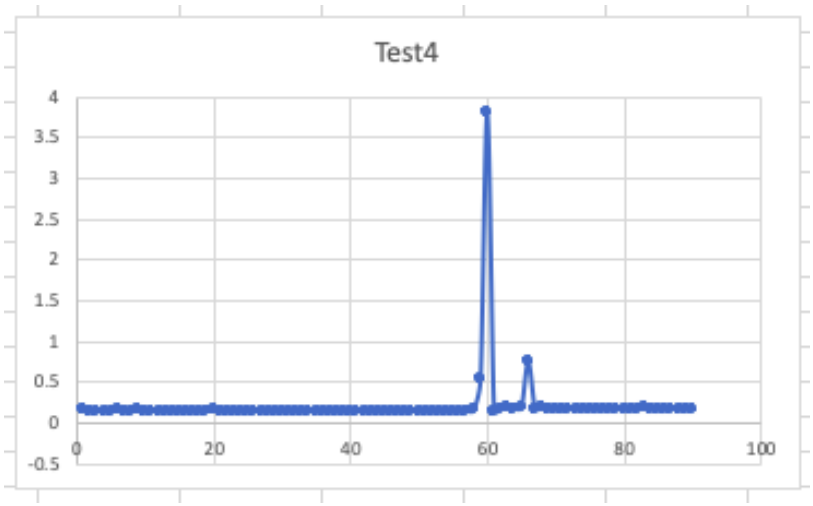

Figure 4: Fourth test for the data g-forces in (m/s^2) Vs. time in (seconds)

This test made by a team member as well. The process of doing this test was releasing the stick at the maximum angle and using the full power of the group member. This group member used the full power as possible to drop the wooden stick of this testing device. The maximum value of the g-force was approximately 4 m/s^2.

Conclusion

In the conclusion, the team finished the testing device and the testing process for the smart helmet project. The team got the maximum g-forces data as possible in this project. The team used two different helmets to increase the accuracy of the output result from the helmet. The team made four tests in total during the testing process. The team maximum g-force was approximately about 4g’s.

Work Cited (Youtube testing device video)

[1] https://www.youtube.com/watch?v=3Qy4uN0LwRI