Final proposal of Plasticity Modeling Project Team: F6 ME 476C

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Project Description

Description of the project:

-Build and test an experimental device that proves the elasticity theory.

Who is sponsoring the project?

- The Mechanical Engineering Department
- Dr. Feigenbaum

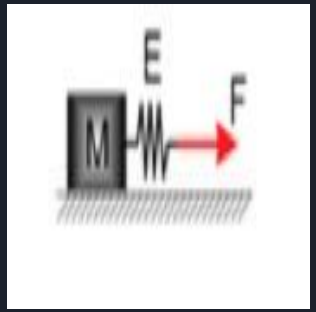


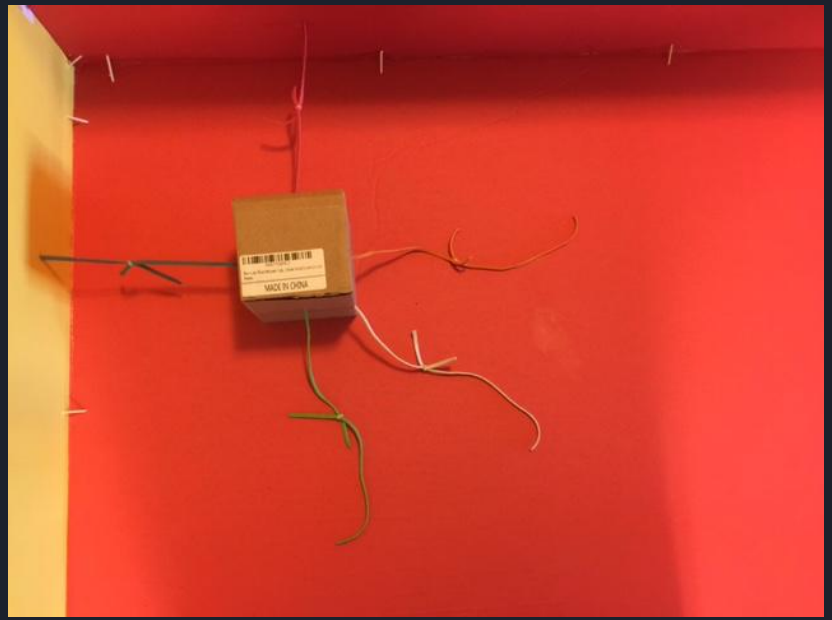
Figure 1: [1]

Design Description

- A force will be applied (push/pull) to the system.
- The Spring will expand before the box starts moving.
- The springs will work as a resistance force acting on the box.
- It will work in a 2D plane.
- A force gauge will be used to measure the force.
- An Arduino UNO board will be used with sensors for the connection part
- The system will generate a graph of force vs. displacement in real time.

Design Prototype

1) Top view



2) Sides view

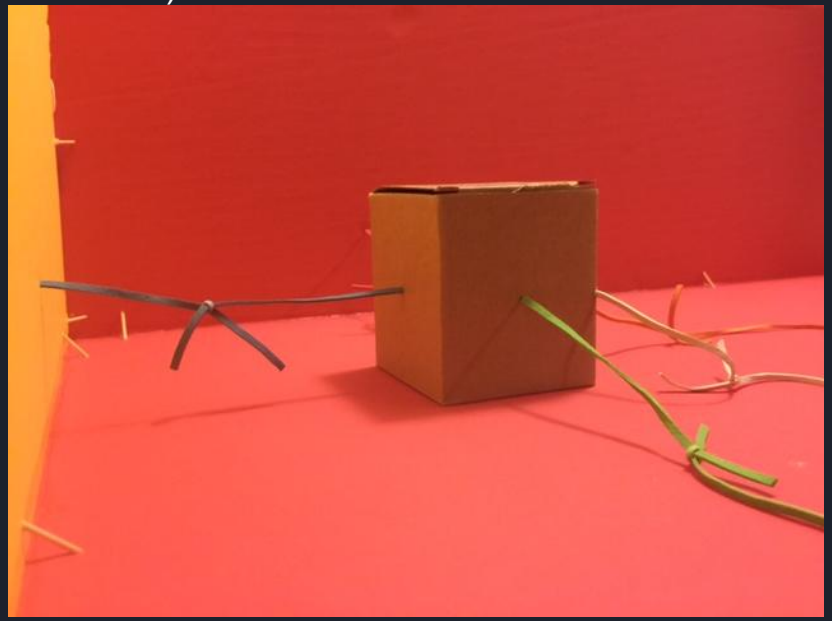
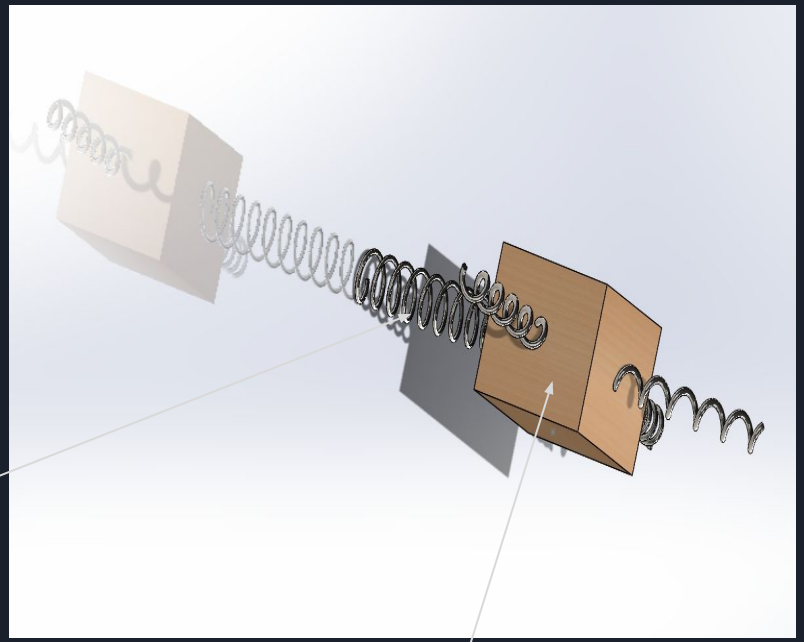


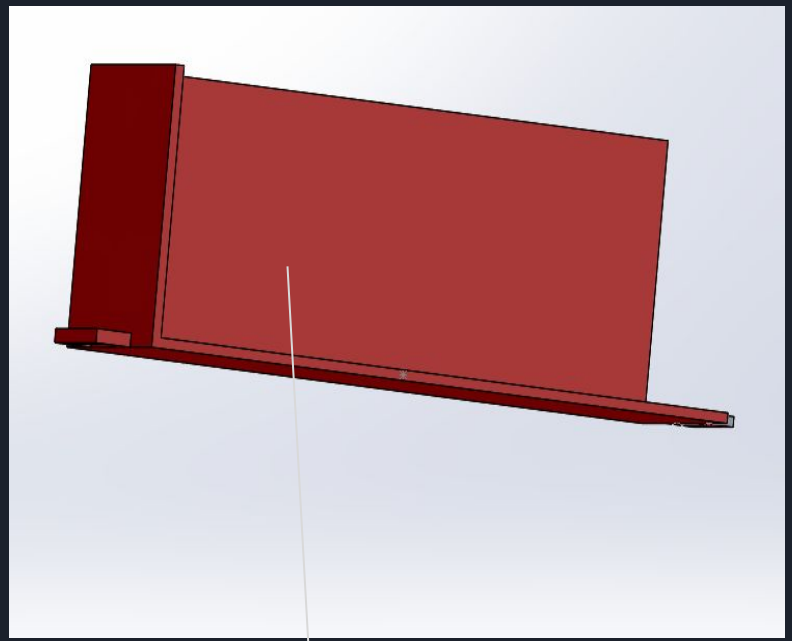
Figure 2: Views

Design CAD modeling



Spring

Box



Wall

Figure 3: Solidworks modeling parts

CAD Modeling

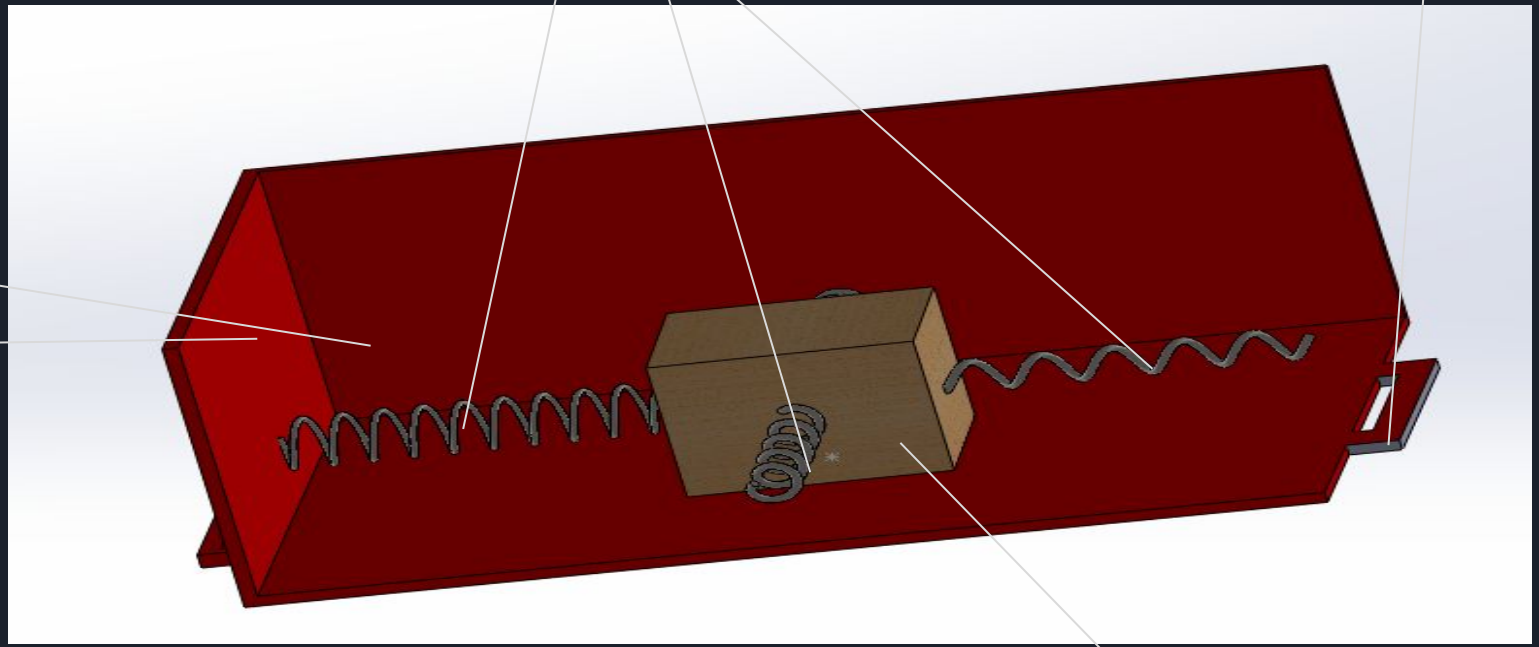


Figure 4: Final solidworks design

Electrical part of the design

1) The appropriate pressure sensor.

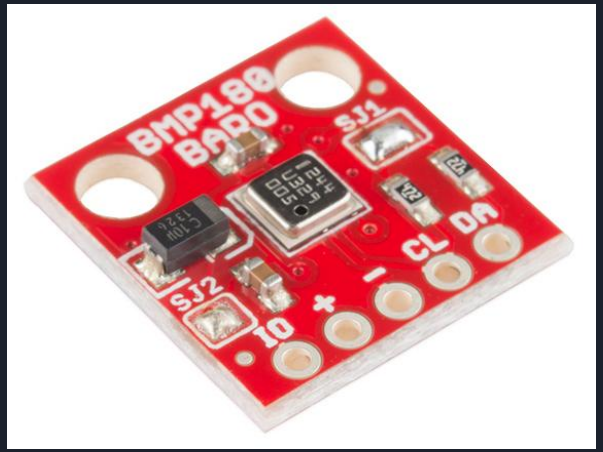


Figure 5: [2]

2) The final electrical connection for the design.

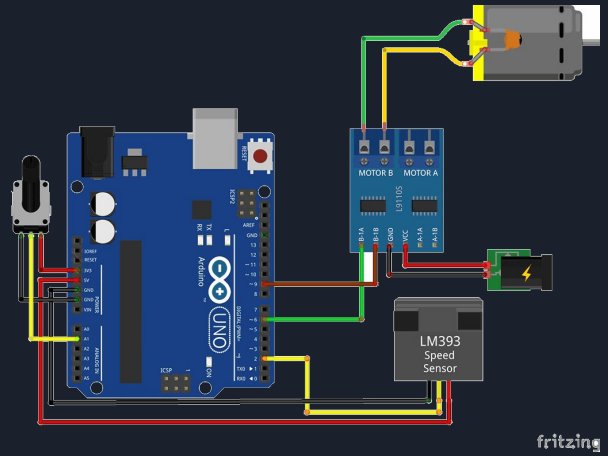


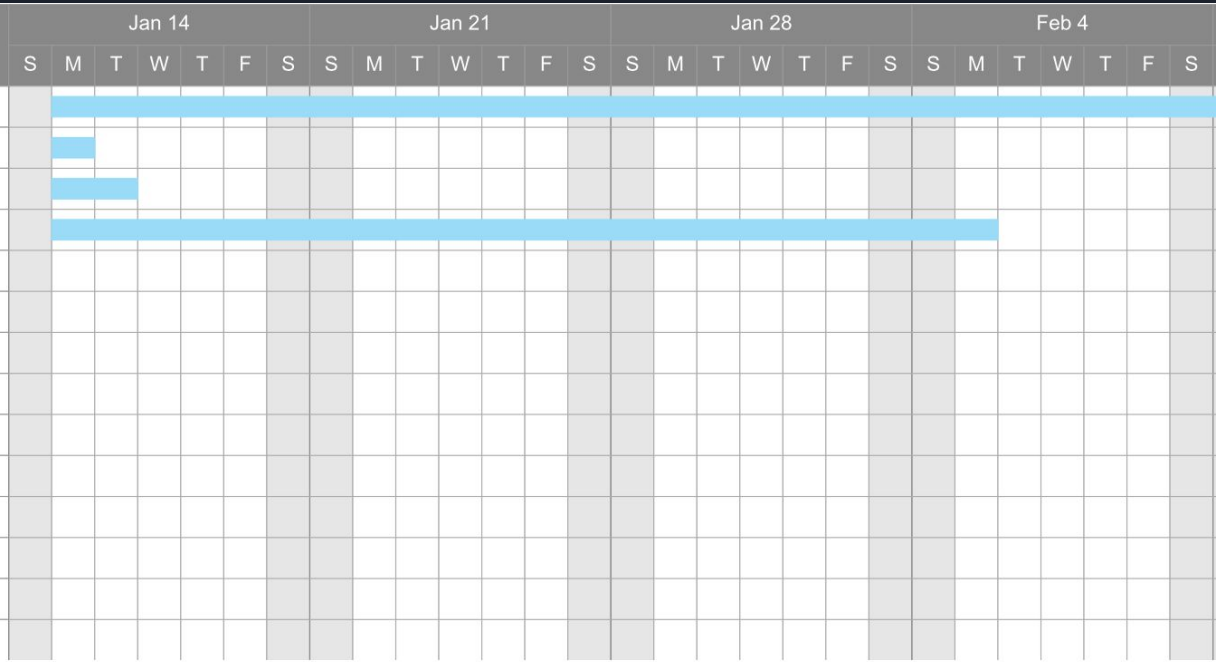
Figure 6: [3]

Design Requirements

1. Easy to carry.
2. Easy to store.
3. Able to generate graphs.
4. Able to be seen by 20 students.
5. Works in an xy-plane.
6. System must be around 40 lbs.
7. Have a friction coefficient to the surface.
8. Moduale.
9. Durable.

Schedule Second Semester

	Task Name	Start	Finish
1	Project Duration	01/15/18	04/30/18
2	1st Staff Meeting	01/15/18	01/15/18
3	Individual Post Mortem	01/15/18	01/16/18
4	Hardware Review 1	01/15/18	02/05/18
5	Peer Evaluation	02/12/18	02/12/18
6	Individual Analysis III	02/20/18	02/26/18
7	Hardware Review 2	02/26/18	03/05/18
8	Midpoint Report and Peer Eval 2	03/05/18	03/12/18
9	Staff Meetings Spring Break	03/26/18	03/26/18
10	Draft of Poster and Op/Assem Ma	03/26/18	04/02/18
11	Final Product Testing Proof	04/02/18	04/09/18
12	Poster and Op/Assem Manual du	03/26/18	04/16/18
13	Final Report and CAD package d	04/16/18	04/30/18
14	Peer Eval 3 due	05/11/18	05/11/18



Budget

- Our ranges are between $500 - $2000.
- Range of anticipated expenses is $100 - $600.
- $0 is spent to date.

Materials used in the design	Approximation costs
Plastic box	$50-$150
Arduino	$27.95-$350
Sensors(BMP180) &(LM393)	$6.99-$35.99 &$5.34-$22.90
Springs	$3.60-$12.07
Total ~	$93.88-$570.96

References

[1]Anon, (2017). [online] Available at: http://R. Hill, Mathematical Theory of Plasticity, Oxford University Press, 1950. [Accessed 4 Oct. 2017].

[2]"BMP180 Barometric Pressure Sensor Hookup - learn.sparkfun.com", Learn.sparkfun.com, 2017. [Online]. Available: https://learn.sparkfun.com/tutorials/bmp180-barometric-pressure-sensor-hookup-. [Accessed: 03- Oct- 2017].

[3]"How to use a Speed Sensor with Arduino", Brainy-Bits, 2017. [Online]. Available: https://brainy-bits.com/blogs/tutorials/speed-sensor-with-arduino. [Accessed: 03- Oct- 2017].
.2017. [Online]. Available:

Questions

Any questions or concern?