

Group number: 07

Project title: Electromagnetic Train

Client &/Advisor: Professor Song Jimming

Team Members/Role:

- 1. Yap Yong Sheng (Team Leader)**
 - 2. Norfarahin Nordin (Communication Leader)**
 - 3. Chung Sheng Su (Webmaster)**
 - 4. Shi Xiang Lim, Larry (Concept Key Holder 1)**
 - 5. Mustafa Hafez(Concept Key Holder 2)**
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○ **Weekly Summary**

In week 3, we do not have any official meeting in EE 491 class due to the career fair. However, we do have a meeting with our advisor Professor Song on Tuesday, 8.30am-9.30am. This meeting discussion is described in details in other section in this weekly report. In this report, all members submitted the reflections, which include their findings on the materials, readings, research that are related to the project. The main aim of this week meeting was focusing on the parameter that we have set up, taking into account the apparatus and materials that we want to use to test the parameters and the amount of time needed for the shipment of the item.

○ **Past week accomplishments**

In this part, all team members have submitted their own reflection and reading of what they have learned regarding the project materials.

- **Yong Shen**

Farah and I went to the meeting with Prof. Song this week to discuss about what type of material we should use for our project. He asked us to finalize 1 or 2 companies that we can get copper wire from. The companies have to be in United States because we could get the materials within 1 or 2 weeks. In this way, we could build our demo on time (by the end of Spring Semester 2017). I found a website that we can get wire from. Below is the link that I found. I was planning to get the copper wires from Southwire. We are planning to get no 6 and no 10 copper wires for our demo. So that we can compare which copper wire can produce higher speed for the train.

Link for item:

<http://www.homedepot.com/b/Electrical-Wire/6/N-5yc1vZbm7vZ1z10myq>

- **Norfarahin Nordin**

Contributions

- I. Writing up the report
- II. Find materials needed for the planned parameter.

Summary

From the meeting with Professor Song and Yong Shen, these are my findings and the outcome from the meeting:

1. The parameters that should be included:
 - I. The type of magnets, shape, and thickness.
 - From discussion the magnet should have regular rectangular shape, and not too thick as this will affect the process of making perfect turns of the coils.
 - Neodymium magnet should be used as based on the research it is the strongest.
 - II. Coil length
 - Depends on how long the turns would be that is correlated with the magnet size
 - From the discussion the copper coil should be ordered longer than the length needed as extra turns might be needed.
 - III. Coil conductivity
 - From the discussion I just realized there is a numbering system for the conductivity of the coil and thickness of the coil.
 - Targeted coil with number 6 or 12.
 - IV. Direct electrical contact

-This aspect will be determined later as the parameter set up are without the electrical contact for the time being.

V. Size of battery

-We only plan to use battery no bigger than AA or AAA as these sizes are more easy to experiment with.

-Some links that showed the demo with these kind of battery:

<https://www.youtube.com/watch?v=FVP2hJQmc1c#t=5.07366>

VI. Tube

-A transparent tube should be purchased to support the coil turns and because of the train motion should be seen from out of the coil.

-the placement of the coil turns whether to be located inside or outside the tube is discussed. Based on the discussion the tube will not significantly affect the strength of the flux.

- **Larry Lim**

Information and research for materials to be used:

Supplier	Length	Price/Length
https://bulkwire.com/magnet-wire	160 ft	\$99
http://www.ganpatiengineering.com/stranded-copper-wire.html		Requested quote
http://www.abcwire.com/copper-tempered-wire		Requested quote
http://www.alconex.com/		Requested quote

Worked on:

- Finding companies to supply (size 10/size 6) insulated copper wires.
- Finding the price for said wires.

Pending issue:

- Limited options.
- Have not had replies yet.

- **Chung Sheng Su**

In this project, we are required to build a electromagnetic train. The concept starts off with attaching a magnet at each end of the battery. After that, we have to build the trail by coiling wires using conductive material such as copper as a path for the “magnet battery” to flow throw. The physics behind this uses the concept of magnetic filed. The coiled wire,

which is also known as a solenoid, will create magnetic field which will interact with the magnets on the battery and create attraction and repulsion and causes the train to move.

- **Mustafa Hafez**

For this week I decided to mainly focus on the physics/concepts of the maglev train.

In my research, I have discovered that there are two different systems used in the construction of a Maglev Train. The first system, implemented by the Germans, is called EMS (ElectroMagnetic Suspension) whereas the other system, implemented by the Japanese, is (EDS) Electrodynamic Suspension.

I'd like to implement a prototype that utilizes the EDS system (this will create a field in front of and behind the train). Further research has led me to believe that this system is the most stable between the two (any minor deviations from the system's equilibrium state are automatically corrected). Also, I'd like to observe the effects of DC current vs AC with the setup.

- **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Yong Shen	Set up meeting, find materials related, and meet with advisor.	5	9
Farah Nordin	Find materials related, report write up, provide some materials information, and meet with advisor.	5	9
Larry Lim	Find materials related, contribute ideas and the reading summary that provides list of material, find the specific company that sell the material discussed by the team members.	5	9
Chung Sheng	Revised concept of the train	2	5
Mustafa Hafez	Revised concept of the train	2	5

- **Plan for coming week**

- All team members will have a meeting with advisor to finalize the items that we would want to purchase. Time duration of the item shipment is one of the important aspects.

○ **Summary of weekly advisor meeting**

- Only 2 members attended the meeting; Yong Shen and Farah.
- Larry Lim unable to attend due to health issue, while the other 2 members unable to attend without any notice.
- The parameters are discussed as follows:
 - i. Coil thickness
 - ii. Coil Length
 - iii. Type of magnets
 - iv. Strength of magnets
 - v. Coil conductivity
 - vi. Copper wires should be used because it is inexpensive and low resistance
- If we decide to do electrical contact for the coils, we need to check the power supply suitability with the coil conductivity.
- The tube size should be as a fix variable, thus calculation can be made for the number of turns and the magnetic flux.
- Position of the tube could be varied such as slanted, flat straight, and across each other like a junction.