sdmay19-15: Capacitor Gun

Week 5 Report
April 1 - April 8
Client: Max Balzer
Faculty Advisor: Mani Mina

Team Members

Grant Larson — *Test and Design Engineer*
Max Balzer — *Meeting Facilitator and Production Engineer*
Bret Tomoson — *Projectile and Power System Designer*
Brett Nelson — *Documentation, Engineer Designer*
Mark Fowler —*Test Engineer, scribe*
Zachee Saleng — *Engineer designer*

Summary of Progress this Report

We reflected on what we accomplished last semester as a group and what we need to improve on and change. We split into three groups to effectively divide up the work which Mani recommended in our bi-weekly meeting.

Past Week Accomplishments

- Split into three groups to divide work
    - Group 1: Max and Bret will work on creating a small, demo model of an electromagnetic propulsion device to help convey engineering theories and technology.
    - Group 2: Mark and Grant will work on the charging circuit either by fixing the current one or making a new one.
    - Group 3: Brett and Zachee will create a document clearly outlining the theory of operation of an electromagnetic propulsion device.

- Looked into fixing current circuit and circuit alternatives - Mark
    - Added RC snubber to charging circuit and tested it this week.
    - Looked into alternatives that can be built cheaply in order to test our rails sooner.

- Materials and small scale design research and production- Max
    - We added the RC snubbing circuit into the charging circuit and tested it this week. It didn't work but we checked connectivity to all points that should be connected and everything was connected correctly. We are assuming one of our mosfets has burnt.
    - The group has started working on the final poster, presentation, and report. We will work on that this next week.
    - The theory of operation is almost complete. That will be our main documentation for the project since we cannot test what we actually built.

- Theory of Operations - Brett

    - Went through all the calculation and found some “estimates” based on our values.
    - Continued to work on this document.

- Finalized safety documents for class reports - Bret
    - Worked with team to finalize safety documents and prepare for reports.
    - Looked over guidelines for project poster.

- Began the beginning stages of designing a new charging circuit -Grant
    - Researched ways to amplify voltages
    - Learned about diode voltage multipliers and rectifiers
    - Created a preliminary design to create 450V

- Theory of operation- Zachee
    - Went through the calculation with brett document template and worked though different questions that we had, and make sure that it meets the requirement about the questions that was asked during the presentation last semester.
    - Still working on the theory of operations (on going)

Pending Issues

- Analyzing the charging circuit that we have already created with the help of professors to better understand and fix what is wrong with it.

Plans for Upcoming Reporting Period

We will all continue working in our groups on our specific tasks.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Grant Larson	I created a charging circuit design based off of research I did during our meeting. The design will include a diode voltage multiplier that will boost our DC voltage. The next step in the circuit is a Full Wave Rectifier that will create an AC voltage that will allow our capacitor to be charged. I then created a write up of the	4	40

	design to add to our final report.		
Max Balzer	The snubbing circuit didn't work but we have an idea as to why. The theory of operation has been worked on pretty intensely and it is almost complete. I have researched into projectiles and how our project would work if we could have tested it, and have come up with the idea that the projectiles need to be a little smaller and longer than they currently are. This is due to the fact that our spring would try to push our projectile more upwards than straight forward into the rails. This would cause the projectile to hit the top of the entrance instead of going in.	10	48
Bret Tomoson	Finalized safety documents to prepare for final reports. Looked at requirements for poster.	6	30
Brett Nelson	Worked on finding calculation to our equations so we have numbers to show based on our research and values we have.	10	38
Mark Fowler	Begin working on project report and presentation. Add any relevant material to poster outline.	5	29
Zachee Saleng	Worked on the theory of operations, with Brett. Cleaned up the part of the current, magnetic field, magnetic force, velocity, and force.	10	38

Plans for the Upcoming Week

- In the coming weeks we will be working on Theory of Operations: Zachee
    - Will keep on adding valuable information and references.

    - Continue to clean up the document
- Gather material for project report, presentation, and poster - Mark
    - Help to write the report, adding information obtained from this semester.
- Small scale prototype design and calculations - Max
    - I need to talk with Lee to see if he can machine our projectiles to where I would like them to be.
    - I will have to get the team together to work on the poster first and then focus on the presentation and report.
- Theory of Operations- Brett
    - Try and figure out why our numbers aren't what we want and expect
    - Finalize this document
- Small-scale design and assembly - Bret
    - Max and I will be working to complete the design and assembly of our small-scale design to demonstrate the theory of operation.
- Have the meeting with Professor Geiger about the charging circuits - Grant
    - Continue to research and analyze the circuit I created

Gitlab Activity Summary

Nothing to report.
