

sdmay19-15: Capacitor Gun

Week 4 Report

March 11 - March 17

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.
- Charging circuit - Mark
 - Resolve issue with charging circuit getting clamped prematurely
 - Look into RC snubber circuit
- Materials and small scale design research and production- Max
 - We have decided to go forward with the RC snubbing circuit in our design to see if that corrects our charging issues.
 - I have talked with Lee and ETG can drill and tap our rails for us, so I will get that done within the week.
 - I have reiterated that the group needs to have the safety portion of the theory of operation done as soon as possible so that we can get that sent to higher authority for approval.
- Theory of Operations - Brett

- Worked on cleaning up the Theory of Operations
- Worked on the calculations for our design and figure out what equations would be best suited for us
- Established plan for the semester and began small-scale design - Bret
 - I have been working with Brett and Zach to finish the Theory of Operation.
 - I started re-working the safety section of the theory of operation.
 - I worked with Brett to edit the Theory of Operation equations.
- Edited Theory of Operation document -Grant
 - Added new safety procedures
 - Provided standard document edits
 - Pulled inspiration from US Military testing pdf
- Theory of Operations - Zachee
 - Brett and I worked on the theory of operations, focusing on references and the safety aspect
 - Worked 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 researched and found a document of safety procedures that the US military uses when they test their weapons. From that document I identified procedures that would apply to our capacitor gun design and added them to the safety portion of our Theory of Operation document.	2	20
Max Balzer	The 2 groups of charging circuit and theory of operation are still working on the respective parts. I have decided to go along with the RC snubbing circuit because we	10	28

	believe that may be our problem with the circuit at this point. The parts are cheap so we might as well try and see if that is the issue. I will help with the theory of operation and continue to be in contact with Mani about what our safety needs to include for us to test our project.		
Bret Tomoson	Transitioned to the Theory of Operation team to help them revise the current version. I am working on safety and helping with equations.	8	24
Brett Nelson	Continued to do work on the Theory of Operations. Cleaned up the different area within the section. Worked on the calculation with Zachee.	10	28
Mark Fowler	Looked into solutions for premature stoppage of charging circuit RC snubber	7	24
Zachee Saleng	Continued working on the theory of operations, with Brett. Cleaned up the part of the current, magnetic field, magnetic force, velocity, and force.	10	28

Plans for the Upcoming Week

- In the coming weeks we will be working on Theory of Operations: “on going” - Zachee
 - Will keep on adding valuable pieces of information and references.
 - We are planning to meet with Lee, to talk about the safety concern and potential website to back up our formulas.
 - Continue to clean up the document.

- Resolve voltage clamping issue in charging circuit - Mark
 - Design rc snubber to prevent clamping during charging
- Small scale prototype design and calculations - Max
 - We need to figure out what an RC snubbing circuit actually does in the charging circuit. From there we can calculate the power dissipated and the values for R and C.
 - I am going to talk with Lee and have him drill holes in our rails for our fasteners.
 - We will all work on the theory of operation because at this point that is our main concern that we need to get finished.
- Theory of Operations- Brett
 - Finalize the calculations we will be using and getting some estimate numbers to use so we have an idea what to expect.
 - Go over the entire document and make sure everything is addressed properly.
- Small-scale design and assembly - Bret
 - I will continue to help finish the Theory of Operation
- Find more affordable parts for the circuit design or come up with a new design - Grant

Gitlab Activity Summary

Nothing to report.
