sdmay19-15: Capacitor Gun

Week 10 Report
November 12 - November 16
Client: Max Balzer
Faculty Advisor: Mani Mina

Team Members

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

Summary of Progress this Report

We finished the parts list and got it to Lee to order. The parts should be here by Friday. We have started a Solidworks design to send to Mike for him to understand what we think the project will look like. The Solidworks design took up most of the week but we are splitting up into teams soon so that we can have enough time to complete the design and build the charging circuit when the parts come in. Max talked with Mike and set up a meeting time to go to his shop to start building the project.

Past Week Accomplishments

- SolidWorks Model- Mark
    - Began to work in SolidWorks to get familiar with the program, so we can collaborate on our design for the first test railgun.
    - Create a design for the railgun for discussion with the rest of the group.
    - 12-1.5v voltage divider for charge pin.

- Solidworks Design and firing mechanism- Max
    - I created a Solidworks design to be given to Mike so that he has an idea of what we are thinking in terms of a design. The design I put together combined my design and Bret's design with the use of our spring loaded firing design to create the railgun as a whole.
    - We figured out we couldn't use a solenoid for the initial velocity because the solenoid we would need is over our budget for this project. With that taken into account, I had to design a type of spring loaded mechanism to give the projectile its initial push it needs.
    - I received all of the parts for the charging circuit so Bret could start on that.
    - Bret and I talked with ISU Police to ensure it is okay for us to bring the project on campus during our demo time.

- I spoke with Mike and he wants a Solidworks design by Thursday so I will make sure the design is done in time for that deadline.
- Mike wants detailed measurements for each part that goes into the project, so I finished that part as well as emailing the project and measurements to him.
- When I spoke with Mike he told me that Saturday would still work for us to come down and build our project.
- My dad came back to me and said the grease is in fact conductive. This is good news because now we don't have to worry about finding a different grease to use for the rails.

- SolidWorks Design - Brett
  - Worked with the SolidWorks team to finish the overall design for the small scale model.
  - Helped create the firing mechanism, in SolidWorks, that will be used to fire our projectile.

- Worked on charging circuit prototype, Solidworks Conversion - Bret
  - I spent most of my time putting together the charging circuit prototype and coordinating a schedule with other members of the team to ensure safe testing and operation.
  - I converted the SolidWorks files to universal STEP files so Mike could view them before our meeting.

- -Grant
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- Worked on the design parts. - Zachee.
  Watched video to learn how to use SolidWorks to become more comfortable with it.
  Designed a prototype of the schematic design, It wasn't really easy for me.
  I never used solidworks. I am still working on it.

Pending Issues

- The test projectile design must be rectangular or square so that it doesn't tumble in the barrel. This basically rules out a bullet unless we fit it with fins which will be left as a 2nd-semester goal.
- Mike underestimates the amount of current and heat we think our project will output. The plastic he recommended looks as if it will melt at a temperature we think we will reach.
- We cannot test the charging circuit as we had planned. This is due to calculations not being solved in a timely manner.
- Build a charging and discharging circuit.

Plans for Upcoming Reporting Period

Using our design from SolidWorks, build the device using the parts we order. Test the device once the building has been completed. Record the data we gather from testing.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Grant Larson			57
Max Balzer	I worked on the Solidworks design most of the week so that I could have that done by our meeting time. I finished the Solidworks design and emailed it to Mike so that he has an idea of what we are thinking before we get down to his shop this weekend. I received all of our parts and distributed them to the group members that needed the necessary parts. I spoke with Mike to check and make sure Saturday still works for us to come down and start building the project. Lastly, I talked with my dad to figure out if the grease was conductive or not. The sales engineer for the Mobilgrease ensured my dad that it was in fact conductive.	15	92
Bret Tomoson	Soldered and assembled 90% of charging circuit prototype. Coordinated charging circuit team tasks. Converted SolidWorks Files.	20	98

Brett Nelson	I was apart of the SolidWorks team that finished the design for our small scale model.	12	73
Mark Fowler	Worked with SolidWorks. Learned the basics of the program and began work on my individual design of the railgun enclosure. 12 volt to 1.5 volt voltage divider. Assist Bret with circuit soldering.	8	66
Zachee Saleng	Worked most of the time during the week on Solidworks design to be able to get ready by Friday. I had some difficult time navigate with Solidworks. I could have been more helpful if we had more time. We did finish design the small scale .	13	81

Plans for the Upcoming Week

- In the coming weeks, we will be working on: - Zachee
    - I will be helping build the part that will be assign regarding the small scale design.
    - I will go over the design document .
    - If the charging circuit is finished and step up properly, the teammate and I will test it.
- Project Plan and design document - Mark
    - Review and revise project plan for final project plan.
    - Go over and revise design document.

- Finalizing my design and solidifying a building date - Max
    - I will help Bret and the charging circuit team finish the equations needed to be able to test the charging circuit next week.
    - I will need to send in a form to ISU Police to gain approval to bring the project onto campus. I haven't done it yet because I want some physical design to take a picture of so they can see what we are bringing.
- Building and Testing - Brett
    - I will help in building the small-scale design.
    - I will help in testing to make sure everything is perfect and it is where the whole Team want it to be (as in functionality).
- Charging circuit build - Bret
    - Finish charging circuit assembly.
    - Begin testing of charging circuit safety and efficiency.

Gitlab Activity Summary

Nothing to report.
