

I PRO 321

Product Development and Testing of Paper Shredder Innovations

Midterm Report

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Team Members

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Objectives

1. Determine the best cutting head for speed, sound, and durability depending on the amount of paper being shred. This will be accomplished by running tests to determine sound, by using a decibel reader, by running large amounts of paper through the shredder and seeing how much it can handle and how fast
 - This objective has not changed. The team is working towards this goal by running specific tests for each issue
2. To look into alternate design ideas, as to implement new design features that could be beneficial to the sponsor, as well as to try to make a more efficient shredder. This would be accomplished by testing new ideas and seeing if they are plausible.
 - This objective has not changed. The team is currently working on a different design measure to meet this goal
3. Determine which motor works best for the speed, sound, and durability for the paper shredder. This will be accomplished by running several different motors through tests to determine rpm, electric output, and how long it will last by constantly running it.
 - This objective has not changed. The team is working towards this goal using specific machinery to determine these issues.
4. After the first three objectives are accomplished, what is learned from these tests will be implemented into the design of a prototype paper shredder. The teams will put in design advice and talk to the machine shop into helping design a prototype machine.
 - This objective has not changed. This is the team's final goal, and as each objective is met, this goal will be met.

Team Breakdowns:

Mechanical Team

Steve Flicek

Aseem Pandey

Michael Hatch

Zach Capps

Patrick Bauer

Electrical Team

Vesna Pesik

Jason Howard

Matthew Anderson

Sebin Lee

Results to Date

Electrical Team

The electrical team has been thus far assisted in working on solving objective 3 for the project. The electrical team has created a universal motor stand for dyno-testing that will help us to calculate the motor size (horse power).

Mechanical Team

The mechanical team has been working on solving objectives 1 and 2. One part of the team has focused on objective 2, and has been working on new ideas or designs for the shredder. So far, this part of the team has designed one new idea or model design, which will incorporate an automatic feeding system, making the paper shredder more efficient. This part of the project is at the moment working on getting the drawings of the design turned into a computer blueprint, so that it can be implemented into an actual prototype and be tested to see if it meets the ideas of the project. The other part of the mechanical team has been working on achieving objective 1. The team to date has acquired two new shredder heads, measured the motor speeds and head speeds for the shredder heads. Also, sound measurements were taken so once the gear ratio is determined the measurements of sound with the changes can be measured against the original sound readings. The team is also currently retrofitting the new shredder heads to torque testing apparatus.

Revised Task and Event Schedule

Electrical Team

The electrical team will continue running tests with the dyno-unit and continue to work on determining which type of motor will fit best with the design and with the demands of the sponsor. The team will determine the amount of power the motors use to shred various amounts of paper as well as to be able to accommodate the other needs of the shredder.

Once the electrical team determines which motor will work best for all desired qualities, the team's work will be incorporated into the design of the prototype paper shredder to fit with the rest of components of the shredder.

Mechanical Team

The mechanical team will begin to make torque measurements of the paper shredder heads as soon as the shredder heads are retrofitted onto the torque testing apparatus. As soon as the shredder heads are attached to apparatus, the team will take torque measurements, and then move to determining the gear ratio and then determine what parts will work best to meet all the desired qualities of the project.

The team will also continue to work on designing new design ideas, and as soon as the design ideas are converted into computer blueprints, the designs will then be turned into a prototype and testing will begin

Once these two tasks are accomplished, the results of these tests will be used with the work of the electrical team to design a prototype paper shredder that meets the desires of sponsor.

Task Assignments

Electrical Team

There are no changes to the plans or assignments to the electrical team. This is due to the team making progress in accomplishing their objectives and goals as well as staying focused on their objective. The current roles of each member of the group are working, so no changes are necessary.

Mechanical Team

The team is going to continue working in the manner they have been, as everyone has been able to keep the project moving towards its goals and progress is being made on both objectives. The team will keep the roles they have been working in, as the project has not been delayed in an unacceptable manner.

Barriers and Obstacles

Electrical Team

The electrical team has run into two major obstacles so far. The first is getting the results from a DC motor that's been tested with the dyno-unit, as the team has little experience with using the device. The second is determining motor is going to give better shredding performances, either the DC motor or the Universal motor.

Mechanical Team

The two main obstacles the mechanical team has run into are turning the new ideas into computer blueprints and using the torque testing apparatus. No member of the project has sufficient training to turn the design drawings into computer blueprints, so the team will be consulting with a professor in the computer science department and see what help can be acquired. The torque testing apparatus has been causing problems in getting the shredder heads mounted to it. To solve this problem, the team has contacted the machine shop and has placed an order with them to get the shredder heads fixed onto the apparatus.

Conclusion

In conclusion, the team has made progress towards meeting the goals given to them by the sponsor. There is plenty of work left to be done, and each team is in position now to start working on the key parts of their objectives. The team met with the sponsor to show how much progress has been made, and to see what suggestions he has. He offered many insights, and helped the team find a direction and answered several important questions. Therefore, with suggestions from him, as well as the teams finally having the necessary pieces to do their needed research, with collaboration and hard work, all the objectives can be met.