**Team 20F03 Malawi**

**ME 486C- 007**

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**Introduction**

In this memo, the team will discuss the success and challenges that came out of the previous semester of this project. This project entails creating a compost transporter that can be used for the country of Malawi. This transporter will be electrically assisted and will help the people dump and load compost and take it from their village to the composting plant. Furthermore, this memo will discuss all of the things that happened last semester and will explain how they will affect this semester for this project. Below describes more in-depth what the team believes contributed to the project and what areas the team can improve upon.

**Contributors to Project Success**

Last semester, our team was created to build an efficient transporter that can transport organic waste from dense neighborhoods to composting sites in Malawi. The design will be an electrically assisted/propelled transporter that allows the people of Malawi to transport organic waste from homes, ditches, and rivers to the compost site. For the project goal, we want to make the transporter durable and maintainable by using the reusable materials found in the country of Malawi. We also want to keep the project budget low due to Malawi's financial state. The team's overall quality goal is to make sure it works and satisfies the customer and client needs. We are not trying to design the prettiest design but rather a safe, efficient, affordable, and maintainable one. In order to complete the purpose and goals, our team has come up with multiple goals and steps. In the weekly meeting with the client last semester, our team members shared our ideas with the client. In the process of continuous improvement, our team determined the sketch of our final design, which completed the purpose and client and customer goals perfectly. However, a prototype has not yet been made. In actual construction, there may be other difficulties our team will have to overcome. These difficulties will have to be overlooked and completed to satisfy our purpose and goals.

In order to achieve the purpose and goals of the group more efficiently, the group made a series of ground rules. Our team plans on meeting through weekly zoom call with our professor, to always be on time, to continue to stay focused on the task at hand, to communicate efficiently, and to respect everyone's opinion. The team will also keep the client updated throughout the progression of the project to make sure we stay on the right track of her needs and the needs of the customers. Also, in order to make decisions, the team has decided to have everyone share what they think about a certain area of the project and then discuss how to proceed. This lets everyone have a chance to be heard and all ideas can be discussed. If any teammates were to get into a disagreement, we will settle it respectfully. We will listen to any participating parties and figure out what the best course of action to take would be. Meanwhile, we will hold each member accountable for their own actions and everyone is expected to give the project a full commitment to all the tasks assigned to them. Each member should be responsible for all the work submitted on behalf of the whole team. Up to now, all the ground rules and coping strategies have been followed and our group has excelled in the first semester of our capstone project. Our group chose to meet via Zoom meeting every Tuesday afternoon to discuss new progress, report to clients, and get feedback. Through continuous improvement, we got the sketch of the final design last semester and are prepared to start ordering more parts and start the prototyping stage. In the weekly zoom meeting, no members are late or absent without earlier notice and everyone's opinions are respected. Because each of us is responsible for different parts, there are no differences among members, and the whole process goes very smoothly. We also got A+ in the last semester, and the members completed all assignments with good quality work. We as a team expect to continue this same behavior following into the last semester of the capstone project.

Perhaps the largest and most obvious problem for last year was COVID-19. The pandemic has caused the first semester to be half virtual and half in-person which could cause problems with group and client meetings. This semester could possibly go all online which would affect the building process severely as there would be no telling how things would get done on time. We already have been waiting for over two months for one of our major parts to come in. Overall, the pandemic can greatly impact the ability to schedule everything effectively. Throughout the design alternative stage of our first semester, our design underwent a lot of modifications. Our group has decided to go with a design that resembles a modified GorillaCart rather than a deep-bucket-like design based on the client’s suggestions. The original idea was to use 8020 Aluminum for the whole cart, but ultimately it was decided that it would be best if it were only used for the frame with an aluminum plate being the base of the bucket. This is due to the complexity of the profile of 8020 Aluminum as well as prices. This is also to make access to the batteries and motor easier when someone may need to work on or replace them. The dumping mechanism has also changed a lot as well. The final design has a removable wall with a bucket on hinges. A hydraulic jack will also be used to raise the bucket on one side by pumping it manually rather than electronically (another design change) and will dump the load off the other side where the removable wall is. The tires will be off-road tires and filled with foam to prevent punctures. The motor system has also been finalized to be a DC motor with a twist-throttle on the handle to activate it when necessary. The final design also implements a handle in the back if a second person is needed to haul the load. The cart will have a carriage underneath the bucket capable of holding the batteries needed and the hydraulic jack and motor.

**Opportunities for Improvement**

In terms of opportunities for improvement, the team has reached most of its goals for the previous semester. The only part that has changed since the team charter is the overall scope of the project. In the team charter, it was said that a tricycle would be constructed but that has since been changed into a much more doable project for one year. The most positive project performance would be sticking within the budget. We managed to stay well within the given budget when it was worried about for the first part of last semester. The most negative aspect of last semester would probably be time management. This is mostly due to the ongoing pandemic and the unexpected nature it has given us. However, this being said, we still managed to stay on track and be mostly caught up. As stated previously, the largest obstacle that has been encountered has been the pandemic. It has been difficult to do anything in person, as well as being able to track certain items that have been shipped. The team is still very unsure if all parts will be in on time to build, test, and have time to improve the design if needed.

Hopefully this semester, we will be able to find times to meet in person and construct this project, as that is the main goal of the semester. Through last semester, many lessons have been learned and we have been able to adapt to the best of our ability. Our client has had her vision of the project many times throughout the semester, but this is no issue as the client’s needs would be constantly changing in the real world. We have all learned more technical lessons through the self-learning assignments that will help to improve our goals continuing forward. However, working as a group and within this group, we’ve managed to learn a lot from each other, even if everything was done virtually and we plan on continuing to do so.

**Conclusion**

In conclusion, there was a lot that happened last semester. Overall we are satisfied with where we got for this semester with the pandemic and with everything that has happened this year. That being said, it didn’t come without challenges. All the challenges that arose were overcome and helped us grow as a team. Furthermore, there is still a lot to do for this upcoming semester. We are in the process of acquiring all the materials so that we can begin to build and test our design. Building and testing the design would determine the capability of the device in the real-world. Testing can also determine how safe the design is and how reliable it is. The team had taken safety and reliability seriously on the design, however, real-world testing might need few changes that we would be ready to make any time needed. The team is hopeful the situation will improve as the semester continues but is also ready for anything that may come our way.