

External Outriggers For The Electric Bike

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Introduction

Otago Polytechnic has a new Electric Vehicle under development by students as a development project leading to sustainable future campus transport. The intent is for students to design and build various aspects of the vehicle in a collaborative manner. This includes electrical and mechanical components from a wide range of backgrounds including overseas students working on aspects alongside each other. The vehicle will be two-wheeled, electrically powered, and completely enclosed. The outer shell had already been made but Otago Polytechnic students were tasked with designing and mounting the final components needed to make it into a useable vehicle.

Problem Statement

Being a two-wheeled vehicle with an enclosed driver the vehicle will become unbalanced when stopped or parked. The vehicle could tip over on either side if there isn't a solution found to stop this tipping causing damage to property and/or person.

Customer Needs

- Internally Activated System
- Ergonomic Handle
- Safe and Strong stand
- Looks Good on the Bike

Proposed Solution

We wanted to design a support for the bike that allowed it to stay stable in times when the bike is stopped or fully parked. We believed a stand that extends to the ground will be a good solution. This stand should lock in place and stop the vehicle from falling to either side. A handle was mounted internally that allows the outrigger to be extended.

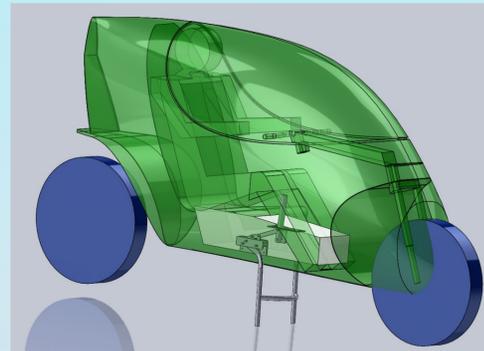


Figure 1: SolidWorks model



Figure 2: Actual model



Figure 3: States 1- Running



Figure 4: States 2- Parking or stopping

Final Result

We came up with a hinged stand solution that could be deployed and put away from inside the vehicle. This was mounted inside a fibreglass frame and made from a combination of steel and aluminium resulting in a strong and stable structure for the vehicle to stand on.

Constraints

Our project was met with a lot of constraints, These included:

- Limited space inside the vehicle
- Had to be activated from inside the vehicle
- Strong enough to hold the weight of the vehicle
- Limited Budget
- 1 semester to build

Areas of Improvement

With a short timeframe we were left with a lot of areas where our outrigger could have been improved. These were:

- A more ergonomic handbrake
- Better Variety in foot attachments
- Polishing and Styling the solution better
- Making a better solution to adjust the outrigger length

Conclusion

We completed our outriggers for the electric bike with a strong enough structure to keep the bike upright when parked. This provided a safe solution for the driver when entering and exiting the vehicle before taking off to drive. Hopefully our project can be a foundation for new students to work off for better electric transport in the future!