SUSTAINABLE MOBILITY PROJECT JOSHUA KUNKLE, JAKOB DAVENPORT, AND MORRIS TAYLOR

Background

Imagine living in a place where daily household tasks, such as fetching clean water, require you to travel miles on foot. Now imagine living this life with a mobility impairment. Getting around would be slow and difficult, likely limited to crawling on hands and knees, and your household contributions would be restricted. For the physically impaired living in Mahadaga, Burkina Faso, this is everyday life.

. The Mobility Tricycle Project originated in 1999 with a hand powered tricycle design for people with limited mobility in Mahadaga, Burkina Faso.



. The Sustainable Mobility Project began in 2016 with the goal of making electric tricycle manufacturing efficient and sustainable for our partners.



. The first electric powered tricycle was fabricated in 2004, because of a special request for a tricycle that would require less upper body strength to drive than





the hand-powered design.



Clients

We partner with the Centers for the Advancement of the Handicapped in Burkina Faso, West Africa.









The mission of the Sustainable Mobility Project is to equip our partner with an appropriate and sustainable method for locally building and distributing our mobility tricycle design to those in need. In rural West Africa, this personal mobility technology brings freedom and empowerment to some of the most











Our Mission

This Past Year's Work

. FRAME BUILDING: Problem-solving and experimentation to resolve issues with the tube-bending process.



- SPLINED SHAFT: Creating an image-driven heat treatment and manufacturing procedure for easy future splined shaft fabrication.
- . **CONTROLS: Redesigning** the brake handle and developing wiring procedures and diagrams for the control boxes.



ALUMINUM CASTING MOLD: Modifying the mold used to cast the housing for the speed reducer assembly to **minimize waste**

in the casting process.

. AXLE MOUNT: Overhauling the design for the rear axle assembly to maximize efficiency and ease of production.



Further Information

For more information about the Sustainable Mobility Project, please visit: http://www.messiah.edu/info/22228/our_projects







Burkina Faso Trip

. In January 2017, the Sustainable Mobility Team put these improved manufacturing procedures to the test by traveling to Fada, Burkina Faso.

- We built five new electric tricycles. Previously, two tricycles per trip was the norm.



. We met the clients receiving trikes — Sala, Souley, Souhoura, Yacouba, and Elisabeth—and their families and enjoyed watching them take a test drive.

Conclusions

Building five tricycles in one trip was an important step forward for our project. Moving forward, the team will further develop and test tricycle manufacturing to generate a **complete** design and manufacturing handbook for our current and future partners.

Acknowledgements

We would like to thank our advisors, Dr. David Vader and John Meyer, Collaboratory Director Douglas Flemmens, as well as Françoise Pedeau and all her staff at the Centers for the Advancement of the Handicapped.





