Wheels for the World Wheelchair Project

Presented by Emily D'Amico

The Need

- Wheels for the World, an outreach of Joni and Friends, is attempting to provide a mobility option to individuals with disabilities around the world.
- Many people around the world suffer from a disability which renders them incapable of freely moving around their community.
- This lack of mobility causes adults to be unable to find employment and children to not have access to education.
- Individuals with disabilities are often seen as less valuable members of their society, deeply harming their sense of self-worth.

Our Goals

- **Provide the gift of mobility to individuals around the world.**
- Design a wheelchair that can be mass-produced by our client which costs less than $225.
- The design should be adjustable to different users and easily collapsible for easy transportation when not in use.
- The wheelchair will be partially assembled in the United States and shipped as a kit to its location where the rest of the assembly will take place based on user customization.

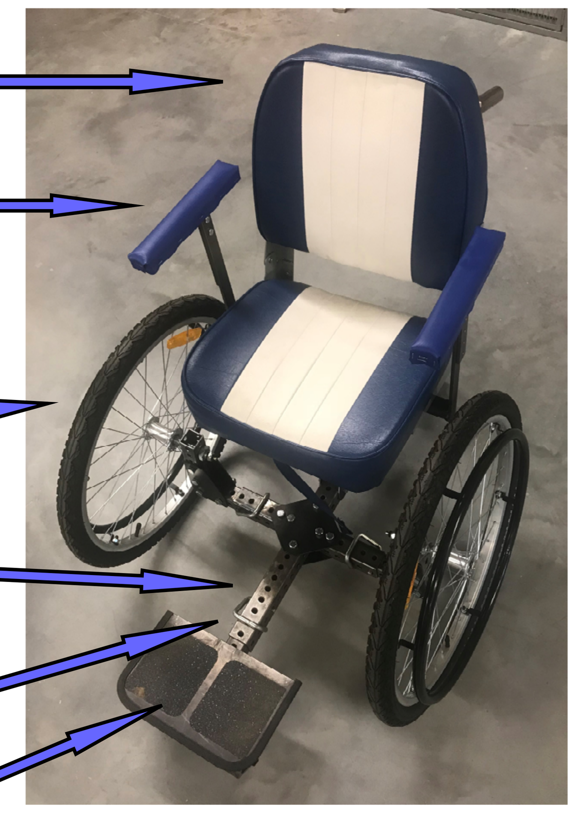
Client

- *Wheels for the World,* Outreach of Joni and Friends
  - *Paul Dorthalina;* Director, Wheels for the World

Wheels for the World
A Disability Program of Joni and Friends

Design

- The Bumblebee wheelchair provided by Hope Haven was used as our design inspiration
- The team designed the wheelchair with the ability to be used on different surfaces
- Design was made for a 100kg (220lb) person with a safety factor of three



Seat: Common boat seat with ability to have height and angle adjusted

Armrests: Light weight design with five different height positions

Wheels: Standard 24" tires with a wide rim base for stability and strength

Frame: Created by telescoping 1.5" and 1.75" steel stop-sign square tubing which allows for adjustability

Gravity Pins: Allow for easy adjustment of the frame and help with collapsibility

Footrest: Designed to be adjustable in angle and length and can withstand the full weight of the person

Push Handles: Attached to the wood block on the back of the chair and are removable for collapsibility

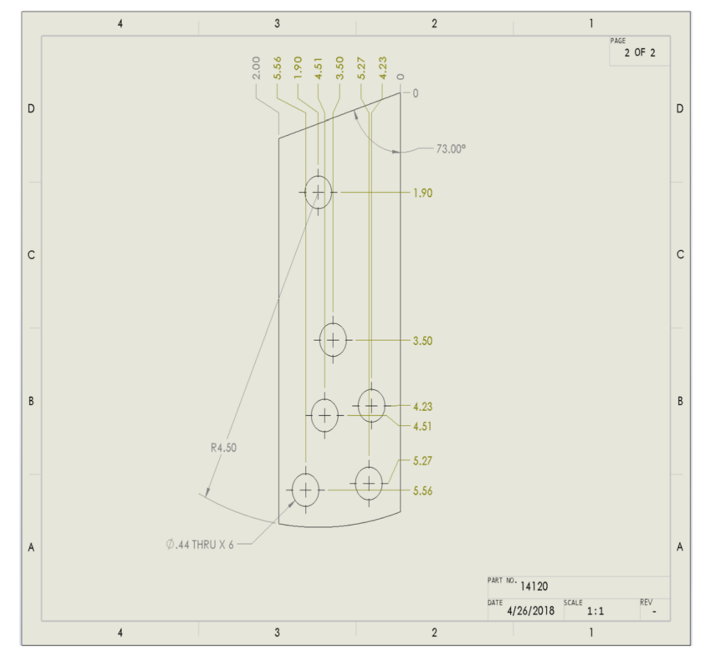
Shock Absorber: Implemented to account for un-even terrain and designed to be easily manufacturable

"Do nothing out of selfish ambition or vain conceit. Rather, in humility value others above yourselves, not looking to your own interests but each of you to the interest of others."
~ Philippians 2:3-4

Testing

- Upon completion of the design stage of the project, the team has moved into testing the wheelchair and making design adjustments based on these observations.
- The team performed qualitative tests on the chair to make adjustments as necessary, such as changes to the armrests' height and width, and has developed a set of quantitative standards that will be used in the future.
- The prototype will be sent to Wheels for the World over the summer to be tested and the design will be refined based on their feedback.

Documentation



Manufacturing manual:

- Includes engineering drawings of all of the individual parts (see left) and sub-assemblies
- Drawing tree was created to organize parts into a numbering system

Assembly manual:

- Mostly pictures with limited written directions to reduce problem of language barrier
- Will be delivered with the assembly kit

Acknowledgements

- *Paul Dorthalina*; Client
- *Dr. Tim Van Dyke;* Project Manager
- *John Meyer;* Engineering Technician
- *Stephen Crooks*
- *Jamie Stark*
- *Randy Tran*
- *Dr. Emily Farrar*
- *Alex Issis*
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