Project Name – Adam Reed-Wheel Conversion Kit

Overview
Our problem is that the current wheels on a walking-assist device (Gait Trainer) for a three year old girl (Lucy) with spina bifida are not rugged enough for her to maneuver around on different outdoor terrains and small obstacles in her path. Therefore, the wheels must be re-designed so that they include a suspension system to allow for rolling over various outdoor terrains and obstacles such as sticks and rocks, while still remaining safe.

Objectives
The overall intent of this project was to create an easy attachable, rugged wheel assembly that could be connected to a Rifton Gait Trainer. The wheel assembly attachment that was designed incorporated a shock suspension system, as well as an efficient clamp attachment.

Approach
- Customer needs were gathered by talking to the Reeds about the limitations the current wheels had.
- Current Gait Trainers and their wheels were researched to see what existed and how to improve upon them.
- Stroller wheels were researched to get an idea of how to create a rugged wheel system.
- After analyzing patent designs and current products, numerous concepts were generated.
- Three main suspension systems, two different kinds of wheels, and two different kinds of attachments were thought of before a final design was chosen.
- The final design was chosen based on what we and our sponsor thought would be most feasible based on customer needs, complexity of design, and time constraints.
- CAD models were made of the top three designs, and an alpha prototype was made of the final design.
- After reviewing the alpha prototype with our sponsor, we constructed our final prototype, along with the necessary modifications.
- Testing was performed for safety and ease/speed of attaching the wheels.
- One wheel fractured due to too weak of an epoxy, so we changed the epoxy material to one much stronger.

Outcomes
- Lucy can now walk over the gap between the elevator doors, small obstacles in her path, and on bark mulch and other various terrains that she previously struggled with.
- All four wheels can be clamped onto the Gait Trainer in about one minute
- The clamp of the wheel is a universal size manufactured by Rifton, so this wheel can be used for newer devices that she will use as she grows.