A Device to Open Heavy Doors – Transverse Myelitis Association

Overview
The Transverse Myelitis Association is an inflammatory disease that causes injury to the spine, resulting in legs becoming paralyzed and arms and hands becoming very weak. The purpose of this project is to create a portable and lightweight device that will automatically open heavy doors. Our clients, GG DeFiebre and Pauline Siegel, struggle to open doors, so the TMA is looking for our group to help them open these doors.

Objectives
The objective is to create a lightweight and portable device that can automatically open the door for those with Transverse Myelitis. Our clients have said that pulling a door is much harder than pushing a door, so the team wanted to focus on opening a pull door.

Approach
- The team had a skype meeting with our clients to learn about their limitations, expectations, and how they currently get through doors.
- 3 concepts were generated, and we ultimately chose a cable winch as the best solution
- The team had skype meetings with the sponsors and connected with them via email to keep them updated on the progress of the project
- A MATLAB simulation was run using specifications we took from doors around campus to determine the force needed to open the door and the time it would take for the door to open
- SolidWorks models were created to visualize the design before it was manufactured
- The team was able to manufacture a working prototype that successfully opened a door
- Testing was done by having the team members sit in the wheelchair and operate the device to make sure the process was easy and the device was safe

Outcomes
The group successfully created a device that attaches to the wheelchair and pulls the door open.
- The team only used 40.5% of the allotted $1000 budget
- The device successfully opens the door in approximately 10 seconds
- The device that was manufactured provides a new and unique process to open doors
- The team was awarded 3rd place for best project in the Capstone Showcase