Door Opener for People in Wheelchairs

Overview
Many individuals with transverse myelitis suffer from weakness or paralysis and require a wheelchair to get around. Heavy doors are often a hindrance on these individuals’ independence to perform day-to-day activities, as they can pose a serious physical challenge for someone with this condition. Many heavy public doors are either too time-consuming to be worth opening, or are simply impossible to open.

Objective
Design a lightweight, portable device to assist people in wheelchairs and people with compromised arm strength with opening heavy doors. The device must be made from readily-available parts and include an instruction set for duplication.

Approach
• A survey was conducted on doors in downtown State College to determine the most common type of door with reference to handle type, weight, and direction of operation.
• Brainstorming led to the selection of a motor powered device to drive the door open.
• The Alpha Prototype was a proof of concept, ensuring the selected solution was practical.
• Refinements and additions on the alpha prototype led to the construction of a beta prototype closer to the chosen solution.
• Testing and analysis of the beta prototype revealed problems with the aesthetics, functionality, and the control interface.
• Adjustments were made to decrease the amount time it took to open the door by replacing the current wheels with larger ones.
• Activation of the motors was implemented into the housing of the device from a switch on the handle.
• Testing showed an operational device capable of opening a heavy door.

Outcomes
• The Transverse Myelitis Association can provide the instruction set to individuals with transverse myelitis free of charge.
• Users can build this device for $150 within 3 hours.
• People in wheelchairs have increased accessibility to more public locations.
• Increased independence in day-to-day activities.
• Addresses the largest segment of difficult doors to open.