

Anterior Tilt Wheelchair

Mechanical Engineering

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Abstract

Anterior tilt on a wheelchair is helpful for transferring a person in and out of a wheelchair. While specialized wheelchairs and some motorized wheelchairs have this capability, few manual folding wheelchairs do. The scope of this project was to create an anterior tilt mechanism that could be added onto a pre-existing wheelchair. This was done using a four bar linkage system driven by two linear actuators.

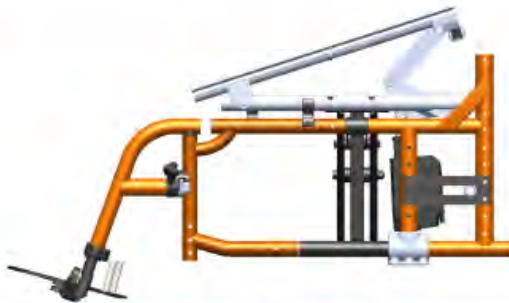
Primary Objectives

- Achieve a minimum tilt of 20°
- 350 lb (min) user capacity
- 15-20 lb system weight
 - Including electronics and battery
- Modular system
- User activated
- Must fold with the wheelchair

Design

- System attaches to the wheelchair by clamps and a support rail. The support rail acts as a base to add on hinges to allow for tilting of seat
- Actuator driven four bar linkage systems powers the tilt
 - Modifying the four-bar system and the actuator used can allow for a greater tilt.
- Foldable horizontal support members prevent the seat from collapsing when in actuation, but also allows the wheelchair to be collapsed when not in use.

Side View



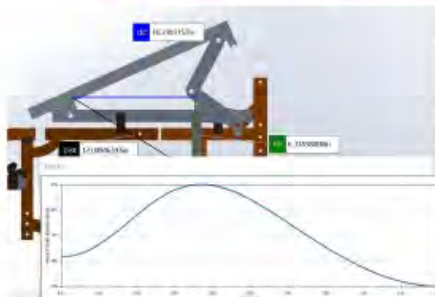
CAD Model



Exploded View



Force Calculations



Stress Plot



Factor of Safety Plot

