Peace of Mind Braking System

Delta Horizons · University of Colorado Boulder · Design Center Colorado
Ashley Atkins, Ben Finan, Brandon Cyrus, Evan Hanson, Julia Beattie, Tiana Decolati

Background

- **Problem:** Standard hand brakes on 4-wheeled walkers require conscious input, which allow the walker to slip out from underneath the user and can be dangerous in the cases of standing or falling
- **Mission:** Improve safety of 4-wheeled walkers
- **Strategy:** Design a mechanical walker braking system that engages at the proper time without conscious user input

Requirements

- Automatic and manual brakes
- Safety brakes engage during falling, standing, or sitting on the walker
- Roll away brakes engage when the walker is unattended
- Braking thresholds suitable for the average user
- Maintain expected walker lifespan
- Does not interfere with any folding and storage of the walker

Previous Designs

- Linkages
- Extension Spring
- Roll-Away Brake
- Compression Spring
- Safety Brake

Design

- **Safety Brakes** engage when large loads are applied to the walker
- **Roll-Away Brakes** engage when no weight is applied to the walker

Testing Data

- **Average Force at Handles vs. User Weight**
- **Left & Right Hand Forces at Handles vs. User Weight**

Conclusion

- Resting arm weight of the user deactivates the Roll-Away Brake
- As springs compress, Roll-Away Brake travels along an angled slot, moving the brake arm away from the wheel, allowing regular walker use.
- Two different springs are incorporated to allow for more precise braking thresholds and longer spring life.
- Further compression of the springs brings the Safety Brake into contact with the wheel.

Future Considerations:

- Add a cover to keep debris out
- Trade non load-bearing components for plastic
- Offer additional sizes
- High-volume manufacturing possibility

Special Thanks

Jose Constancia
Daniel Riffell
Andrew Morton
Dario Atallah