DEPARTMENT OF MECHANICAL ENGINEERING

Up We Go
Stand-Up Assistive Device for the Elderly

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Motivation, Goal, Impact

Motivation: To empower our end users to stand up independently

Goal: Design a portable and versatile device that assists users when standing

Impact: Increased independence improves functional mobility, reduces caregiver burden, and enhances overall quality of life

Target User: Older adults with musculoskeletal decline who retain adequate lower-extremity sensation and motor control

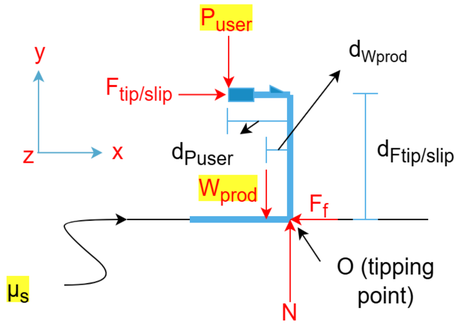
Requirements

- Purely mechanical
- Target production cost of $200
- Be compact and portable
- Accommodate ambidextrous single-handed operation as well as dual-handed use
- Compatible with various furniture types

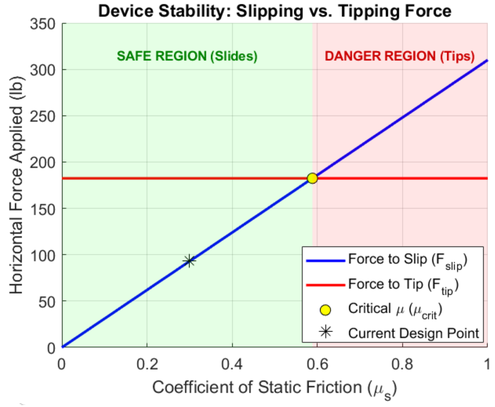
Final Design

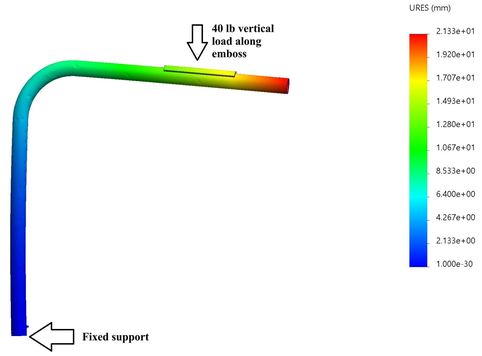
Usable Form	Material	Total Weight	Portable Form
H: 27"-37" W: 19" L: 20"	Aluminum 6061	~ 8 lbs	H: 27" W: 4" L: 15"

Design Calculations & Decisions



Siemens NX Human Modeling

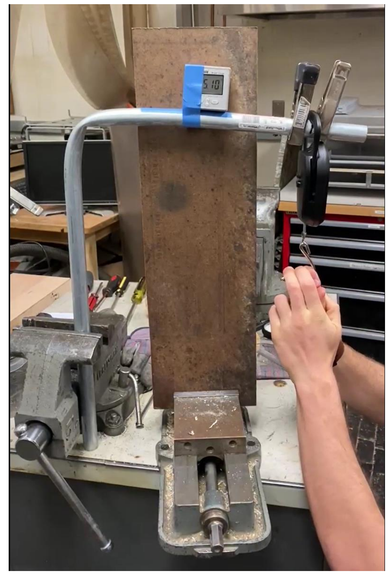




FEA Handle Deformation

Prototype & Test Results

- EMT conduit
  - ⌀ ¾" handles
  - ⌀ 1" base
- 3D printed bushings and shaft collars
- First version of scissor-frame with wood, nylon string, & zip ties
- Deflection/strength test on handle
  - 34 lbs failure for 90° elbow joint
  - 40 lbs failure for manually bent handle



Note: Testing done on EMT prototype. Final material load tolerance is higher.