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FIVE GUYS

Automotive Solutions



Vision Statement

To create a prototype solution to significantly improve the ease of entering and exiting seats in cars for individuals with moderate knee or back impairments.



Requirements

- Increase height of seat cushion to reduce awkward movements
- Design such that the **seat can be in any position** with the door closed
- Weight limit of **300 lbs**
- Cost-effective / simple installation
- Less than **30 seconds** to enter/exit
- Adhere to NHTSA standards

Competitors

Bruno Valet LV



- \$3,300 + Installation
- Must return to standard position to close door
- Requires door to be fully open

HandyBar



- \$23
- Doesn't assist user to reduce force
- Only provides additional supporting surface

SEAT ASSIST

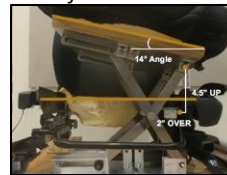
Solution



- Two Four-Bar Mechanisms (1018-CD Steel)
- Utilizes single electronic actuator to lift user
- Attached to base of seat cushion and seat frame
- Drop-in installation
- Runs off of car battery
- Single switch activation with user feedback

Testing

Test 1: Position Verification



Test 2: Timed Motion

	Time Up	Time Down
Loaded (150 lbs)	16.8	12.0
Unloaded	13.8	12.0

Test 3: Max Loading

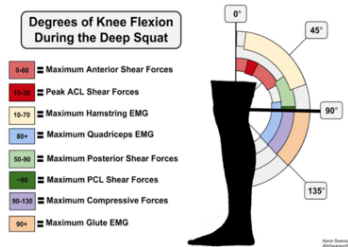
Prototype	Final Design
200 lbs Test Limit	300 lbs Limit
3/8" Actuator Rod	1" 3/16" / 2" Actuator Block
675 lbs Actuator	1000 lbs Actuator



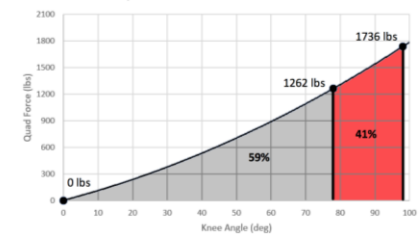
Test 4: Knee Flexion Analysis



User Benefits



Required Quad Force for 200lb Person



Business Case

- 8.8% of Americans report trouble kneeling, stooping, or bending (CDC Health Survey)
 - 0.1% annual market penetration, 28,400 units / year
 - Market to OEM, integrate on an assembly line
 - 30% profit share
 - **\$1.3 Million Annual Profit**
- Prototype Cost: \$380
Production Cost: \$450
Sales Price: \$600

Future Work

- Safety and Crash Test Analysis
- Improve upper and lower attachment plates
- 1000 lbs actuator
- Improve stress capability of actuating rod