

# Instructions on Completing Mock-Up of Spring-Loaded Design for Lift/Lower of Center-Mounted Footrests on Power Wheel Chairs

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## intro: Instructions on Completing Mock-Up of Spring-Loaded Design for Lift/Lower of Center-Mounted Footrests on Power Wheel Chairs

Center-mounted footrests lift to be stowed beneath the seat well, and lower to be deployed. A mechanism for independent operation of footrest stowage and deployment is not included in market power wheel chairs, and PWC users have expressed the need for such a mechanism. My group research at Georgia Tech has aimed to design a solution that permits wheelchair users to independently lift and lower a center-mounted footplate during transferring processes.

The mock-up is constructed to showcase the mechanism by which the track slide design works to lift and lower the power wheelchair center-mounted footrest.

link to youtube video demonstrating use, and uses of several other designs:

<http://www.youtube.com/watch?v=5ks2oms2GBs>



### step 1: Materials

#### MATERIALS NEEDED FOR CONSTRUCTION

##### Torsion spring

- o Preferred with housing
  - o Spring force sufficient to move 5lb, 10 in. long mass
  - o Part used: *Metal spring door closer* (home depot)
- "Features a non-handed design with adjustable closing tension. Easily mounts to the surface and can operate up to a 150 lb. load. (MFG Model # : KC10HD, MFG Part # : KC10HD)" - Homedepot.com

##### Spring Plunger

- o part used: *brass pull ring hand* (McMaster Carr, part # 8482A421)
- "retractable plunger, nonlck nose, 3/8 in- 16, w/o lock, 2.0 4.0 # end force" - Homedepot.com

##### Cable system

- o Length of cables allows stretch from spring plunger to hand operated lock release
- o Hand-operated manual pull mechanism to lift spring plunger
- o Tension such that the pin is moved with a deliberate hand motion
- o Part used: *Bike Brake* ; Only handle and cable used

Two 80/20 aluminum bar segments

- o 2 x 1 x (1 in. \* height of seat well)
- o 2 x 1 x 1 in.

##### 80/20 fasteners

##### hook - eye screw

##### small bracket

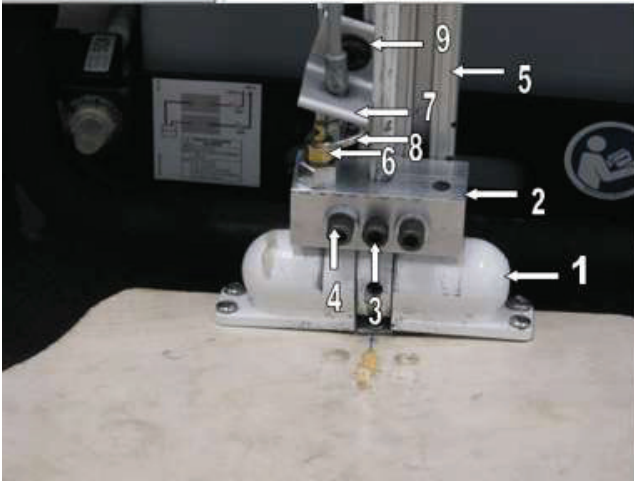
<http://www.instructables.com/id/Instructions-on-Completing-Mock-Up-of-Spring-Loade/>

various setscrews

## step 2: Mounting the Spring

Cut a piece of wood for footboard that is approximately 10' X 10" X 1" with 5lbs < weight < 10lbs.

Mount torsion spring to footboard (#1 in figure) using 1' screws.



## step 3: Mounting Board to Chair

Drill three holes through one long face of smaller aluminum block (2). Center hole is for setscrew (3). Other holes are for 80/20 fasteners (4) mounting to long 80/20 segment (5). Bit size matches selected screw diameter.

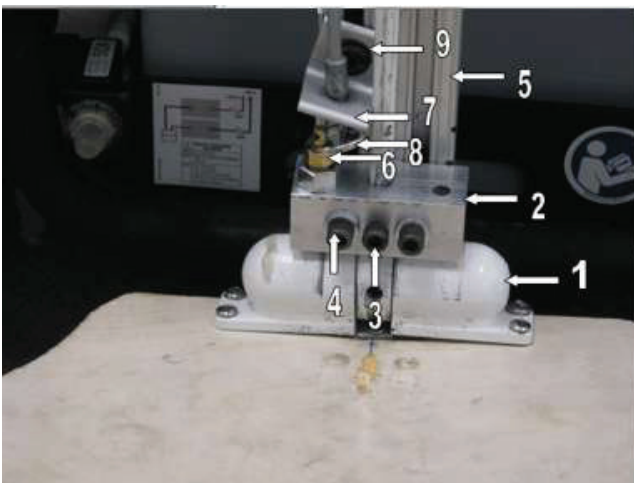
Thread setscrew hole.

Drill one hole through the long face on top of small aluminum block, adjacent to face with three holes. Bit size to allow passage of torsion spring extender through small block.

Drill one hole on the same face, away from the center hole. Bit size matches that of spring plunger.

Thread spring plunger hole.

Assemble footboard with mounted spring to the small aluminum block with spring plunger (6) and secure to 80/20. It is recommended to attach a board to the opposite end of 80/20 to be laid on work surface for stability.



#### step 4: Attaching Cable System

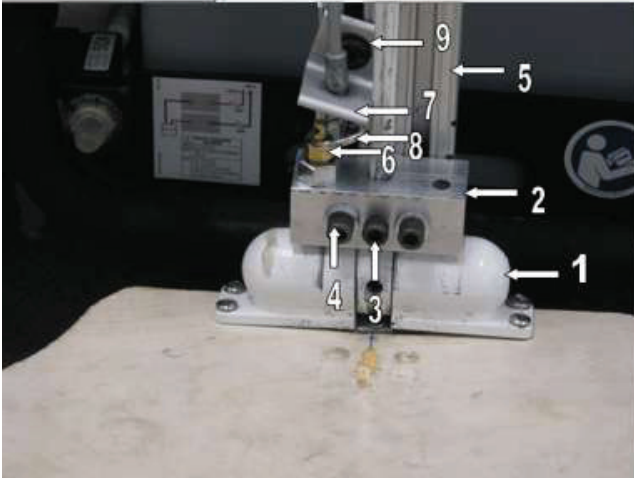
Drill one hole through a side of the bracket (7) to pass a fastener. Drill one hole through the other side of the bracket to pass the cable.

Pass the cable through the bracket. Using a sturdy connector (8), secure end of cable to top of spring plunger. Key ring was used.

Using an 80/20 fastener (9) secure the bracket to the side face of the longer 80/20 segment. Position such that cable is allowed to move during pull until connector meets bracket. Force of cable pull will lift plunger spring to remove locking mechanism and permit footrest to move.

Secure hook-eye screw (10) to outer face of long 80/20 and thread cable through such that it is guided up and around user legs.

Handle (11) can be laid next to the user when not in use.



#### step 5: Complete Drawing



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