



University of
New Hampshire

Motorized Handcycle for People with Physical Disabilities

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Sponsor: Brayton Energy



Project Goals

- Develop a safe, reliable, and enjoyable electric assisted handcycle
- Compete financially with other commercial handcycles
- Safely support a 250 lb rider
- Reach 25 mph on flat terrain
- Create adjustable components to maximize accessibility
- Weigh under 75 lbs

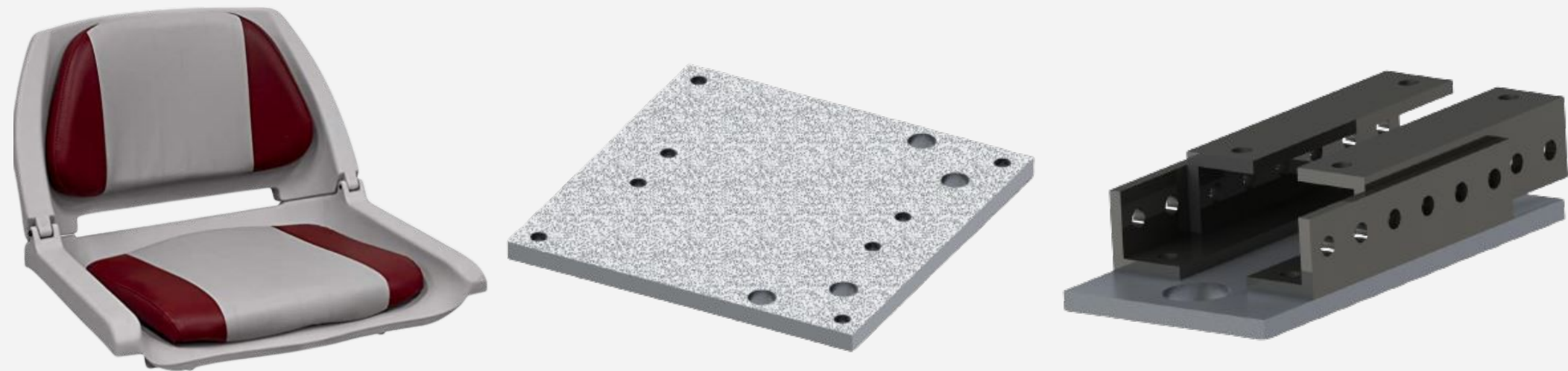
Frame Design

- Designed in 2018
- 0.035" thick, 2" diameter titanium tubing



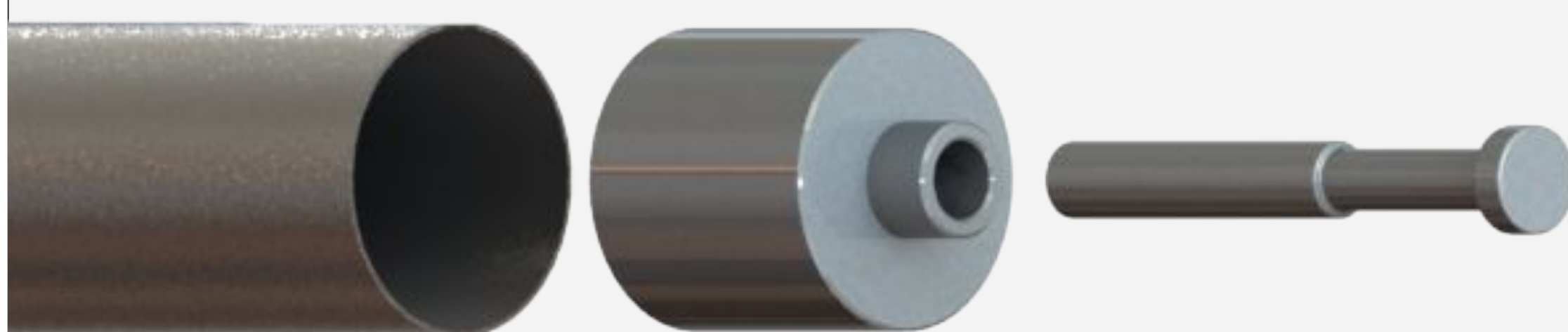
Seat Assembly

- Weatherproof, adjustable, houses taillight
- Optional seat belt for riders with neuromuscular disorders
- Predicted factor of safety of 15



Rear Wheel Fixture

- Allows for quick release of rear wheels
- Made of low-carbon steel, F.S. approximately 30



Final Design



Current Handcycle Design (04/23/2021)

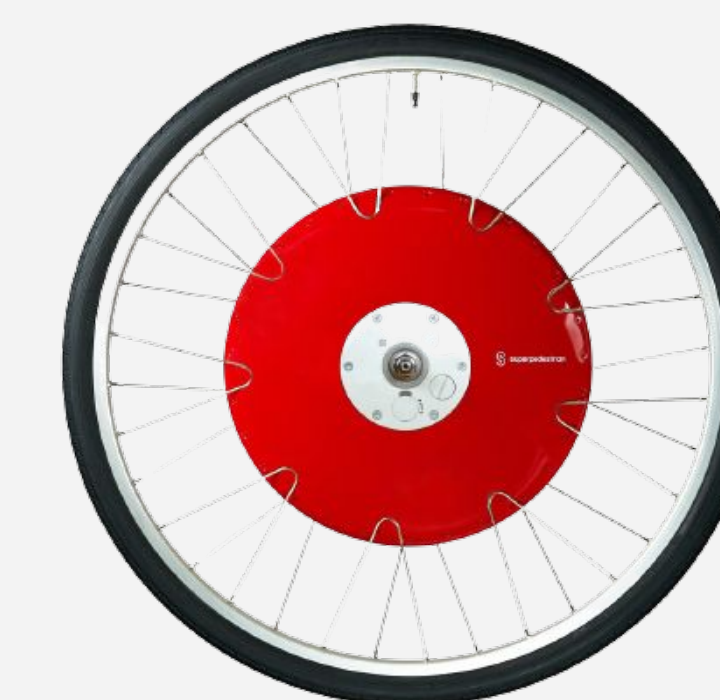
Footrest Attachment

- Made of aluminum and low-carbon steel
- Uses lynchpin for easy adjustability
- Can swivel around frame for increased wheelchair accessibility
- Diamond Plate prevents feet from sliding during ride
- Easily removable if not needed



Copenhagen Wheel

- 26 inch diameter, 16.8 pounds, waterproof
- Provides a proportional amount of electric assistance from pedalling
- Reaches speeds up to 25 mph on flat terrain
- 31 mile battery life, has regenerative braking
- Connects to phone app, shows handcycle speed and provides electronic gearing
- Phone mount on frame allows for easy access and high visibility



Gear Design

- Single mechanical gear to prevent derailing and streamline design
- Use electronic gearing in wheel to simulate different difficulties
- Two custom-made idler gears reroute chain, improving turns
- Two machined rods optimize placement and hold headlight



Testing

We performed testing with four members of the UNH sled hockey team that had a wide spectrum of physical disabilities. Feedback was used to maximize accessibility and ensure safety. Zoom meetings were used to interview several other people with various mobility impairments. All project goals were met by the end of testing.



Testing with 3 Members of UNH Sled Hockey Team

Acknowledgements

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- Rory McCarthy - Move with Freedom
- David Lee - Northeast Passage
- Daniel Santos - UNH Sled Hockey
- Jonathan Moreau
- Superpedestrian

Website

<https://sites.google.com/view/unhhandcycle>

Instagram

@unh_handcycle