

Product Overview

The "Get Up and Go" Gait(or) Aide is a lift and harness system that provides offset weight support for users undergoing neuromuscular rehabilitation on elliptical machines. The user is strapped into a harness that connects to an overhead cable that statically lifts using a motor and winch. Once suspended, the Frame translates the user over top the elliptical. When exercising, the Dynamic Weight Offset Mechanism adjusts and maintains the tension in the cable to be equal to the desired weight offset. Novel features include lifting patients from their wheelchair, and dynamic variable weight offset between 0-350 lbs.

Harness

- The harness is made up of **nylon webbing** with **polyurethane foam padding** at the torso and waist for the user's comfort
- It **facilitates users in wheelchairs by first lifting from the torso**, then the rest of the harness can easily be attached
- It attaches to the cable with a mount consisting of a rigid bar, eyebolt, and clevis grab hooks

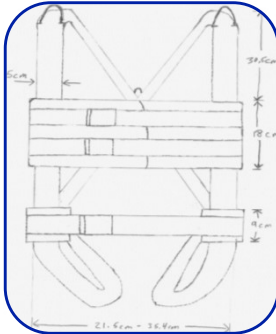
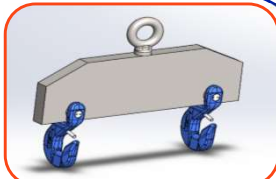


Figure 2. Harness Mount and Textile Sketch

Static Lift Mechanism

- The electric winch uses a 12 V 3-horsepower copper permanent magnet motor and has a **pulling capability of up to 3000 lbs**, the winch fairlead and winch accessories are made of steel
- 7x19 Galvanized Zinc Coated Carbon Steel Cable, Clear Nylon Coating **Minimum Break Strength 2,800 lbs**
- Polypropylene case guards the mechanisms and protects against pinch points

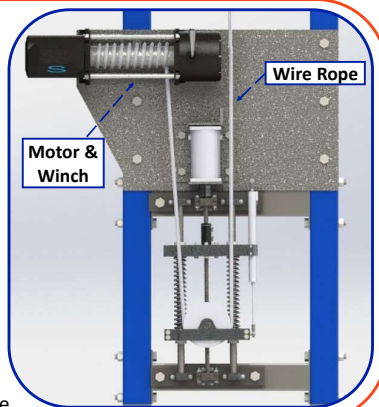


Figure 6. Winch, Motor, Wire Rope

Figure 1. Full Assembly Render with Elliptical



Safety Features

- Safety rope has two components, steel carabiners and polyester lanyard, which has 400 lbs of capacity. By wrapping lanyard around an I-beam and attaching carabiner to harness, this system **can prevent user from falling if rope is broken**
- Users can keep balance and body stable using the handle on the frame
- Emergency stops attached to frame have **ability to cut the power with a single push** by user or helper

Product Costs

- OTS Parts: \$3168.30
- Raw Materials: \$1211.50
- Manf. & MFG Labor: \$105.30
- Energy Consumption: \$0.13
- Assembly Labor: \$107.10
- Total Cost: \$4592.33**

Frame Design

- 2.2 m high and 1.4 m wide
- Each 2 by 3 inch 11-gauge steel tubing
- Swivel action brakes** on each high strength polyurethane wheel



Figure 3. Safety Rope and Emergency Button

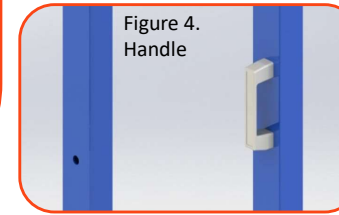


Figure 4. Handle

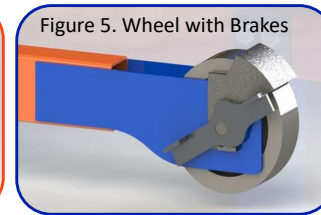


Figure 5. Wheel with Brakes

Dynamic Weight Offset Mechanism

- Cable length is held constant; the ball screw assembly and DC motor adjust the compression of the die springs, changing the cable tension to be equal to **any user-defined value between 0% and 100% their body weight**
- Linear potentiometer tracks the change in spring compression as the user vertically translates on the elliptical and commands the ball screw assembly to **continuously adjust and maintain the unloading cable tension**
- DC Motor capable of 1800 RPM and 12 lb-in torque, supports up to 350 lbs of dynamic weight offset at exceptional fitness intensity of 180 strides/min

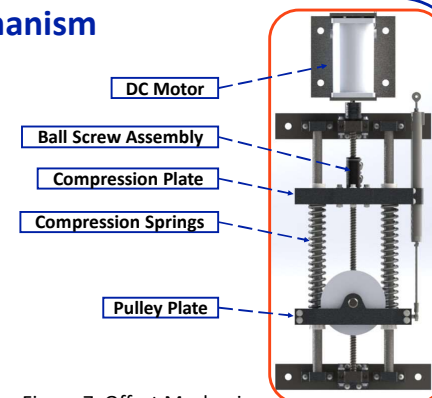


Figure 7. Offset Mechanism

Acknowledgements

We would like to thank Cummins and Northrup Grumman for their sponsorship, and Dr. Traum for his invaluable guidance in our pursuit and enjoyment of mechanical engineering design.



THE "GET UP AND GO" GAIT(OR) AIDE

Customer Needs Mapping

