

Engineering Specification #5 – Tilt Resistance Range

The purpose of this test is to determine the range of force that the tilt resistance spring cartridge assembly is able to resist. The ideal value for this spec is 0 to 150 lbs or greater, and the marginal value is 0 to 150 lbs.

Start Date: 5/14/08

Finish Date: 5/14/08

Engineers set-up experiment: Jonathan Bawas, Carl Mangelsdorf, James Nardo, Jeffrey Tempest, Jen Zelasko

Equipment Needed:

1. Balance Training Bicycle
2. All five spring cartridges
3. Characteristic “patients” in each weight class

Experiment Set-up:

- 1.) Request “characteristic” person (short/light, short/heavy, tall/light, or tall/heavy) in specified weight class to mount bicycle while in locked position
- 2.) Apply a spring preload to the cartridge via winch control
- 3.) Remove Locked position
- 4.) Slowly remove preload to allow greater tilt ranges
- 5.) Request “characteristic” person to lean as far as possible in order to reach maximum tilt
- 6.) Then request “characteristic” person to attempt to upright by correcting balance
- 7.) Repeat with all weight classes and “characteristic” people within that weight class

Conclusions:

Based on our observations, every “characteristic” person was able to be accommodated within their weight class. Although the short/light people did not reach the same maximum tilt angles as some of the heavier people they were still able to ultimately utilize the bike’s capabilities. By means of the preload, the tall/heavy people were also easily accommodated and used the bike as designed. It was also noted that the winch preload served as a perfect step between the upright locked position and being able to achieve maximum tilt. This allowed the winch operator full flexibility in determining suitable tilt ranges for that specific person. If the person did not feel comfortable at any angle the tilt range could be limited via winch control.