

Engineering Test – Spring Cartridge Load Capability

The purpose of this test is to determine the maximum force that can be applied to the shell of the spring cartridge, wire rope and rope connections. The ideal value is greater than 225lbs, a factor of safety of 1.5, with a marginal value of 150lbs.

Start Date: 5/15/08

Finish Date: 5/15/08

Engineers set-up experiment: Carl Mangelsdorf, James Nardo

Equipment Needed:

1. Winch with specified wire rope and end connection
2. All of the spring cartridges
3. Cable weight training device

Experiment Set-up:

- 1.) With the winch securely fastened to a stationary object connect one end of the spring cartridge to the wire rope end connection
- 2.) Then connect the other end of the spring cartridge to the cable weight training device
- 3.) Choose the desired test weight on the cable weight training device
- 4.) Use the winch control buttons to compress the spring inside the cartridge until the inner piston reaches maximum travel (max allowable spring compression)
- 5.) Slowly continue to lift the desired test weight until visual confirmation has been made.
- 6.) Repeat steps 1 through 5 with increasing weights
- 7.) Repeat steps 1 through 6 with all spring cartridges

Conclusions:

The spring cartridge assembly is very strong. All cartridges were able to withstand the maximum weight capacity of the cable weight training device at over 245lbs. There were nothing of concern during the tests nor were there any signs of deformation or fracture after the tests. Materials and construction were determined and implemented properly.