Material Strength Test Sample

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VIEW IN BROWSER

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Summary

I am using this to compare Taulman 645 Nylon to Trimmer Line: http://taulman3d.com/645-specifications.html...

3D Printers > Test Models

Tags: strength strengthofmaterials test

I am using this to compare Taulman 645 Nylon to Trimmer Line:

http://taulman3d.com/645-specifications.html

http://www.amazon.com/Maxpower-333665-Residential-065-Inch-1800-Foot/dp/B003VPAEL6/ref=sr_1_1?ie=UTF8&qid=1371438069&sr=8-1&keywords=maxpower+trimmer

I print samples, then use three Carabiners to pull them apart, and see which one fails first. I recommend that you weigh your samples to make sure that you are doing a fair test. Whichever one breaks first, make more samples of it with more layers until it breaks second, and then weigh that - to see how much you had to add to it to overtak the stronger material. Note that the type of infill that you use will make a difference.

http://www.amazon.com/Truper-Spring-Hooks-Steel-Carabiner/dp/B005LCFKG6/ref=sr_1_2?s=sporting-goods&ie=UTF8&qid=1371438151&sr=1-2&keywords=steel+carabiner

http://www.amazon.com/dp/B0022IQ78M/ref=pe_385040_30332200_pe_309540_26725410_item

Preliminary results - I weighed the two samples on an Ohaus laboratory scale:

http://www.amazon.com/Ohaus-Cent-O-Gram-Overhead-Mechanical-Readability/dp/B0051WM9JW

The trimmer-line sample was 6.10 g. The T645 was 5.47g. The T645 broke. This test needs to be repeated with the T645 weighing the same or more. I can increase the extrusion multiplier by 12%.

I completed the second test. This time I made sure that the weights were closely matched through control of the extrusion multiplier. 5.86 grams for the trimmer line and 5.93 grams for the T645. That is less than 1.2% difference. This time the T645 won. I set up tow straps with my Sequoia, and the samples did not break when I took my foot off the brake and let the truck creep forward. They just stopped the truck from moving! Then I gave more gas and the blue snapped. I bet these can support my weight many times over.

From these very limited sample points, it appears that the T645 is stronger, by at most about 9.7%.

Third test:

I just had to find out what would win a tug-o-war, so I printed these on my M2 with E3D hot end and then pulled them apart. 6 top and bottom. 4 perimeter. 0.15mm layers. 99% infill.

Since there is just one sample of each material, it is not statistically-valid. Ranked from best to worst:

GizmoDork black Polycarbonate (290C) $50 per KG Polymaker Polymax (205C) $77.89 per KG ColorFabb PLA-PHA (205C) $56.00 per KG eSun PETG (yellow) (250C) $33.99 per KG

Taulman Tritan (275C) $90.00 per KG ColorFabb XT (250C) $65.33 per KG

Octave ABS (230C) $31.00 per KG

Not tested yet:

Taulman 645 (245C) $70.40 per KG

Category: 3D Printing Tests

Model files

strengthloop.stl

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strengthloop.sldprt

Find source .stl files on Thingiverse.com

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