Subject: Mechanical design of springs incorporated into object
Posted by darenw on Thu, 13 Jun 2013 08:21:41 GMT
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For one product, I'd like a part to be held within a larger frame, and to let the inner part rotate by (probably) 20 degrees or so. It will not be a separate free-moving part, but joined to the frame, with limited mobility. I'd like to join it by a strip or wire of material, so the whole thing is one piece. What should I know about designing this strip or wire? How flexible is each of the materials I could use? How flexible is a long thin part? Are there graphs or empirical formula to estimate spring constant from geometry? The image shows, crudely, some types of springs I'm considering. The inner disk will rotate about the red axis (by means not shown) but only a few degrees.

File Attachments

1) spring-ideas.jpg, downloaded 98 times

Subject: Re: Mechanical design of springs incorporated into object
Posted by UniverseBecoming on Sun, 16 Jun 2013 16:43:02 GMT
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Nice torsional spring designs.

Try looking at these two videos to get an idea.

Shapeways Ask An Engineer #1: Wall thickness to use for 3D printed wires.

and

Shapeways Ask an Engineer #2: Strength and Structure.

As for actual numbers, I don't know of anything off the top of my head, but should you find something let me know.

Subject: Re: Mechanical design of springs incorporated into object
Posted by darenw on Thu, 20 Jun 2013 02:41:20 GMT
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Those videos are great for an intuitive sense of strength. The stuff *can* bend without breaking, enough for springs, if thin enough. It *can* break if too thin. My project might work with wires of

1.5mm diameter, perhaps. Sure, it would be nice to have solid numbers I can plug into engineering formula.

I'd like a rule of thumb: how much force does it take to bend a beam such-and-so thick and yay long by how many degrees? How many degress can it safely bend repeatedly without permanent damage? Can I bend it just a little more, assuming some small amount of damage, but know it'll be good for, say 1000 cycles? Hungry for information...

Those videos are less than great at production quality, but then they're 3D print engineers, not Hollywood celebs with James Cameron directing

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Subject: Re: Mechanical design of springs incorporated into object
Posted by AmLachDesigns on Thu, 20 Jun 2013 07:27:14 GMT
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materials data sheet wsf

Subject: Re: Mechanical design of springs incorporated into object
Posted by UniverseBecoming on Thu, 20 Jun 2013 07:37:35 GMT
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Thanks AmLach!

For some reason I completely forgot about that!