Subject: Designing and printing a bicycle stem
Posted by brunoxyz on Tue, 16 Apr 2013 18:14:26 GMT
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Hello all, I would like to hear experienced opinions about what I am about to attempt. I would like to print a custom front piece for a bicycle stem, and was wandering if it would actually be strong enough, and what material should I use.

This is the part that I would design and print
http://www.paragonmachineworks.com/PDGImages/SP4002.jpg

and this is a bike stem for reference. it holds the handlebar and fork together.
http://thumbs4.ebaystatic.com/d/l225/m/mTJaIacUu1LTfkEpKAxYq zQ.jpg

Should I design and print the whole thing or can I get away with designing the front plate where I am trying to add some custom art.

Would the stress from the screws that hold it together or the forces from the handlebar crack the printed part?

I have never printed anything in 3D even though I have read a good amount about it, so almost any opinion should be useful.

Thanks!

some inspiration: https://vimeo.com/34293503

Subject: Re: Designing and printing a bicycle stem
Posted by Mhagan on Thu, 18 Apr 2013 21:29:44 GMT
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as an avid cyclist and certified 3Dprinting Nerd, I would say, It probably could be with the right design but I am not sure enough to bet my life on it. The results of stem failure, I have seen some in races, are almost always catastrophic. Personally I would err on the safe side and make a badge to be epoxied on a normal stem front plate and leave the load bearing part design to the engineers at cycling component manufacturers. This would open up a whole new range of materials, I think Polished Alumide would be pretty snazzy as a badge on the stem.

Subject: Re: Designing and printing a bicycle stem

Posted by brunoxyz on Fri, 19 Apr 2013 14:25:39 GMT
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Thanks for your reply Mhagan, an exposied badge is a good idea I didn't think of, I am indeed a bit worried that the stem could break and I imagine how nasty such a fall could be at good speeds.

I may give that a try. Or perhaps make a sort of emblem for the front tube on the bike.

thanks!

Subject: Re: Designing and printing a bicycle stem
Posted by FreeRangeBrain on Mon, 22 Apr 2013 21:44:05 GMT
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I wouldn't trust ANY sintered material to be strong in tension, and would consider it to be fairly weak in compression. As steel goes, stainless is generally weaker than carbon steel, and I would expect a sintered material to behave more like concrete (a composite material - aggregate and cement) than a homogenous material. It might be analogous to particle board - don't bend it too much, don't pull on it too much, and don't bear down on small areas too much.

Shapeways already warns (on the material pages, I think) that printed items should be considered for decorative purposes only. Sure, it's a liability waiver of a statement for them, but it's probably good advice too.

Making a stem cap cover/badge/hood ornament sounds like a grand idea!

Subject: Re: Designing and printing a bicycle stem
Posted by GlenG on Sat, 27 Apr 2013 15:55:10 GMT
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Yah,
The SS media would be the only thing close to strong enough for a critical structural part. But it is not as strong as common wrought bar stock. Also it is heavy and prone to rust when exposed to the elements. Deifnitely a better idea to use it only as an add on bling detail. And the plastic materials are cheaper and lighter.
-G

Subject: Re: Designing and printing a bicycle stem
Posted by brunoxyz on Sun, 28 Apr 2013 02:52:07 GMT
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Thanks for your thoughts on this guys, greatly appreciated. I think I'm definitely going for the decorative elements instead. until 3D printing in metal is cheaper and stronger

Subject: Re: Designing and printing a bicycle stem
Posted by GlenG on Sun, 28 Apr 2013 16:24:31 GMT
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Don't get me wrong, given proper design aspects the SS print material is extremely strong. Just not as strong as forgings or hi alloy castings. Somewhere close to so called malleable cast iron. Generous fillets and radii help insure strength. Still for bike parts where weight and corrosion resistance are prime factors it's probably not a good choice for anything other than quick prototyping.

-g