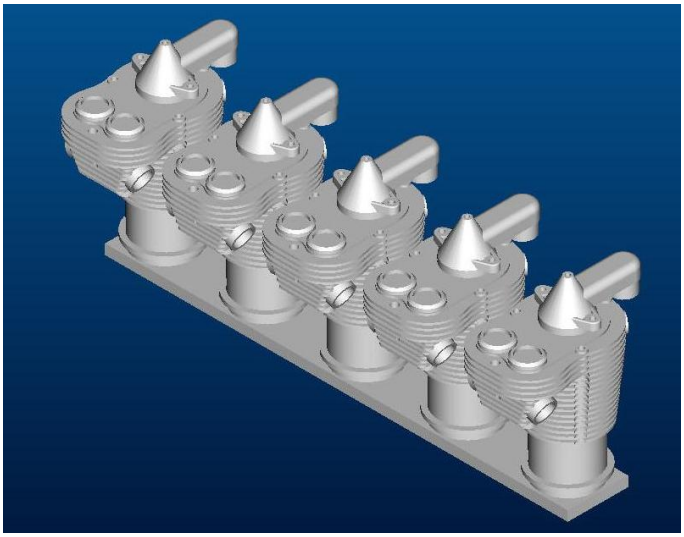
Knowing that my cylinder was quite a detailed part, with very thin surfaces and walls, I only had two possible options, “frosted detail” and “ultra frosted detail”
http://www.shapeways.com/materials/frosted_detail

I chose the second, but was rather shocked at the cost: $6 for one cylinder!!! 30 for 5 cylinders!!! A little too much, I would say...

I checked the material datasheet again and saw there was a start-up fee of $5 per part. So, the next logical thought was, what if I combine the same parts to one “total” part, this should divide the start-up fee to more parts, and it did, at $13,5 for 5 cylinders, $2,7 per cylinder, certainly a more reasonable price.

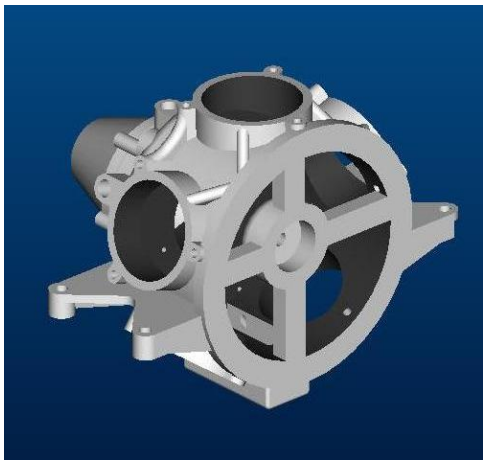


While at drawing, I thought about modeling the crankcase as well, in order to create a CAD assembly of the whole engine. So a quick part was made and an engine assembly

I had not yet placed an order, mainly because the total was much less than the minimum order of $25. As I would not waste money for nothing, I thought about adding the crankcase to the model as well.

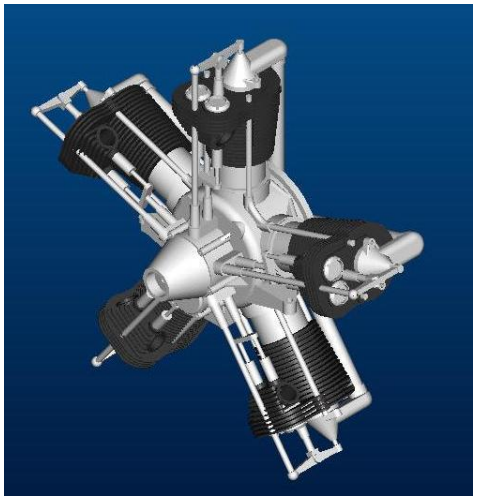
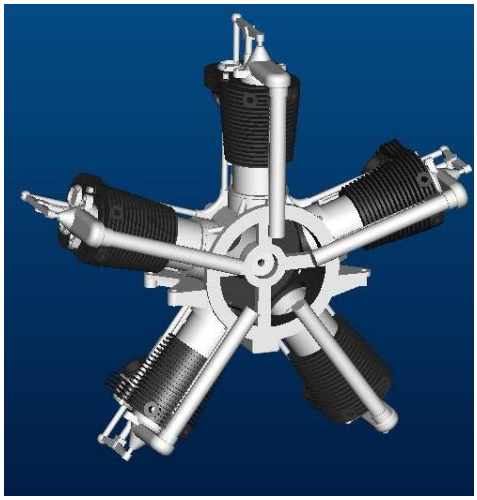
I had initially planed to make it out of balsa, but the more I thought about it, the more it intrigued me to create it in plastic, with accurate slots for the cylinders at the correct angle etc...
So I went ahead and added some more details.

And the more I studied the pictures, the more I modeled and more details went into it… I added every hole that existed in the original, and which made enough (?) sense to model and so the crankcase evolved into something like the images. The small holes at the cylinder bases are 0,5mm diameter and there are even some at 0,3mm, a test to see if they can come ok out of the process (I doubted it).

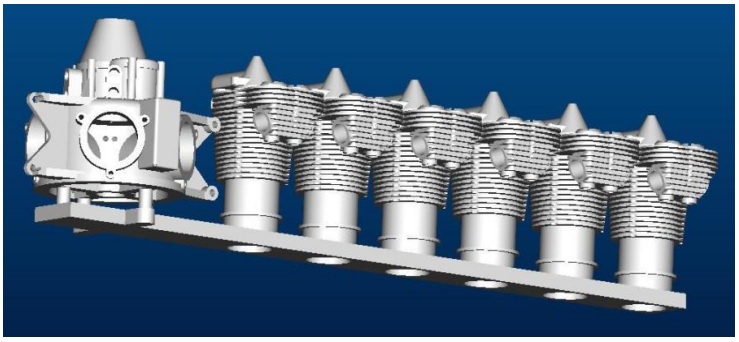



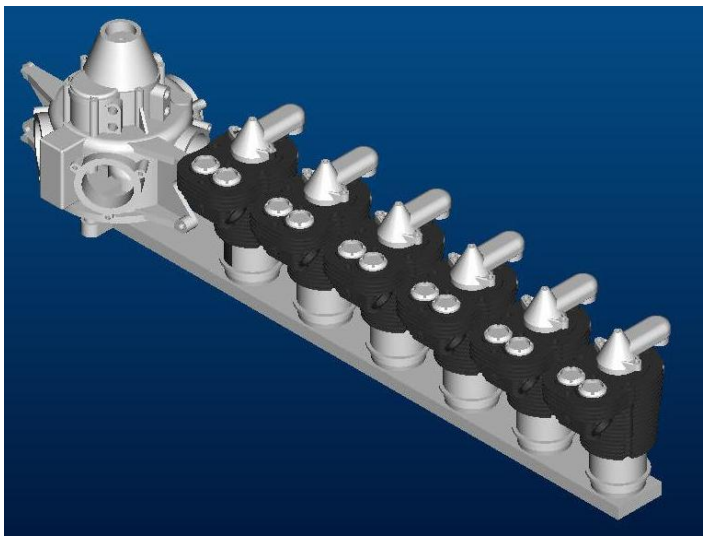
As this is a rubber model, I thought a little in advance and decided to build-in some right- and down-thrust, so the rear hole for the prop shaft was calculated at the desired angles.

And while we are playing with the computer, how about updating that little assembly? And upgrading it by adding various valve pushrods, cylinder fixing rods, rocker arms etc? And some color as well? And rotating it on the screen, which is a favorite "toy" of CAD users…


The crankcase was merged with the previous cylinder parts into one new part. I ordered one part in Frosted Detail material and one in Frosted Ultra Detail, to compare the results. The order was placed and accepted, at exactly $25 for the two parts – engine sets.





A few days later I received a message that my model could not be produced with Frosted Detail material, because the minimum wall thickness could not be less than 0,7mm. I got a coupon refund for the value and was left with Frosted Ultra Detail.

Three weeks later (a little more than the advertised delivery time), I received by courier (included in the price) a parcel with my part. My first impression was not very good. True, the parts looked in general what I had designed, but the fins were not clearly spaced and the parts did not feel clean. And they weren't. There was some residue of resin or some other material, which needed cleaning. A brush and tissue were used and after a few minutes of cleaning up, the cylinders started to look the part. Next I checked the various holes, passing through them a corresponding drill bit. Much to my pleasant surprise, the holes were excellent, even the 0,3mm ones.

The parts are somewhat fragile with this material, especially with the very thin fins, which I discovered by dropping a cylinder, by accident of course.

I also discovered that some material was missing from my crankcase, at the fixing lugs on one side. Also, two cylinders did not fit into the crankcase and the holes needed sanding, while the other three were ok.

I thought the process is not so accurate after all, until I went to the computer and checked my original CAD model. And, yes, the errors existed in my model as well and were overlooked. I was pretty much sold on it after that.