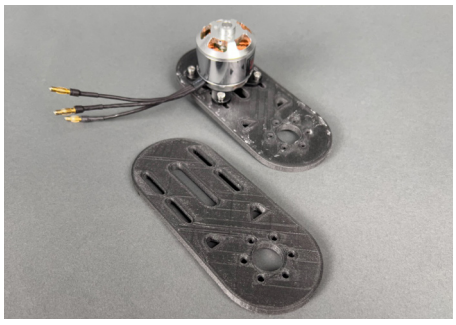
RAISE3D: MATERIAL DIVERSITY

One particular client of ours is pushing the envelope of affordable long range electric longboards.

OVERVIEW

In a bustling city, the challenges of traffic congestion and inadequate, and unsanitary public transportation options have significantly limited commuting choices. The need for flexible, efficient, and eco-friendly means of getting around becomes increasingly apparent.

Recreational electric wheel and axle systems have emerged as popular personal transportation devices over the last few decades. The use of bikes, skateboards, and longboards, offer the convenience and flexibility of vehicles while being environmentally friendly and in some cases prove to be more efficient than vehicles.



Iteration Print next to Completed Print

Test iterations laid out with Final print & motor installed

CHALLENGE

Across the wide spectrum of 3D printers that are available, Raise3D have established themselves as leaders in their class. Their well calibrated printers, paired with continuous development in cutting edge technology, make them excellent for engineering grade part production.

When it came to prototyping, our client faced the challenge of lengthy timelines with outsourcing prototyping and limited control over materials. The material used with prototype parts needs to closely match the mechanical properties of the production parts to be able to test the functionality of the system as realistically as possible.

RAISE3D

PROJECT HIGHLIGHTS

66-68%
Less Commuting Emissions

6.66%
More Heat Deflection

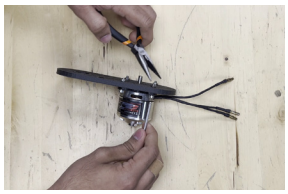
100x
Faster Prototype Creation

APPLICATION

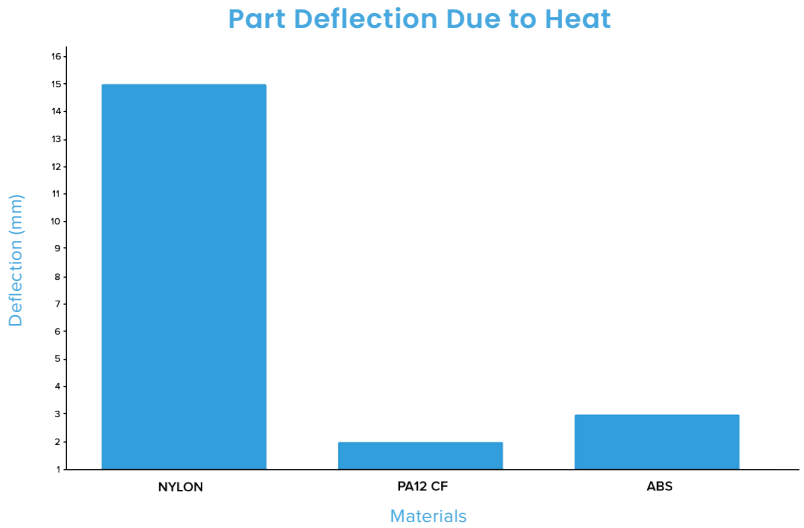
One particular application that our client utilizes his Raise3D printers for is prototyping motor brackets to mount electric motors to the trucks of a longboard. The application calls for a material that can withstand vibrations from the drive of the longboard, heat produced from the electric motor, small high velocity impacts (road gravel), and under all these conditions, must be able to maintain form under mechanical stress from the motor.

During his prototyping phase, he tested his design with three different materials: ABS, nylon, and PA12 CF. Among the factors that would cause the bracket to deform, temperature was the most to fear. The motor would be mounted to the trucks of the electric motor with an insulating pad between the motor and the bracket. The effective heat translated to the bracket would be 75°C. This means the materials our client prototypes with should be able to deflect heat at a temperature of 75 °C.

Designing the prototype Motor Bracket (Video)



Assembling the Motor on 3D Printed Bracket (Video)

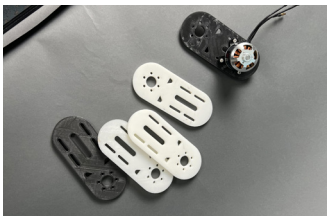


RESULTS

Above you can see the deflection due to heat of each material in a 75 °C environment for 1 hour. From the graph above, the carbon fiber infused nylon could withstand the highest temperature without any deformation. Additionally, PA12 CF has a high impact strength which makes it the most suitable for a motor-belt system. On the other hand, nylon and ABS had a deformation beyond what was tolerable for our client. Thanks to the Raise3D E2 and E2 CF 3D printers, our client was able to quickly iterate through his designs in house. He was able to fabricate his parts with materials of different mechanical properties, from ABS to carbon fiber infused nylon, saving weeks in prototyping time and being able to test his parts without interfering with his workflow or deadlines. Comparatively, getting a custom injection molded prototype fabricated could have taken him up to 3 weeks. With a Raise3D printer, the process took 5 hours per prototype, including setup, a large time difference between fabrication methods.

FUTURE BENEFITS

All-in-all, the client was able to go from design, materials selection, and finally a finished prototype in 3 weeks. The Raise3D E2 and E2CF printers versatility with various materials of unique mechanical properties allowed our client to consider all options and find the material that fit closest to his application. Additionally, the printer's ability to quickly iterate through his designs which reduced the time spent prototyping, allowed him to take his prototyping to a new level.



All Parts laid out on table

ADDRESS PROBLEM
Find an Eco-Friendly alternative mode of transportation

BRAINSTORM SOLUTION
Motorize long board for a boost in speed, with minimal alteration

DESIGN & VALIDATE
Designed mounting brackets for Motor, tested in different materials

3D PRINT
Quickly iterated through designs to test fit & functionality

RESULTS
Successful installation. Achieved goal of alternative eco-friendly transportation

Interested in streamlining your prototyping process? Book a free consultation with Shop3D and find out how a Raise3D 3D printer can accelerate your time to market.

SHOP3D.CA

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