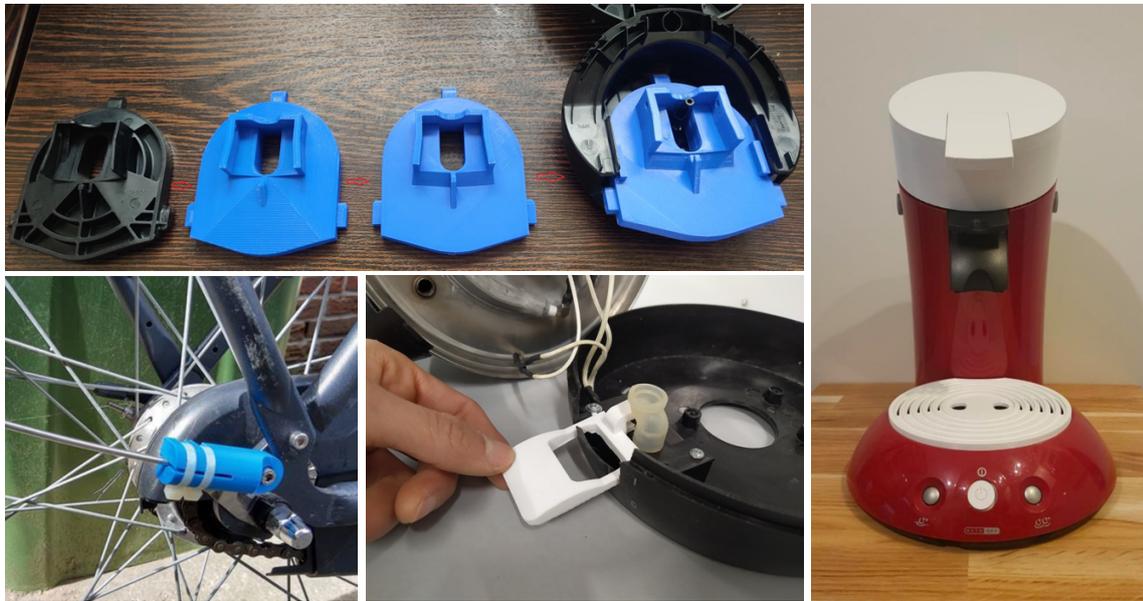


Graduation project

Testing the performance of 3D-printed components

Starting date: February 2021 or onward

Company collaboration: **Ultimaker**



Examples of 3D printed components used as spare parts to repair products.

Context

Fused Filament Fabrication (FFF) is a relatively new technology and only recently it finds applications not only for concept design but also for industrial purposes. There is a growing interest in printing tools, gigs and fixtures with specific dimensional accuracy and mechanical properties. However, the link between material properties, print process and final performances is still not fully understood.

Moreover, standard tests (like ISO and ASTM) have not been developed yet, leaving designers with an incomplete or wrong set of Technical Data Sheet (TDS) data, often based on ISO/ASTM standards developed for injection moulding. Those data are crucial for the material and print process selection, and to design functional parts using 3D printing.

The scope of the project is to evaluate the current testing methods and TDS for FFF, and give advice on improvement needed to move forward in the development of new standards.

Assignment

1. Evaluation of all the data and measurement methods used for FFF. Including but not limited to those used to define the TDS.
2. Identification of missing test procedures to define mechanical performance.
3. Selection of 1 missing test procedure.
4. Develop a new standard test procedure.

5. Test how representative are those TDS values of the real properties of custom printed objects /components by use of a case study. [Bicycle parts and accessories are proposed as a case study but you are free to suggest other possible case studies.](#)
6. Deliverable: guidelines on how FFF TDS values can be used and tested when designing products/parts, supported by the results of your case study.

Outcome

The outcome of this research and the newly developed test will be used by Ultimaker as an internal standard. Knowledge gained on TDS and test protocols will be valuable and applied as part of the 3D Printing for Repair guide, which is currently being developed by the Sharepair research group at the TU Delft.

Contact us!

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