

Internship assignment

Upscaling filament production

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BASF 3D Printing Solutions | Forward AM – Innovating Additive Manufacturing

BASF Forward AM provides superior materials and solutions with the goal to lead additive manufacturing. With our access to the full spectrum of BASF's material know-how and our extensive end-to-end services portfolio, we meet our customers highest requirements.

Our one-stop portfolio gives our customers all the tools needed to succeed in 3D printing and additive manufacturing, from testing, validating components to process optimization, and a comprehensive range of high-performance 3D printing materials. Because every application is unique, we tailor solutions to meet specific needs. With our broad 3D printing know-how, we identify the perfect solution for realizing applications.

At our facility in Emmen, the FFF department of Forward AM is housed, where the Ultrafuse filaments are developed, produced, and sold. We are one of the largest manufacturers in Europe with an exclusive focus on filaments for FFF printing.

Assignment

When 3D printing speaks to you than challenge yourself to deep dive in the production of high-quality filaments! A fast-growing market results in an increase in requests for new products (polymer types). As a company we need to grow with the demand while customers rely on a constant high quality. Changing extrusion parameters, inevitable when upscaling, can impact the polymer quality and its flow characteristics during printing. Something that needs to be minimized.

Your challenge will be to increase the throughput of the extruder in a controlled fashion and monitor changes in the final product closely by choosing the right analysis to track the effect of the upscaling. If done right the gained efficiency might exceed 40%. During upscaling you will encounter bottlenecks and unexpected issues, solving these can be just as challenging and are integral to the assignment.

The goal is to setup a standard procedure for upscaling production output using 1 thermoplastic material as a pilot. Along this route there is much to investigate like:

- The cooling behavior of the polymer over time in a waterbath. A tool to simulate the cooling rate using finite element method can be developed in programs like MatLab.
- Calculating the required energy to heat the material to the desired point in the extruder at different speeds.
- Optimize machine and settings that impact the key quality parameters using Fast Fourier Transformation (FFT)

For this position we are looking for a pro-active team player with the ability to communicate effectively with different stakeholders from a variety of disciplines (including Technical Service, Marketing, Engineering and Production). As a person, you are curious and critical of any outcome. You have excellent analytical thinking skills and always strive to find the most suitable solutions quickly. You are self-critical, resourceful, hands on and open to receiving and giving feedback in a respectful and transparent manner.

Activities

- Gain experience with the process of extrusion
- Use of extrusion equipment
- Analyze extruder data
- Analyze polymers characteristics
- Setup models for extrusion process