

Division of Mechanics

Comparison of titanium alloy in AM to traditional manufacturing with regards to life calculations for heart implant device

The proposed Master project is done in collaboration with Syntach AB, a medical device start-up company which is based in Lund. Syntach has been working on an active heart implant, used to treat patients with heart failure. The implant is designed to last for 10 years and one of the parts is made using additive manufactured titanium alloy. Advances in additive manufacturing (AM) have made it possible to create complex geometries in even the toughest metals. Titanium alloys are possible to 3D print using laser powder bed fusion (L-PBF), where lasers are used to melt down layers of metallic powder to shape the desired geometry. Even though this technique is revolutionizing there are still some uncertainties related to the mechanical properties of the printed material, especially in comparison to traditional manufacturing methods such as milling or molding.



The aim of the project is to compare the mechanical properties of material manufactured by AM to traditional manufacturing methods. Since L-PBF melts the material together, layer by layer, the direction of the layers relative to the design might affect the mechanical properties, which will be investigated. Material samples will be provided by Syntach to perform tensile tests and low-cycle fatigue. The results will be compared to existing fatigue data for traditionally manufactured titanium. Part of the project is also aimed at investigating the spread between different batches of the same alloy. The fracture surface will be investigated through a microscope. Based on the conclusions from the tests, fatigue calculations and a life estimate of the design will be made. This project is suited for 1 or 2 students and can start in February 2021.

Additional information

Some information related to the project might be a company secret, applicants will be required to sign an NDA. Syntach AB is a growing start-up company based in Lund, applicants will be provided the possibility of employment after the master project.

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