

Evaluation of Mechanical Properties of Low Alloy Steels Produced by Additive Manufacturing

Background:

The number of alloys approved for additive manufacturing (AM) remains limited, this is especially true for ferrous-based alloys that can be used in structural applications. One of the main reasons for this is the negative effect of carbon on processability, as an increased carbon content promotes the formation of defects within the material (e.g. porosities and cracks).

Previous work established processing conditions that produced defect-free, high density low alloy steel specimens via Laser Powder Bed Fusion (L-PBF). Using this as a baseline, the proposed work would focus on understanding the mechanical properties of these low alloy steels. This would be done by analyzing both tensile and charpy testing results. In addition, an investigation into the effect of heat treatments on mechanical property performance would be done as well.

AM parts will be manufactured via L-PBF at Chalmers, while testing of the specimens will be realized in collaboration with industrial partners. Analysis of the components themselves will be done at Chalmers using advanced microscopy tools and sample preparation techniques.

Requirements:

We are looking for a master student, with a profile towards material science. A solid background in additive manufacturing would be an advantage.

Extent and Time Plan:

- Period (January-June 2021)
- Number of credits 30 ECTS/högskolepoäng(hp)
- The thesis is intended for one student

More Information:

Contact supervisor at Chalmers – William Hearn (hearn@chalmers.se) for more information about the project. Apply with your CV, academic transcripts and a cover letter in English. Welcome to apply!

Supervisors & Examiners:

Supervisor at Chalmers: William Hearn, hearn@chalmers.se

Examiner and Co-supervisor: Eduard Hryha, hryha@chalmers.se