

Faculty of Engineering

Summer Research Program 2022-2023

Project Title: LPBF HX machine equivalency investigation

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Objective

1. Optimising processing conditions to minimise variance of surface quality and density for parts built at different locations of the building platform.
2. Optimising processing conditions to achieve consistent and repeatable building quality with powders from different conditions (e.g. varying size distributions, recycling times, storage time).
3. Understanding the relationship between processing conditions and cracks, porosity, microstructures and mechanical properties and establishing fundamental mechanisms for the phenomena observed.

Project Details

Laser powder bed fusion (LPBF) is a layer-wise powder-based additive manufacturing method capable of building 3D components from their CAD models. This approach offers enormous benefits for generating objects with geometrical complexity. However, building quality from SLM process can vary significantly and it requires extensive research to achieve consistent and repeatable fabrications in terms of dimension accuracy, surface roughness and mechanical properties. Microstructure and mechanical properties of LPBFed components are strongly influenced by processing conditions.

The skills that will be gained through this project include: usage of the software for the design of supporting structures; operating AmPro SP500 laser powder bed machine; Optical microscope for examining microstructures; carrying out mechanical testing including tensile and fatigue (if necessary).

Prerequisites

Additional Information