

Aerospace Engineering Thesis Defense

High Cycle Fatigue Behavior of Additively Manufactured Thin Wall Inconel 718

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Abstract

Thin wall Inconel 718 is used in Heat Exchanger and cellular materials like Honeycombs. These do not have the same mechanical properties as the bulk material. Complex geometries such as the Honeycomb can be manufactured using Additive Manufacturing, although the properties of these structures are different from the conventional material. In this study, the effects of size and heat treatment on fatigue properties of Thin-wall Inconel 718 materials, manufactured using Laser Powder Bed Fusion (LPBF)- AM technology was explored. High Cycle Fatigue (HCF) tests were performed on seven different thicknesses (0.3mm-2mm) that underwent two different types of Heat treatment. The influence of Hot Isostatic Pressing (HIP) on thin wall specimens was investigated. The results suggest that specimens that underwent HIP behaved similarly to wrought Inconel 718 and are less sensitive to stress. Also, the fatigue strength of the thinner specimen is significantly lower than the thick specimen.



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Zoom Link: <https://asu.zoom.us/j/88445779088>