

ILAS 2018 ABSTRACT TEMPLATE

Wire + laser additive manufacture

W. SUDER^{1*}, M. MORTELLO¹, G. PARDAL¹, J. HONNIGE¹, S. AKHTAR¹, S. W. WILLIAMS¹

¹*Welding Engineering Research Centre, Building 46, Cranfield University, Bedfordshire, MK43 0AL, United Kingdom*

*Corresponding author: Tel: +44 (0) 1234750111; E-mail: w.j.suder@cranfield.ac.uk

This work aims to investigate the capability of wire laser additive manufacture (WLAM) technology for producing near-net shaped parts. Single and multi-layered structures were built in different configurations. Different aspects of wire melting and melt pool formation were investigated in order to achieve deposits with good dimensional stability, fidelity and low surface waviness. The fundamentals of process dynamics were analysed based on the results from various wires types and shapes. Both coaxial and off-axis wire feeding systems were used. Numerous process parameters affect the laser-material interaction and the wire transfer mode. Different criteria need to be satisfied when developing a process for high deposition rate or net-shape. Compared to plasma arc deposition, lasers are less efficient in melting metallic wires, but if controlled properly offer much better surface quality. The laser requires much more accurate control of wire position than plasma, but it enables more accurate control of the bead shape.