

54th CIRP Conference on Manufacturing Systems

Development of handling system concepts for additive process chains with Laser Powder Bed Fusion (L-PBF)

Rainer Horstkotte^{a,*}, Florian Heinrich^a, Marcel Prümmer^a, Kristian Arntz^a, Thomas Bergs^{a,b}

^aFraunhofer Institute for Production Technology IPT, Steinbachstraße 17, 52074 Aachen, Germany

^bLaboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Campus-Boulevard 30, 52074 Aachen, Germany

* Corresponding author. Tel.: +49-241-8904-243 ; fax: +49-241-8904-6243. E-mail address: rainer.horstkotte@ipt.fraunhofer.de

Abstract

Laser Powder Bed Fusion (L-PBF) is an additive manufacturing (AM) technology that enables the production of highly complex and individualized metal components. Since these components need post-processing, L-PBF is usually utilized within a manufacturing process chain. The automation of this process chain is a crucial step towards the industrialization of L-PBF. This paper presents a methodology for the conceptual design of handling systems for the automated handling of L-PBF components. It includes the selection of gripping and clamping devices, robots and other peripheral systems. Restrictions that arise from the complexity of the components and the technologies are considered.

© 2021 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Peer-review under responsibility of the scientific committee of the 54th CIRP Conference on Manufacturing System

Keywords: Additive manufacturing; AM; Laser Powder Bed Fusion; L-PBF; Process chain; Automation, Automated handling, Automated gripping; Automated clamping; Automation concepts; Post-processing, Handling systems
