



Fraunhofer
IPK

Fraunhofer Institute for Production
Systems and Design Technology IPK



DigiWAAM

Crack Susceptibility and Inline Monitoring of the WAAM Process

IN COOPERATION WITH:



Forschungsvereinigung
Stahlanwendung e. V.



SUPPORTED BY:



Federal Ministry
for Economic Affairs
and Energy

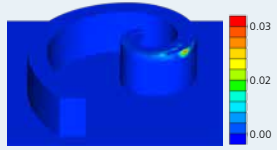


on the basis of a decision
by the German Bundestag

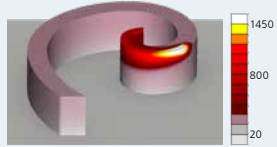


Crack prevention in additive manufacturing

Additive manufacturing of metals using wire arc welding is becoming increasingly important in industrial applications. The process's high deposition rate enables the production of large-volume components with complex shapes and flexible design options. However, due to the novelty of the process, standardized test procedures to qualify new materials are not yet available. For example, there are no procedures to determine the susceptibility of materials to cracking during processing.



Plastic strain rate in 1/s



Temperature range in °C

We investigated the susceptibility to cracking in wire arc additive manufacturing (WAAM) both experimentally and digitally in cooperation with CIT SENAI in Brazil. The goal was to develop a methodology to evaluate cracks in a test component and monitor potential crack formation during the process. In Germany, a benchmark geometry was studied through finite element simulation of the welding process. Based on these results, the Brazilian partners developed an in-line monitoring system to detect cracks during the build-up process.

Contact

Dr.-Ing. Max Biegler

Head of the Joining and Coating Technology department

Phone: +49 30 39006-404

max.biegler@ipk.fraunhofer.de

Fraunhofer Institute for Production Systems

and Design Technology IPK

Pascalstrasse 8–9, 10587 Berlin

www.ipk.fraunhofer.de

