Maximilian Mosig
Master of Science
Helmut-Schmidt-Universität, Hamburg, Germany

From Click to Fix: Towards fully Automated Cold Spray Repair

Abstract
The use of cold spray repair offers a cost-efficient and sustainable alternative to replacing damaged parts. However, achieving the necessary repair standards requires reliable, repeatable and efficient process steps that interact seamlessly. These include damage detection using sensor systems, pre-machining of the detected damage, surface structuring for improved adhesion, and finally material deposition as well as post-machining. Integrating automation technology in terms of robotics and advanced software algorithms is crucial for optimizing this complex workflow. The here presented concept demonstrates a fully automated cold spray repair process. This involves executing a digital process chain followed by its application in the physical environment, allowing all steps to be automatically applied from initial damage detection to the fully repaired component. This approach has been implemented and validated in full shape industrial scale laboratory environment, enabling precise, reproducible, and efficient repair processes.

Biography
Maximilian Mosig is a research associate at the Institute of Automation Technology at Helmut Schmidt University in Hamburg, Germany. He holds a master's degree in industrial engineering, specializing in product development. His doctoral research focuses on robot-assisted laser heating in cold spray, with particular emphasis on trajectory planning, process simulation, and strategy development. He is currently working on synchronized modeling and control of robotic and laser systems to enable automated and reproducible cold spray repair processes.