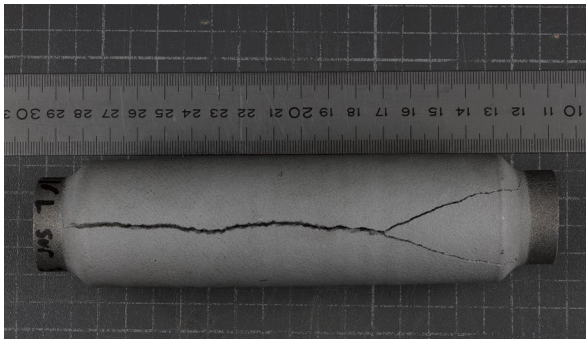


Additive manufacturing using Cold Spray

Laury-Hann BRASSART
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Industrial Partner: EDF

Supervisors: M. Jeandin, F. Delloro, G. Rolland



- Cold Spray
- Additive manufacturing
- Repair
- Adhesion
- Shock laser

Abstract:

Cold gas dynamic spraying, namely cold spray, is one of the most innovative thermal spray processes. Cold spray is an additive manufacturing process actually since it is based on external deposition of powdered material. Up to now, cold spray was mainly devoted to coating applications. However, cold spray is currently envisaged for direct manufacturing of actual shaped parts, which could therefore meet well-established laser-based additive manufacturing techniques, e.g. so-called LBD (Laser Beam Deposition). Compared to laser processing, cold spray can show advantages such as better efficiency and flexibility. Repairing using cold spray can be considered to be halfway between coating by cold spray and additive manufacturing due to less demanding geometrical requirements from deposition. In contrast, adhesion criteria are nearly the same for both repair and additive manufacturing. These criteria relate to particle-substrate bonding, knowing that the substrate can be made of particles. The major scientific objective of this thesis work rests on the understanding of phenomena involved at the interfaces which results from cold spray dynamic conditions. This should lead to specifications to meet the required adhesion strength. In parallel, cold spray build-up mechanisms will be studied to go into the governing parameters to make cold spray an additive manufacturing process for real part achievement.