

## **Bonding quality of a cold-sprayed deposit. A laser resonant ultrasound spectroscopy characterization.**

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Cold spraying (CS) is a versatile and efficient method for deposition of relatively thick metallic coatings. Unlike the conventional thermal spraying methods such as plasma spraying the CS process does not involve substantial heating or melting of the sprayed powders. Instead, the formation of the coating arises from a severe plastic deformation of the accelerated powder particles upon their impingement at the substrate [1]. Resonant ultrasound spectroscopy [2] was applied to determine the mechanical properties of a planar interface between a cold-sprayed iron deposit and an aluminium alloy substrate. The measurements were done at room temperature and during a thermal cycle from room temperature to 500 °C. The properties of the interface were determined by analysing the resonant frequencies of a sandwich-like sample by means of a numerical model. While the as-sprayed deposit at the room temperature showed a perfect adhesion to the substrate, the thermal cycle caused deterioration of the properties due to precipitation of FeAl<sub>3</sub> along the interface and subsequent cracking. The modal analysis allowed localization of the damage zone along the interfaces and simulating its temperature evolution during the cooling run [3].

*Keywords: Resonant Ultrasound spectroscopy, Cold spraying, Metal-metal interface, Bonding quality, Damage localization*

### **References:**

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