

RESIDUAL STRESSES ANALYSIS IN THICK HVOF INCONEL 718 COATINGS FOR FUTURE REPAIR APPLICATIONS

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Residual stresses in HVOF sprayed Inconel 718 thick coatings on Inconel 718 substrates were determined by neutron diffraction, using the strain imager for engineering applications, SALSA, at the ILL in Grenoble.

Cylindrically shaped specimens having different coating and substrate thicknesses were analyzed. For each specimen through thickness scans were performed, with finer steps close to the interface between coating and substrate, measuring in two orthogonal directions and assuming radial symmetry. A special analysis method was developed in order to eliminate peak shifts due to aberration effects near the surface and interface. The specific difficulty was that diffraction peaks of coating and substrate overlap.

The obtained residual stresses and their dependence on the coating thicknesses are essential information for the future development of thick coatings that will enable expansion of the application area of thermal sprayed products into new repair and aeronautical maintenance applications.