

PRODUCTION OF HARD AND WEAR RESISTANT COATING THROUGH LASER SURFACE ENGINEERING

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ABSTRACT

Purpose-The objective of this paper is to fabricate a coating of Ni-WS₂-Al₂O₃ on SS304 substrate by fibre laser.

Design/Methodology/Approach- The SS304 samples were clad at different laser cladding parameters. Effect of the coating parameters on the microstructure, surface morphology and chemical composition of the substrates were analysed by means of scanning electron microscope and electron dispersive x-ray spectroscopy. Variation in the friction and wear characteristics were studied by a pin-on-disc apparatus, in ambient air. Clad thickness was measured under optical microscope.

Findings-A good metallurgical bond existed between the substrate surface and the composite coating. Microhardness of the specimens metamorphosed to 380.6HV_{0.5} from 131.5HV_{0.5} which is approximately three times of the SS304 substrate due to the presence of hard Al₂O₃ particles. The wear and coefficient of friction values of the specimens reduced to almost 9 μm which is approximately 1/33 of the wear value of the parent material (306.7μm) for 180 seconds time duration which is attributed to variation in laser power and scan speed.

Originality/value-The paper is aimed at improving the hardness and tribological properties of SS304 by laser cladding techniques so as to reduce the wearing of gears and turbine blades made up of this material.

KEYWORDS: Surface Engineering, Laser Cladding, Friction, Wear, Microhardness