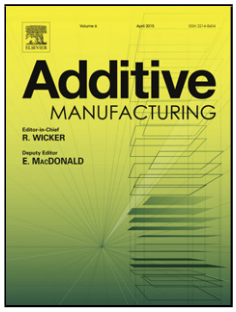

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Development and characterization of multilayer laser cladded high speed steels

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Abstract

Two high speed steel (HSS) alloys were laser cladded on $42CrMo_4$ steel cylindrical substrate by using a 4 kW Nd:YAG laser source. After optimization of the laser material processing parameters for single layers, multilayered clads were produced. Microstructural characterization of the laser deposits constitutes studies of the carbides and matrix, which was done by using Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), Electron Backscattered Diffraction (EBSD) and High Resolution Transmission Electron Microscopy (HRTEM).

The strengthening mechanism of LC1 (Fe-Cr-Mo-W-V) was comprised of a martensitic matrix and retained austenite along with networks of VC and Mo_2C eutectic carbides. Cr enriched fine carbides (Cr_7C_3 and $Cr_{23}C_6$) were embedded within the matrix. During laser cladding of the multilayer

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