

Mechanical properties and characterization of metallic bond coat used in hardfacing of petroleum drill bits

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Abstract : Tungsten carbides are widely used as weld hardfacing deposits in petroleum drill bits. To assure proper bonding of the hardfacing to the substrate, several choices of bond coating layers are offered. In this study, tow different commercial powders A and B and mixtures of both them were thermal sprayed onto a carbon steel XC18 substrate used in petroleum drill bits. The micro hardness respectively, of the hardfacing surface and bond coating layers was measured. The microstructure was observed by optical microscopy and field emission scanning electron microscope equipped with energy-dispersive X-ray spectrometry. It has been observed that the mixture of 75% of A and 25% of B produces an uniform coating metallurgically bonded to the substrate with a little heat affected zone and a little amount of porosity.

Keywords : Thermal spray coating, drill bit, Bond coat layer, weld hardfacing, adhesion.