

Hardmetal Alternative Technology for Developing High Wear Resistance in PTAW Hardfacing

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ABSTRACT

The existing state of the art for wear protection in PTAW hardfacing is incorporation of high concentrations of WC in an appropriate binder / matrix material. The weakness of this approach lies in the metal-ceramic interface where the metal may not be strongly bonded to the ceramic and the soft matrix material which may wear preferentially. This paper reports on the results of a hardmetal alternative strategy by developing iron based alloys which are processed through the atomization of a homogeneous liquid melts. In these newly developed alloys, high volume fraction of borocarbide phases can be formed during solidification without the need of adding external carbide powders resulting in high hardness ($R_c > 70$) in the as-welded condition. The microstructure, phases formed, and hardness will be documented and the resulting wear performance (ASTM G-65) will be correlated to an equivalent amount of WC particulates added to conventional materials, including Ni-Cr-B-Si.