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CHARACTERIZATION OF WEAR AND EROSION RESISTANCE COATINGS ON MARTENSITIC STAINLESS STEEL

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ABSTRACT

Boiler valves and liquid impellers of power generating stations are subjected to regular degradation by wear and erosion [1, 2]. Martensitic stainless steel is used as base material in the current study. Hard and wear resistant coatings are employed onto the surface of Martensitic stainless steel to enhance the life of componentin the severe environmental conditions. 86WC-10Co-4Cr and 75Cr_3C_2-25NiCr coating materials are used in the present study and coating processes employedare Plasma spray process and Detonation Gun Spray process (DG) [3]. Erosion studies are carried out with the air jet erosion tester with compression attachment and characterization of coatings is carried out using the porosity testing and X-ray diffraction techniques. Complex carbides like CO_3W_3C, CO_4W_2C, $Cr_{23}C_6$and $Cr_3C_2$are identified fromXRD patterns [4]. W_2C carbide is observed in DG coated 86WC-10Co-4Cr substrate due to partial decarburization of WC. Silica is used as an erodent material for Air-jet erosion tester and the test conditions for this erosion test employed are velocity of 60m/s and 90° impact angle [5, 6]. In this study the detonation gun spray process has exhibited higher erosion resistance compared to that of plasma spray process on substrate. It is observed that hard phases provide protection against low angle impact and metallic phases act tough, for highangleerosion.

Keywords: Solid Particle Erosion, Wear Resistant Coatings, Martensitic Stainless Steel, Plasma Spray Process, Detonation Gun Spray Process.

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