KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY SPONS0RED

"DEVELOPMENT OF WEAR RESISTANT HIGH VELOCITY OXY-FUEL CERMET COATINGS ON GAS TURBINE BLADES"

A PROJECT REPORT SUBMITTED TO

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ABSTRACT

High Velocity Oxy Fuel (HVOF) spray process has grown in to a well-accepted industrial technology for obtaining wear and corrosion resistant layer. In the present study, HVOF process which uses kinetic energy and output of a supersonic flow of burned liquid petroleum fuel gas was used to deposit Co-based hard facing Stellite 6, Oxide alloy and carbide alloy cermets powder on gas turbine blade substrate materials. The microstructures and several properties of the coatings have been investigated to evaluate its potential for application in power generation industry. The Wear test carried on Pin-on-disk for different loading and speed conditions on substrate and coated materials. The sliding wear resistance of the cermets coating is seven times higher than that of the uncoated steel. The sliding wear resistance of the cermets coating can be attributed to the formation of the protective oxide layer on the surface due to flash temperature generated during sliding also the unique layered microstructure of HVOF coating improves the wear resistance. The abrasive wear resistance of uncoated steel is higher when compared to coated steel due to severe plastic deformation and the higher hardness ratio between silicon carbide particles and steel which might have caused the penetration of the particle on the surface providing shielding effect against wear.