

عنوان مقاله:

Fatigue behavior and grindability evaluation of conventional and nanostructured plasma sprayed Al_2O_3 -13% TiO_2 coatings

محل انتشار:

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خلاصه مقاله:

Modifying material surfaces to enhance wear and corrosion resistance is a common practice for both military and commercial applications. Electrodeposited hard chrome and Ceramic coatings are common wear resistance coatings. In plasma spray, the coating material (powder) is injected into a plasma stream where it is heated and accelerated toward the substrate surface. After impacting the surface, the ceramic rapidly cools thus forming a coating layer. Both hard chrome and ceramic coatings have serious deficiencies that can limit their use. Chrome electroplating uses closely regulated hazardous materials. Compliance with the various environmental safety regulations has made hard chrome increasingly expensive to use. Plasma sprayed ceramic coatings are somewhat less expensive than chrome (when clean up costs are included), but are generally brittle, and have low grindability and very low fatigue life. The need for better coating materials has been recognized and considerable effort has recently gone into finding replacements. Nanostructured coatings offer the potential for significant improvements in engineering properties based on the improvements in physical and mechanical properties resulting from the reduction of microstructural features by factors of 100 to 1000 times compared to conventional engineering materials. Nanostructured materials can have improved strength, hardness, ductility, toughness, specific heat, and enhanced diffusivity compared to conventional materials [1,2]. Nanostructured thermal spray ceramic coatings, such as Al_2O_3 - TiO_2 , have demonstrated superior wear performance compared to related coatings produced from conventional ceramic oxide powders [3-5]. In this paper the fatigue behavior and grindability of nanostructured thermal sprayed Al_2O_3 -13% TiO_2 coatings compared to the conventional specimens

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