

Fatigue behavior effect of shot peening associated to plasma nitriding surface treatment in F138 stainless steel

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Analysis of shot peening associated to plasma nitriding surface layers on austenitic stainless steel are conducted to verify the influence of the surface treatment in fatigue behavior. Shot peening can be used to increase fatigue resistance, due to the surface residual stress induced. Additionally, shot peening can be used as a previous plasma nitriding treatment to improve nitrogen atoms diffusion, increasing the layer hardness, thickness and fatigue resistance [1]. Thus, the aim of the present work is to study the effect of previous shot peening surface treatment in plasma nitrided F138 stainless steel fatigue properties. Specimens treated with plasma nitriding and shot peening associated to plasma nitriding were analyzed in high cycle fatigue tests. Previous shot peening treatment to plasma nitriding promoted a failure in lower strength values than reference specimens, and its similar to plasma nitride specimens. The result can be associated to roughness increase due to shot peening and plasma nitriding treatments, which can influence fatigue behavior as other surficial morphological characteristics of the formed layer [2]. Fracture surface were analyzed by scanning electron microscopy (SEM) and ductile fracture surface was observed in all conditions. In higher load conditions cracks and microcracks were formed on the sides of the specimen.

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References:

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