

Shot Peening as a Process for Improving Fatigue life, Strength and Enhancing the Resistance to Stress Corrosion Cracking

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Abstract— Shot peening is a surface treatment process in which an elastic-plastic sheet material is subjected to multiple impact by small size hard **particles made of glass or hard steel in a defined and controlled manner resulting in a compressive stress which extends certain distance below the surface. This results in improvement of its fatigue life and strength.** **Stress corrosion cracking (SCC) may be defined as a degradation** of the mechanical properties of a material under the combined action of tensile stress and corrosive environment of the susceptible material. It is a harmful phenomenon which might cause catastrophic fracture without a sign of prior warning. In this paper, the shot peening process, SCC, the parameters affecting it, the mechanism of the improvement of fatigue life and enhancement of stress corrosion cracking SCC and its limitation are given and discussed. Furthermore, the different harmful effects and damages caused by SCC are also given and discussed. Finally a novel method for increasing the resistance to SCC by grain refining the structure of the material of the component which is susceptible to SCC by using some rare earth refiner elements is presented and discussed.