

Experimental study of shot peening effect on the surface of austenitic stainless steels : roughness, residual stresses and workhardening

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Abstract : Shot peening is a mechanical surface treatment widely used in automotive and aerospace industries to enhance the fatigue life of mechanical parts. In this process, many small and hard particles, called shots, are projected at high velocities on to the sample. The multiple impacts plastically deform the material surface and induce an in-plane compressive residual stress field near the surface. Roughness, compressive residual stress and work hardening of an AISI 304 austenitic stainless steel was studied to explain its evolution according to the Almen intensity and mechanical properties. Shot peening increases surface hardness levels. We can confirm in case of CSP the highest microhardness observed at topmost surface. According to these results it can be considered, that after CSP application, the microhardness in depth of 0.025 mm increased from about 220 HV to 350 HV.

Keywords : -shot peening, residual stresses, work hardening, Almen intensity, roughness, FWHM.