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

Mohamed Chaib, Mohamed Belhamiani, Abdelkader Megueni, Abdelkader Ziadi, Javier Belzunce

Abstract : Shot peening is a mechanical surfacetreatment widely used in automotive and aerospaceindustries to enhance the fatigue life of mechanicalparts. In this process, many small and hard particles,called shots, are projected at high velocities on to thesample. The multiple impacts plastically deform thematerial surface and induce an in-plane compressiveresidual stress field near the surface. Roughness,compressive residual stress and work hardening of anAISI 304 austenitic stainless steel was studied toexplain it evolution according to the Almen intensityand mechanical properties. Shot peening increasessurface hardness levels. We can confirm in case ofCSP the highest microhardness observed at topmostsurface. According to these results it can beconsidered, that after CSP application, themicrohardness in depth of 0.025 mm increased fromabout 220 HV to 350 HV.

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