Fusion and heat affected zones damage during fatigue assessment assisted by digital image correlation

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Abstract : This work aims at following strain field expansion incurred in welded austenitic stainless steel during cyclic loading assisted by three dimensional Digital Image Correlation (3D DIC) method. The latter is an indicative device helping to distinguish the high stressed area from the low stressed one during fatigue test. 3D DIC monitoring of strain field and stress condensation in the studied area reveals the presence of simultaneous strain localization in two regions bordering between them an area with a reduced stress level. SEM-ECCI analysis of the hybrid zone supposes that the microstructural damage in the welded joint would be controlled by hardening and softening phenomena, caused by sub-grains formation and twins annihilation during loading

Keywords : Cracks, Image processing, Strain mapping, Welded joint