Damage measurements caused by fatigue in carbon steel C45

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1. ABSTRACT

Damage is a very important concept in fatigue studies. In the context of the continuous damage mechanics of materials is defined as a property that decreases the component strength, until failure. The process of damage creation consists in the superficial discontinuity nucleation (micro cracks) and/or volumetric discontinuity nucleation (micro cracks or micro-cavities) in the material. It begins where the localized stress exceeds the material yielding stress under stress or strain fluctuation. Generally mechanical components suffer damages along their entire life, since the external loads exceed the allowable stress. In applications where the fatigue problems are determinative, the damage measurement has a fundamental importance. In this case, always that the external alternate stress for superior to the fatigue strength limit, will occur an irrecoverable and cumulative damage in the material. The damage quantitative evaluation is a complex task, since it involves macroscopic and microscopic characteristics of the material. The objective of this work is measure damages caused by reverse fatigue in carbon steel C45, utilizing technique of measurement of the electric resistivity variation.

Keywords: fatigue, damage, electrical resistance measurement.