

Fatigue limit estimation of metals based on the thermographic methods: A comprehensive review

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Abstract

Infrared Thermography has been under review in the last thirty years due to its versatility and potential in the detection of the thermal signature associated with intrinsic energy phenomena due to dissipative processes, specifically those relying on mechanical fatigue. Nowadays, it is a well-established technique that can support mechanical and structural engineers to implement a damage-tolerant design, assess the residual life, and finally characterize the fatigue behavior of materials. The aim of this work is to review all thermography-based approaches and procedures for fatigue limit estimation by rapid tests, draw considerations on the role of thermal methods in mechanical design and machine construction, and discuss the pros and cons of each method and open points. This review is intended on one hand, as a warning/guideline to direct new research toward issues that have not been fully resolved or understood yet and on the other hand, to sum up, what has already been done in the field.

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