

**MONITORING OF FATIGUE DAMAGE DEVELOPMENT IN AS-RECEIVED  
AND EXPLOITED 10CRMO9-10 POWER ENGINEERING STEEL  
SUPPORTED BY DIGITAL IMAGE CORRELATION**

**Modelling and Characterization of Damage and Fracture**

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**ABSTRACT:** This research aimed to compare the effect of long-time degradation of two different states of 10CrMo9-10 (10H2M) power engineering steel by using different experimental and analytical approaches. The specimens machined from the as-received steel and the same material after exploitation for 280 000 hours at the temperature of 540°C and the internal pressure of 2.9 MPa were subjected to fatigue loading that was simultaneously monitored by using the Digital Image Correlation (DIC) technique. The effect of long-time degradation on the mechanical response of 10H2M steel was studied through fractographic observations and was finally described as a function of the fatigue damage measure,  $\varphi$ , and the fatigue damage parameter  $D$ .

**Key words:** fatigue development, damage, 10H2M steel, digital image correlation (DIC).