SM7S_12666

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

IN-SITU Observation of Fatigue Crack Growth in Carbon Steel

Michal A. Miskiewicz, Zbigniew Pakiela, Krzysztof J. Kurzydlowski

MSEF, WUT, Warszawa, Poland

One of the main features associated with small fatigue crack growth is that they frequently exhibit deceleration when they approach microstructural barriers such as grain boundaries. In-situ observation of crack propagation can give interesting information about crack development in multi-phases materials. In this paper authors present their results of crack propagation behaviors in steel samples under cycling loading, obtained using optical microscope with in-situ recording device. For measurements was chosen, common used carbon steel (0.45% weight C). Because mechanical and morphological properties of pearlite and ferrite are different so crack propagation behavior should be different, what is very interesting from material design point of view, where even grain boundary properties could play significant role. Local behavior is not well described by classical fracture theory, which assuming material as continuum solid body, so authors focused on this problem closer in the paper.

View the extended summary