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Experimental and numerical investigation of mixed mode I+II and I+III fatigue crack growth in S355J0 steel

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Highlights

Mixed modes fracture test were performed using rectangular specimens.
The change of the angle of loading effect on fatigue life of the specimens.
The MTS criterion predicts the initial fatigue crack curving direction correctly.
The fatigue crack paths under mixed mode conditions were investigated.
The fractography analysis of crack surfaces was performed.

Abstract

This paper presents the results of an experimental investigation about fatigue crack paths and fatigue crack growth on S355J0 steel subjected to I+II and I+III mixed mode conditions both under load ratios $R = 0$ and 0.1 and different mode mixities. In particular, compact specimens with distinct notch inclinations were exposed to mixed mode I+II (tension and shear) whereas prismatic specimens provided with an external one-sided sharp notch were subjected to mixed mode I+III under distinct bending to torsion ratios. The influences of distinct load mixities on fatigue crack growth rates and fatigue crack growth

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