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

**Dariusz Rozumek[a*], Zbigniew Marciniak[a], Grzegorz Lesiuk[b], José A. Correia[c], Abílio M.P. de Jesus[c]**

[a]*Opole University of Technology, Department of Mechanics and Machine Design, Mikołajczyka 5, 45-271 Opole, Poland*

[b]*Faculty of Mechanical Engineering, Department of Mechanics, Materials Science and Engineering, Wrocław University of Science and Technology, Smoluchowskiego 25, 50-370 Wrocław, Poland*

[c]*INEGI/Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal*

Highlights

Mixed modes fracture test were perform 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

* Corresponding author. Tel.: +48-774498410.