

Finite Element and Experimental Investigation of Ductile Crack Growth of Surface Cracks

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Abstract : An investigation on ductile crack growth of shallow semi-elliptical surface cracks with $a/w=0.2$, $a/c=0.33$ under bending was carried out, where a is the crack depth, w is the plate thickness and c is the crack length at surface. Finite element analysis and experiments were modelling and the crack growth model were verified with experimental data. The results showed that the initial crack shape was no longer maintained as the crack developed under ductile tearing. The maximum growth at the deepest point at early stages was stopped when the crack depth reached half thickness and growth occurred beneath surface. Excellent agreement in the crack shape patterns was observed between the experiments and the crack growth model.

Keywords : crack growth, ductile tearing, mean stress, surface cracks

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