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Abstract

The present paper reports the results of a study on fatigue crack growth in a system with an interface between two elastic–plastic solids of different yield strength. Fatigue crack growth analysis is conducted by the use of a cohesive zone model. Irreversibility of material separation processes is introduced through the load history dependent degradation of the cohesive strength. Fatigue crack growth is considered to occur along the direction perpendicular to the interface and along the interface. Crack growth rate acceleration, deceleration or arrest, as well as crack bifurcation at the interface are predicted in dependence of the plastic property mismatch of the two solids and the interface properties. The outcome of the simulations is in very good agreement with trends of published experimental data.

Keywords

Crack branching and bifurcation, Crack propagation and arrest, Crack tip plasticity, Crack mechanics, Layered material