

**Wang, B.,** Siegmund, T., Numerical Simulation of Constraint Effects in Fatigue Crack Growth, International Journal of Fatigue, 27, 2005, pp. 1328–1334

### **Abstract**

The computational analysis of constraint effects on fatigue crack growth is discussed. An irreversible cohesive zone model is used in the computations to describe the processes of material separation under cyclic loading. This approach is promising for the investigation of fatigue crack growth under constraint as the energy dissipation due to the formation of new crack surface and cyclic plastic deformation is accounted for independently. Fatigue crack growth in multi-layer structures under consideration of different levels of T-stress are conducted with a modified boundary layer model. Fatigue crack growth is computed as a function of layer thickness and T-stress for constant and variable amplitude loading cases.

### **Keywords**

Cohesive zone model, Fatigue crack growth, Cyclic loading, Constraint, Multilayer structures