

Fracturing Simulation Of Cruciform Joint Under Biaxial Loads

A Al-Mukhtar

Abstract:

The fatigue crack growth under mixed-mode loading was simulated using finite element method (FEM). The stress intensity factors (SIFs) have been calculated by the linear elastic fracture mechanics approach (LEFM) using fracture analysis code-2D (Franc2D). Due to the symmetrical stress distribution around the crack tip in biaxial stressed specimen, the crack growth under opening mode-I was considered. The crack growth occurs mainly along the direction where the mode-I stress component becomes the maximum. Therefore, KI was used only in the numerical integration of the fatigue life equation. It was found that the fatigue crack growth was faster at a smaller λ , i.e., higher σ_y on the horizontal crack plan. Moreover, fatigue strength (FAT) values decrease as λ increasing. Finally, it was shown that FAT under λ can be predicted using the SIF and the concept of LEFM.