Computation of Thermal Stress Intensity Factor for Bonded Composite Repairs in Aircraft Structures

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Abstract : In this study the Finite element method is used to analyse the effect of the thermal residual stresses resulting from adhesive curing on the performances of the bonded composite repair in aircraft structures. The stress intensity factor at the crack tip is chosen as fracture criterion in order to estimate the repair performances. The obtained results show that the presence of the thermal residual stresses reduces considerably the repair performances and consequently decreases the fatigue life of cracked structures. The effects of the curing temperature, the adhesive properties and the adhesive thickness on the Stress Intensity Factor (SIF) variation with thermal stresses are also analysed.