

Interlaminar stress analysis for carbon/epoxy composite space rotors.

Abstract

This paper extends the previous works that appears in the International Journal of Multiphysics, Varatharajoo, Salit and Goh (2010). An approach incorporating cohesive zone modelling technique is incorporated into an optimized flywheel to properly simulate the stresses at the layer interfaces. Investigation on several fiber stacking sequences are also conducted to demonstrate the effect of fiber orientations on the overall rotor stress as well as the interface stress behaviour. The results demonstrated that the rotor interlaminar stresses are within the rotor materials' ultimate strength and that the fiber direction with a combination of $45^\circ/-45^\circ/0^\circ$ offers the best triple layer rotor among the few combinations selected for this analysis. It was shown that the present approach can facilitate also further investigation on the interface stress behaviour of rotating rotors.

Keyword: Composite space rotors