CRACK GROWTH RESISTANCE CURVES OF BIDIRECTIONAL GLARE LAMINATES BY NORMALIZATION METHOD

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Abstract: GLARE laminates are hybrid composite materials made of alternating layers of thin aluminum alloy sheets bonded together by S-glass fiber-reinforced epoxy adhesive. This composite was developed for aeronautical applications and is being used in fuselage sections of the Airbus A380 aircraft. One of the most important properties for the application of GLARE is its fracture toughness, which need to be accurately measured in a given temperature range. Crack growth resistance curves (J-R curves) at room temperature and at -50° C of bidirectional GLARE 3 5/4 0.3 were experimentally determined by normalization and elastic unloading compliance methods. Both methodologies were applied based on the ASTM E1820-17 standard with small modifications. Normalization method emerges as an alternative technique for J-R (or CTOD-R) curves determination without sophisticated instrumentation, which make it very valuable for low temperature testing. The results indicate that the normalization method can be applied for the determination of crack growth resistance curves of bidirectional GLARE laminates in the experimental temperature range.

Keywords: Fiber-metal laminates, GLARE 3, J-R curves, normalization method, unloading compliance