BOND THICKNESS EFFECT ON IMPACT PROPERTIES OF ADHESIVELY BONDED GRAPHITE/EPOXY COMPOSITES

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ABSTRACT

Adhesively bonded composites are often subjected to impact during manufacturing or service. The impact may result in a reduction in strength and structural integrity of engineering components made of adhesively bonded composite structures. In this study, impact test is carried out on adhesively bonded graphite epoxy composites panels at different low impact energies ranging from 5J to 20J by using drop-weight impact test equipment. The effect of bond thickness on impact response and the resulting damage is investigated. The resulting internal damage due to impact on the adhesive bond line is interrogated using ultrasonic nondestructive evaluation. The ultrasonic C-scan of the gated ultrasonic wave signal is taken and the ensuing debond area on the adhesive bond is determined quantitatively for specimens joined by different thickness of adhesive bond. Results revealed that increasing the thickness of the bond increase the maximum contact force reached for duration of impact. Besides, the shape or size of local debond area in the adhesive layer has showed dependence on thickness of the bond and impact energy. It is indicated that the debond area decrease with increase in thickness of adhesive bond.

REFERENCES