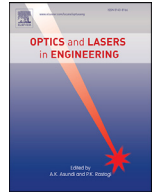




Contents lists available at ScienceDirect

Optics and Lasers in Engineering

journal homepage: www.elsevier.com/locate/optlaseng



Fracture analysis of functionally graded material using digital image correlation technique and extended element-free Galerkin method



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ARTICLE INFO

Keywords:

Functionally graded materials (FGMs)
Stress intensity factors (SIFs)
Digital image correlation (DIC)
Extended element-free Galerkin method
(XEFGM)

ABSTRACT

This work aims to experimentally investigate the mechanical properties and fracture analysis of a functionally graded material (FGM) made from sphere glass and epoxy resin composites using a hand lay-up process. The stress intensity factor is determined by the digital image correlation (DIC) technique for the compact tension specimen. The results of the DIC technique are compared using the meshless extended element-free Galerkin method. The applicability of the experimental method is demonstrated for a five-layered epoxy/glass FGM with layers ranging from pure epoxy to 60% glass–40% epoxy in the glass-rich side. The relevant results obtained from the experimental work agreed well with those of the numerical method. This study is important for researchers to address the unavailability of an explicit code and standard in the hand lay-up process and conforming specifications of the fracture mechanism of FGMs.

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