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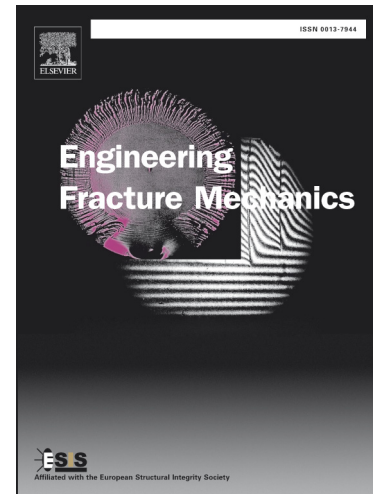
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# THROUGH-THICKNESS FRACTURE BEHAVIOUR OF UNIDIRECTIONAL GLASS FIBERS/EPOXY COMPOSITES UNDER VARIOUS IN-PLANE LOADING USING THE CTS TEST

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## Abstract

In this study, the pure mode I, pure mode II and mixed mode I/II fracture behaviour of a laminated unidirectional (UD) long glass fiber epoxy composite was investigated. The values of mixed mode fracture toughness and mixed mode critical strain energy release rate (CSERR) were measured. The mixed mode loading was applied to the specimens using compact tension shear (CTS) testing fixture. To ensure proper crack propagation, some modifications were applied to the specimens. The crack propagation through the thickness of the composite and energy absorbing processes associated with the through thickness fracture were studied. A detailed study of failure mechanisms on the fracture surface was performed. The study shows that the change in the value of toughness was related to the fracture morphology.

**Keywords:** *Mixed mode fracture, unidirectional glass fiber/ epoxy, Through-thickness crack, CTS specimen.*

## Nomenclature

CSERR	critical strain energy release rate
CTS	compact tension shear
$\alpha$	Loading angle
$a$	crack length
DCB	Double Cantilever Beam
$E$	Young's modulus
ENF	End Notched Flexure
$G$	strain energy release rate
$K_{eff}$	effective fracture toughness
$K_I, K_{II}$	Mode I and mode II fracture toughness
$\varrho$	Fiber angle

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