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Predicting notched tensile strength of full-scale composite structures from small coupons using fracture mechanics

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Abstract: *The initial fracture propagation within a full-scale stiffened quasi-isotropic composite panel and coupons with stringer feet under tensile loads was investigated. The specimens were made from Non-Crimp Fabric through Vacuum assisted Resin Transfer Moulding. The failure loads of all configurations were successfully related using the same value of trans-laminar fracture energy. The method involved independent tests of scaled-down Over-height Compact Tension specimens and the Virtual Crack Closure Technique. It was found to be crucial to include the fully developed damage process zone in the crack length and to interpret the results carefully in order to identify the failure loads consistently.*

Keywords: Fracture mechanics; Notch; Virtual Crack Closure Technique (VCCT); Vacuum assisted Resin Transfer Moulding (VaRTM); Non-Crimp Fabric (NCF).

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