Mode III interlaminar fracture toughness of advanced composite materials: experimental testing and numerical modelling

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The objective of this study is to experimentally investigate and numerically model damage phenomena in fibre-reinforced advanced composite materials with a focus on interlaminar fracture toughness. Standard test procedures have been established for fracture modes I and II using the Double Cantilever Beam (DCB) [1] and End-Notched Flexure (ENF) [2] tests, respectively. For Mode III, there is no standard procedure yet, but the Edged Crack Torsion (ECT) test is widely used [3, 4] (Fig. 1a). As an alternative, the Split Cantilever Beam (SCB) [5] has also been proposed (Fig. 1b). The SCB test can be performed with a simpler test set-up than that required for the ECT, but whether the Mode III interlaminar fracture toughness results obtained from the ECT and SCB tests are comparable is still an open question.

The final aim is to compare the two test setups for Mode III interlaminar fracture toughness characterisation by conducting both experimental tests and numerical simulations.

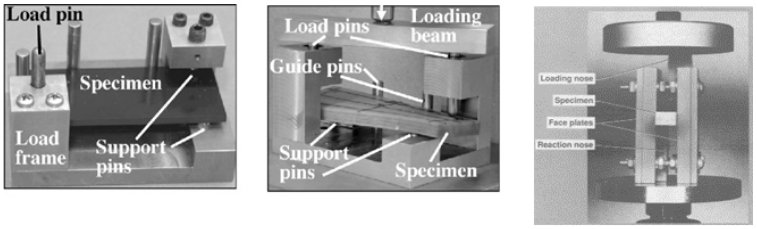

Figure 1: Mode III interlaminar fracture tests: a) ECT; b) SCB [4, 5].

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References

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