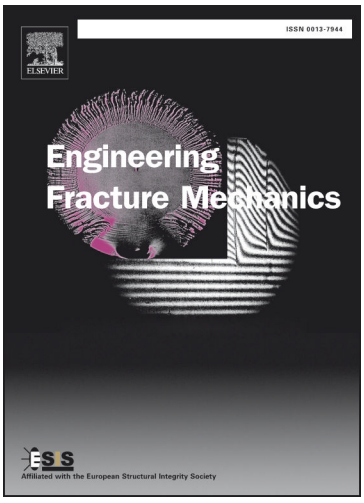

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Experimental and numerical assessment of the work of fracture in injection-moulded low-density polyethylene

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Abstract

The fracture mechanics properties of injection-moulded low-density polyethylene (LDPE) sheets were investigated both experimentally and numerically. The total work of fracture was determined experimentally, by means of fracture mechanics testing of sheets of injection-moulded LDPE with side cracks of different lengths. A multi-specimen method, proposed by Kim and Joe (Polymer Testing, 7, 1987, 355-363), was employed. The total work of fracture was estimated to 13kJ/m^2. The experiments were simulated numerically using the finite element method. Crack growth was enabled by inclusion of a cohesive zone, and the constitutive response of this zone was governed by a traction-separation law. The local (or essential) work of fracture was estimated through numerical analyses, where the initiation of crack growth was simulated and the outcome was compared to the experimental results. The local (i.e. essential) work of fracture was estimated to 1.7kJ/m^2, which

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