

DAMAGE AND INTERFACIAL DELAMINATION MODELLING IN COMPOSITE MATERIALS

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ABSTRACT

Despite their high stiffness and strength properties in relation to weight, composite materials are susceptible to damage and/or delamination, the latter kind of phenomenon occurring especially when they are characterized by a laminated structure. Damage may occur in the form of micro-cracks and voids, and usually leads to a macroscopic loss of stiffness and strength. Delamination is a typical kind of interfacial fracture phenomenon which occurs in laminated composite materials, often accompanied with intra-laminar damage, and may lead to a catastrophic structural collapse.

A notable effort has been devoted to the numerical and theoretical modelling in the last decades but a number of aspects need to be further investigated. These aspects include the choice of a computational efficient analysis able to include both the accuracy of a continuum formulation and the effectiveness of structural (beam or plate) models, the problem of an effective crack initiation criterion, the notable importance of an appropriate interfacial crack propagation modelling in mixed-mode condition, multiple delaminations, crack propagation in dynamic regime, instability effects like fibre buckling and localised deformations, the formulation of appropriate macroscopic constitutive relations taking into account damage in the micro-scale, non-linear and irreversible processes accompanying crack propagation, multi-scale analysis (see, for example, references [1-7]).

The mini-symposium aims to bring together scientists working in the field of composite materials, in order to identify the fundamental advances and new ideas in this research field.

Contributions to the mini-symposium are encouraged dealing both with basic modelling and computational problems and with specific aspects of engineering interest.

For any further request, please contact

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