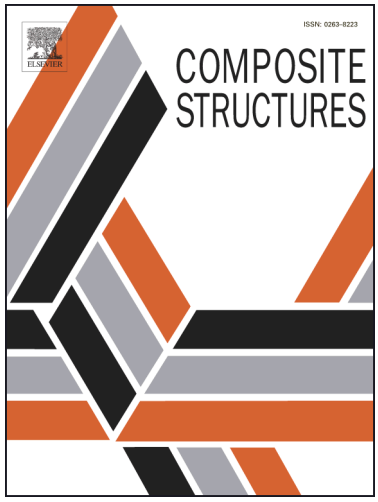

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Abstract

The eXtended Finite Element Method (XFEM) allows modelling of the onset and propagation of multiple cracks in a material without prior assumption on their positions. In the current work, the method is examined for its capability to predict matrix cracking in cross-ply composite laminates under quasi-static tensile loading – a phenomenon that is well understood in the field. The study is performed using commercially available ABAQUS tools and focuses on the effect of numerical and physical parameters. The propagation of transverse cracks and delaminations is described by cohesive laws. XFEM predicts physically sound evolution of crack densities in function of the applied load if input data, such as the transverse strength (including statistical parameters of its distribution) and critical energy release rate characteristics in the cohesive laws, are correctly prescribed. These input parameters are difficult to determine experimentally, and their choice may be controversial. The paper investigates the influence of these parameters on the crack development history and discusses issues in their choice.