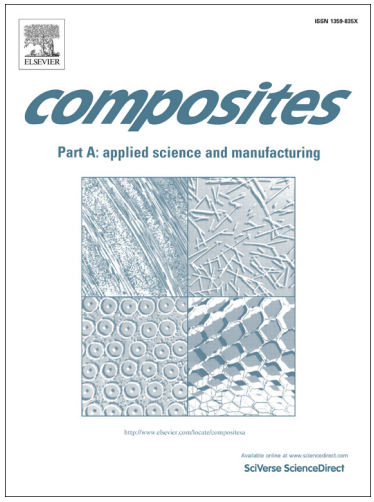

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Analytical prediction of damage due to large mass impact on thin ply composites

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Abstract

This article presents analytical models for predicting large mass impact response and damage in thin-ply composite laminates. Existing models for large mass impact (quasi-static) response are presented and extended to account for damage phenomena observed in thin-ply composites. The most important addition is a set of criteria for initiation and growth of bending induced compressive fibre failure, which has been observed to be extensive in thin ply laminates, while it is rarely observed in conventional laminates. The model predictions are compared to results from previous tests on CFRP laminates with a plain weave made from thin spread tow bands. The experiments seem to confirm the model predictions, but also highlight the need to include the effects of widespread bending induced fibre failure into the structural model.

Keywords

A. Material: Carbon fibre, Fabrics/textiles
B. Property: Impact behaviour
C. Analysis: Analytical modelling