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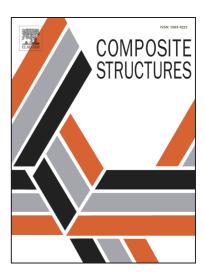
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Impact damage growth in carbon fibre aluminium laminates

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Abstract

The paper presents an analysis of the response of fibre metal laminate based on aluminium

and carbon fibre reinforced polymer to low-velocity impact. The comparison of the force-time

dependencies with the actual effects of the indenter–laminate system (using high-speed cameras)

contributed to the identification of the representative points and ranges that determine characteristic

changes in the laminate structure in terms of damage and specific forms of its degradation. The

authors proposed five damage states of aluminium-carbon lamiante during low-velocity impact. The

initial stages of the damage is associated with internal degradation and plastic deformation of the

laminate until the impact resistance of the fibre metal laminates indicated by the authors. Matrix

cracks, delaminations between composite layers with different orientation, as well as delaminations

at the metal/composite interface are the characteristic damage modes. The catastrophic failure with

cracking of the aluminum layers and composite materials and impactor penetration of the hybrid

laminate are the next stages. Identifying damage initiation, propagation and its stages in live-time

analysis of an aluminium-carbon laminate under impact may lead to making progress in this kind of

laminates and understanding and interpretation of the impact phenomena.

Keywords: carbon fibres, hybrid composites, impact behaviour, damage mechanics

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