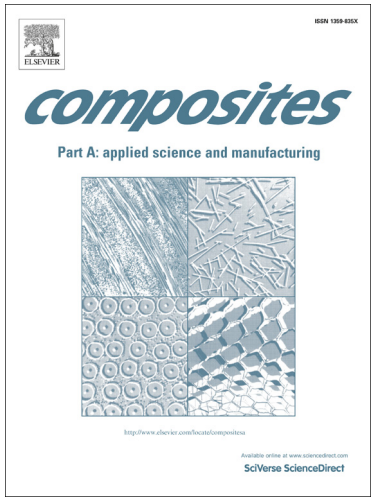

Analytical studies on the imperfection sensitivity and on the kink band inclination angle of unidirectional fiber composites

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Analytical studies on the imperfection sensitivity and on the kink band inclination angle of unidirectional fiber composites

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Abstract

Imperfections stemming from the manufacturing process influence the compressive strength and fiber kinking of unidirectional composites significantly. Therefore, the effect of initial fiber misalignment is addressed herein by revisiting a previous analytical model for unidirectional composites. The precursor model is improved by taking into account such imperfections and the formulations are subsequently validated against experimental data. Significant improvements are achieved for the accuracy of the initial compressive strength. The model is furthermore capable to determine the post-buckling response precisely which is of importance since composites can exhibit substantial post-buckling strength. The kink band geometry, especially its inclination angle β with respect to the fiber direction, is inherently related to the analytical formulations. However, to date no recognized expression for β

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