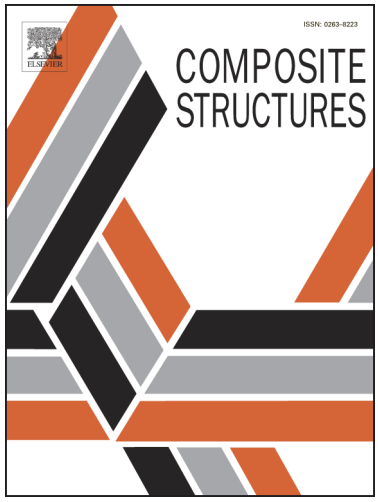

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Effect of tow thickness on the structural response of aerospace-grade spread-tow fabrics

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Abstract

The effect of ply thickness on the onset of intralaminar and interlaminar damage is extremely important for the structural response of laminated composite structures. This subject has gained particular interest in recent years due to the introduction in the market of spread-tow, ultra-thin carbon-fibre reinforcements with different configurations. In the present paper, an experimental test campaign was carried out to study the structural response of aerospace-grade plain weave spread-tow fabrics (STFs) of different areal weights. The results showed that, in spite of an apparent superior longitudinal tensile strength of the thick STF, the multidirectional thin-STF laminate exhibited an improved tensile unnotched strength over the thick-STF laminate, attributed to its damage suppression capability. However, damage suppression was also responsible for similar tensile notched strengths. In compression, the thin-STF laminate performed substantially better than the thick-STF laminate in both unnotched and notched configurations. Finally, a similar bearing response was obtained in both STF laminates, in spite of a slightly higher resistance of the thin-STF laminate to the propagation of subcritical damage mechanisms.

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